Gavin Fly Ash Reservoir

Gavin Power, LLC

2020 Annual Groundwater Monitoring and Corrective Action Report

Gavin Power Plant
Cheshire, Ohio

31 January 2021

Project No.: 0545239

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2020 Annual Groundwater Monitoring and Corrective Action Report

Gavin Power Plant
Cheshire, Ohio

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Acronyms and Abbreviations

Name	Description
ASD	Alternate Source Demonstration
CCR	Coal combustion residual
CFR	Code of Federal Regulations
ERM	ERM Consulting & Engineering, Inc.
FAR	Fly Ash Reservoir
Gavin	Gavin Power, LLC
Plant	General James M. Gavin Power Plant
RWL	Residual Waste Landfill
SSI	Statistically significant increase
TDS	Total dissolved solids

EXECUTIVE SUMMARY

On behalf of Gavin Power, LLC (Gavin), ERM Consulting & Engineering, Inc. (ERM) has prepared this *2020 Annual Groundwater Monitoring and Corrective Action Report* summarizing groundwater sampling activities at the Fly Ash Reservoir (FAR) at the General James M. Gavin Power Plant (Plant) in Cheshire, Ohio. The FAR is one of three regulated coal combustion residual (CCR) management units at the Plant that are subject to regulation under Title 40, Code of Federal Regulations, Part 257, Subpart D (40 CFR § 257.50 *et seq.*), also known as the CCR Rule. A review of the CCR monitoring well network is documented in the *Groundwater Monitoring Network Evaluation* for the FAR (Geosyntec 2016).

This report documents the status of the groundwater monitoring program for the FAR, which includes the following as required by 40 CFR § 257.90(e):

- A summary of key actions completed;
- A description of problems encountered and actions taken to resolve the problems; and
- Identification of key activities for the coming year.

The FAR CCR unit groundwater monitoring program began 2020 in a "detection monitoring" program status as defined by 40 CFR § 257.94 and remains in detection monitoring at the end of the 2020 reporting period. Groundwater monitoring in 2020 consisted of two semiannual monitoring events completed in March and September 2020, which included groundwater level measurements and subsequent groundwater sampling. Groundwater level measurements were used to construct updated groundwater potentiometric surface maps for each of the geologic units monitored.

Groundwater samples were collected for laboratory analysis of CCR Rule Appendix III constituents and the results were compared to previously calculated upgradient well prediction limits to identify statistically significant increases (SSIs) for downgradient wells. The following locations and analytes exhibited SSIs in 2020:

Well	Date Sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids (TDS)
2016-07	15 March 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	24 March 2020	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	17 Sept 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
2016-08	15 March 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	24 March 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	17 Sept 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
9910	15 March 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	17 Sept 2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase

The SSI at well 2016-07 was evaluated in the attached *First Semiannual Sampling Event of 2020 Alternate Source Demonstration Report* (ERM 2020c). The ASD report identifies cement-bentonite grout from well installation of adjacent well 2016-08 as the source of this SSI; therefore, 2016-07 remains in detection monitoring at the conclusion of 2020. Accordingly, no remedial actions were selected, initiated, or performed in 2020.

1. INTRODUCTION

The General James M. Gavin Power Plant (Plant) is a coal-fired generating station located in Gallia County in Cheshire, Ohio, along the Ohio River. The Plant encompasses three regulated coal combustion residual (CCR) management units that are subject to regulation under Title 40, Code of Federal Regulations, Part 257, Subpart D (40 CFR § 257.50 *et seq.*), also known as the CCR Rule: the Residual Waste Landfill (RWL), the Fly Ash Reservoir (FAR), and the Bottom Ash Pond. The FAR is approximately 300 acres in area and located 2.5 miles northwest of the Plant (Figure 1-1). From the mid-1970s until January 1995, fly ash was sluiced from the Plant to the former Stingy Run stream valley. The settled CCR materials were retained behind the Stingy Run Fly Ash Dam in the FAR. After January 1995, CCR materials were placed in the state-permitted RWL. Following the promulgation of the CCR Rule, a Closure Plan was prepared under the requirements of 40 CFR § 257.102 in October 2016 (AEP 2016). Closure of the Fly Ash Reservoir was ongoing in 2020 and will be completed in 2021.

This report was produced by ERM Consulting & Engineering, Inc. (ERM), on behalf of Gavin Power, LLC (Gavin), and documents the status of the groundwater monitoring program for the FAR, which includes the following as required by 40 CFR § 257.90(e):

- A summary of key actions completed;
- A description of problems encountered and actions taken to resolve the problems; and
- Identification of key activities for the coming year.

Consistent with the notification requirements of the CCR Rule, this annual groundwater monitoring report will be posted to the Plant operating record no later than 31 January 2021 (40 CFR § 257.105(h)(1)). Within 30 days of placing the report in the operating record, notification will be made to the Ohio Environmental Protection Agency, and the report will be placed on the Plant publicly accessible internet site (40 CFR § 257.106(h)(1), 257.107(h)(1)). Table 1-1 cross-references the reporting requirements under the CCR Rule with the contents of this report.

Table 1-1: Regulatory Requirement Cross-References

Regulatory Citation in 40 CFR Part 257, Subpart D	Requirement (paraphrased)	Where Addressed in This Report
§ 257.90(e)	Status of the groundwater monitoring program.	Section 2
§ 257.90(e)	Summarize key actions completed.	Sections 2.3 and 3.1
§ 257.90(e)	Describe any problems encountered and actions taken to resolve problems.	Section 2.3
§ 257.90(e)	Key activities for upcoming year.	Section 4.0
§ 257.90(e)(1)	Map, aerial image, or diagram of coal combustion residual (CCR) Unit and monitoring wells.	Figure 2-1
§ 257.90(e)(2)	Identification of new monitoring wells installed or abandoned during the preceding year and narrative description.	Sections 2.1, 4.0
§ 257.90(e)(3)	Summary of groundwater data, wells sampled, date sampled, and whether sampling was required under detection or assessment monitoring.	Section 2.3, 3.2, Appendix C
§ 257.90(e)(4)	Discussion of any transition between monitoring programs.	Section 4.0
§ 257.93(c) (via § 257.90(e)(5))	Rate and direction of groundwater flow each time groundwater is sampled	Section 3.1
§ 257.94(e)(2) (via § 257.90(e)(5))	Any Alternate Source Demonstration (ASD) reports and related certifications.	Appendix A

2. PROGRAM STATUS 40 CFR § 257.90(e)

2.1 Monitoring Well Network

Hydrogeology within the FAR is characterized by a shallow zone of saturation that overlies an upper aquifer system that consists of sandstone and interbedded clay and shale units. The uppermost aquifer system, which includes the Morgantown Sandstone and the Cow Run Sandstone, is overlain by the Clarksburg Red Beds, which act as a confining layer.

The CCR groundwater monitoring network is documented in the *Groundwater Monitoring Network Evaluation* for the FAR (Geosyntec 2016). Figure 2-1 provides the Morgantown and Cow Run monitoring well locations on the site location map. Wells 2016-01 and 2016-02 in the federal sampling program were decommissioned in 2019, after the fall sampling event, due to the permitted expansion activities associated with the RWL (Figure 2-1).

2.2 Previous Groundwater Monitoring Activities

The FAR monitoring wells were sampled eight times between August 2016 and July 2017 to establish upgradient well baseline data. Prediction limits were developed using the baseline data and compared to the July 2017 downgradient well results, consistent with the CCR Rule and the Groundwater Monitoring Plan Appendix G Statistical Analysis Plan developed for Gavin (ERM 2017). This comparison resulted in the identification of statistically significant increases (SSIs) for Appendix III analytes in the downgradient FAR wells, which were reported in the *2017 Annual Groundwater Monitoring and Corrective Action Report* (ERM 2018a). ERM prepared an Alternate Source Demonstration (ASD) Report (ERM 2018b) to address these SSIs. Downgradient results from the spring and fall sampling events in 2018 and 2019 were reported in the *2018 Annual Groundwater Monitoring and Corrective Action Report* and *2019 Annual Groundwater Monitoring and Corrective Action Report* (ERM 2019a and ERM 2020a) and SSIs associated with the 2018 and 2019 results were addressed in additional ASD reports (ERM 2018c, ERM 2019b, ERM 2019c, ERM 2020b). Each ASD report concluded that SSIs resulted from alternate sources, and thus the CCR unit remained in detection monitoring. Table 2-1 and Table 2-2 below summarize SSIs identified in 2017, 2018, and 2019.

Table 2-1: Previous SSIs for Morgantown Downgradient Wells

Well	Date Sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
2016-01	Jul-2017	ϕ	ϕ	ϕ	X	ϕ	ϕ	ϕ
	Mar-2018	ϕ	ϕ	ϕ	X	X	ϕ	ϕ
	Sep-2018	ϕ	ϕ	ϕ	X	X	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
2016-07	Jul-2017	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
9910	Jul-2017	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
	Mar-2018	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
	Sep-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; NA = Not Applicable; SSI = statistically significant increase

Table 2-2: Previous SSIs for Cow Run Downgradient Wells

Well	Date Sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
2016-02	Jul-2017	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2018	ϕ	X	X	ϕ	ϕ	ϕ	ϕ
	Sep-2018	ϕ	X	X	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	X
	Sep-2019	ϕ	X	ϕ	ϕ	ϕ	ϕ	X
2016-08	Jul-2017	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	May-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; NA = Not Applicable; SSI = statistically significant increase

2.3 2020 Sampling Summary

Groundwater samples were collected in 2020 as part of the detection monitoring program under 40 CFR § 257.94 and analyzed for the constituents listed in Appendix III to 40 CFR Part 257, Subpart D. Tables 2-3 and 2-4 provide a summary of the 2020 sample dates and the well gradient designation (upgradient or downgradient of the CCR unit) for the FAR monitoring well network.

Several monitoring wells could not be sampled due to insufficient water, significant depths to groundwater and/or pump malfunctions in 2020. In an effort to resolve these and other sampling challenges that resulted in the inability to collect samples in 2020, pump inspection and modifications in selected wells is planned for 2021.

Table 2-3: 2020 Sampling Dates for FAR Morgantown Well Network

Sample Date	Upgradient Wells							Downgradient Wells	
	2016-03	2016-05	2016-11	96148	96152	96153R	96154R	2016-07	9910
12 March 2020							X		
13 March 2020			Dry						
15 March 2020		Dry				X		X	X
24 March 2020						X		X	
25 March 2020	X								
26 March 2020				Dry	X				
14 Sept 2020			Dry				X		
15 Sept 2020						X			
17 Sept 2020		Dry			X			X	X
21 Sept 2020	X								
27 Oct 2020				X					

Notes: FAR = Fly Ash Reservoir; NS = not sampled
Sampling of certain Morgantown wells was limited in 2020 by the following factors:
(1) Wells with sampling events marked with "Dry" had an insufficient volume of water to allow collection of samples.
(2) Samples for 96153R and 2016-07 were collected on 15 March 2020, misplaced, and resampled on 24 March 2020. The initial samples were later found and both samples were analyzed.
(3) Upgradient well 96156 was noted as damaged and could not be sampled in 2020.

Table 2-4: 2020 Sampling Dates for FAR Cow Run Well Network

Sample Date	Upgradient Wells						Downgradient Wells
	2016-04	2016-06	2016-09	2016-10	96147	MW-20	2016-08
12 March 2020			X				
15 March 2020		X				X	X
24 March 2020						X	X
25 March 2020	X						
26 March 2020					X		
30 March 2020				X			
14 Sept 2020			X	X			
15 Sept 2020						X	
17 Sept 2020		X					X
21 Sept 2020	X						
23 Sept 2020					Dry		

Notes: FAR = Fly Ash Reservoir; NS = not sampled
Sampling of certain Cow Run wells was limited in 2019 by the following factors:
(1) Samples for MW-20 and 2016-08 were collected on 15 September 2020, misplaced, and resampled on 24 March 2020. The initial samples were later found and both samples were analyzed.

2.4 Monitoring Well Installation

As reported in the initial FAR ASD Report for 2017 (ERM 2018b), Gavin intended to install additional monitoring wells along the downgradient boundary of the FAR in 2018. In December 2018, Gavin advanced a boring downgradient of the FAR, but the Morgantown Sandstone was absent and the confining layer above the Cow Run Sandstone was not sufficiently competent to properly install casing. The drilling program was therefore suspended at that time. Gavin plans to evaluate the potential to resume monitoring well installation at the downgradient boundary of the FAR after construction activities at the northern end of the RWL, which were completed in December 2020.

2.5 Data Quality

ERM reviewed field and laboratory documentation to assess the validity, reliability, and usability of the analytical results. Samples collected in 2020 were analyzed by TestAmerica of North Canton, Ohio. Data quality information reviewed for these results included field sampling forms, chain-of-custody documentation, holding times, laboratory methods, cooler temperatures, laboratory method blanks, laboratory control sample recoveries, field duplicate samples, matrix spikes/matrix spike duplicates, quantitation limits, and equipment blanks. Data qualifiers were appended to the results in the project database as appropriate based on laboratory quality measurements (e.g., control sample recoveries) and field quality measurements (e.g., agreement between normal and field duplicate samples). The data quality review found the laboratory analytical results to be valid, reliable, and usable for decision-making purposes with the listed qualifiers. No analytical results were rejected.

3. 2020 RESULTS

3.1 2020 Groundwater Flow Direction and Velocity

Depth to groundwater measurements were collected in March and September 2020 at each monitoring well prior to each sampling event. Groundwater elevations, calculated by subtracting the depth to groundwater from the surveyed reference elevation for each well, were established for each sampling event. Groundwater elevations, interpreted potentiometric surface maps, and interpreted groundwater flow directions for wells screened in the Morgantown Sandstone and Cow Run Sandstone for March and September 2020 are presented on Figures 3-1 through 3-4.

The principal direction of groundwater flow in the uppermost aquifer system under the FAR (both in the Morgantown Sandstone and Cow Run Sandstone) is from the north and northwest to the south and southeast, toward the Ohio River. Groundwater velocity estimates are presented in the next sections.

3.1.1 Morgantown Sandstone Groundwater Velocity

Horizontal hydraulic gradients were calculated for the Morgantown Sandstone using groundwater elevations calculated at wells 96154R and 2016-21 for both the spring and fall sampling events. The velocity of groundwater through the Morgantown sandstone is estimated based on the measured horizontal hydraulic gradient, a hydraulic conductivity of 7.18×10^{-5} centimeters per second (Geosyntec 2012), and an estimated effective porosity value of 0.01 for fractured bedrock. For the spring sampling event, a horizontal hydraulic gradient of 0.0103 was calculated, resulting in an estimated groundwater velocity of 77 feet/year. For the fall sampling event, a horizontal hydraulic gradient of 0.0101 was calculated, resulting in an estimated groundwater velocity of 75 feet/year.

3.1.2 Cow Run Sandstone Groundwater Velocity

Horizontal hydraulic gradients were calculated for the Cow Run Sandstone using groundwater elevations calculated at wells 2016-09 and 9631 for both the fall and spring sampling events. The velocity of groundwater through the Cow Run sandstone is estimated based on the measured horizontal hydraulic gradient, a hydraulic conductivity of 2.92×10^{-5} centimeters per second (Geosyntec 2012), and an effective porosity value of 0.01 for fractured bedrock. For the spring sampling event, a horizontal hydraulic gradient of 0.009 was calculated, resulting in an estimated groundwater velocity of 26 feet/year. For the fall sampling event, a horizontal hydraulic gradient of 0.011 was calculated, resulting in an estimated groundwater velocity of 32 feet/year.

3.2 Comparison of Results to Prediction Limits

Consistent with the CCR Rule and the Gavin Statistical Analysis Plan (ERM 2017), a prediction limit approach was used to identify potential impacts to groundwater. Upper prediction limits were developed for the Appendix III parameters; in the case of pH, a lower prediction limit was also developed. The 2018 Alternate Source Demonstration (ERM 2018b) provides documentation of the most recent revisions of the upper and lower prediction limits for the FAR.

3.2.1 March 2020 Sampling Event Results

Tables 3-1 and 3-2 summarize SSIs observed in the Morgantown and Cow Run downgradient wells for the first semiannual sampling event of 2020. The field sampling event was conducted between 15 March and 26 March 2020.

Table 3-1: SSIs from March 2020 Sampling Event – Morgantown

Analyte	Monitoring Well		
	2016-07 (3/15/20)	2016-07 (3/24/20)	9910
Boron	ϕ	ϕ	ϕ
Calcium	ϕ	ϕ	ϕ
Chloride	ϕ	ϕ	ϕ
Fluoride	ϕ	ϕ	ϕ
pH	ϕ	X	ϕ
Sulfate	ϕ	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase
Results are for the downgradient wells sampled on 15–24 March 2020.

Table 3-2: SSIs from March 2020 Sampling Event – Cow Run

Analyte	Monitoring Well	
	2016-08 (3/15/20)	2016-08 (3/24/20)
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase
Results are for the downgradient wells sampled on 15–24 March 2020.

An alternate source was identified for this pH SSI at 2016-07 from the March sampling event as documented in the *First Semiannual Sampling Event of 2020 Alternate Source Demonstration Report* (ERM 2020c). This ASD report identified cement-bentonite grout from the construction of adjacent well 2016-08 as the alternate sources for these SSIs.

3.2.2 September 2020 Sampling Event Results

Tables 3-3 and 3-4 summarize SSIs observed in the Morgantown and Cow Run downgradient wells for the second semi-annual sampling event of 2020. The field sampling event was conducted between 14 September and 27 October 2020.

Table 3-3: SSIs from September 2020 Sampling Event – Morgantown

Analyte	Monitoring Well	
	2016-07	9910
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase
Results are for the downgradient wells sampled on 17 September 2020.

Table 3-4: SSIs from September 2020 Sampling Event – Cow Run

Analyte	Monitoring Well
	2016-08
Boron	ϕ
Calcium	ϕ
Chloride	ϕ
Fluoride	ϕ
pH	ϕ
Sulfate	ϕ
Total Dissolved Solids	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase
Results are for the downgradient wells sampled on 17 September 2020.

No SSIs were identified for this semiannual sampling event. Appendix B provides a summary of all historical and current analytical results obtained from the FAR groundwater monitoring program.

4. KEY FUTURE ACTIVITIES

The six ASD reports prepared to date demonstrated that sources other than the FAR were responsible for the identified SSIs. As required by 40 CFR § 257.94(e)(2), the demonstrations were completed within 90 days of detecting the SSIs and were certified by a qualified Professional Engineer and the FAR currently remains in detection monitoring status. Therefore, two groundwater sampling events will be performed in 2021 at the FAR.

In accordance with an Ohio Environmental Protection Agency-issued Permit-to-Install, the Plant intends to continue expanding the RWL to the northwest in 2021. Following the RWL expansion, the Plant intends to evaluate the potential to install additional wells at the downgradient boundary of the FAR. Additionally, Gavin will evaluate the potential for repair or replacement of well 96156 in 2021. The installation of the liner at the FAR was completed in November 2020, such that surface water is no longer in contact with ash. The FAR closure is expected to be completed in 2021 and Gavin will begin post-closure care.

5. REFERENCES

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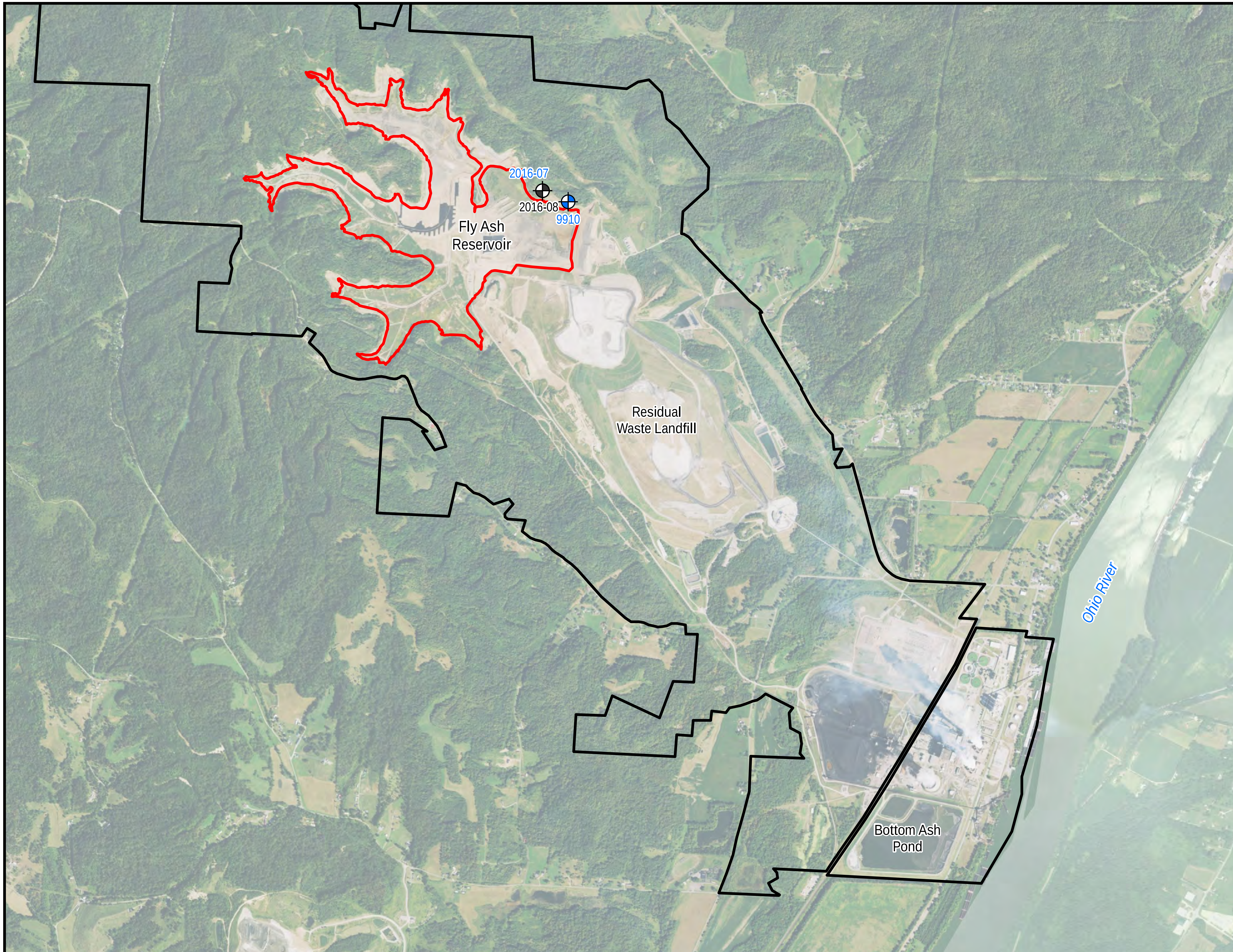
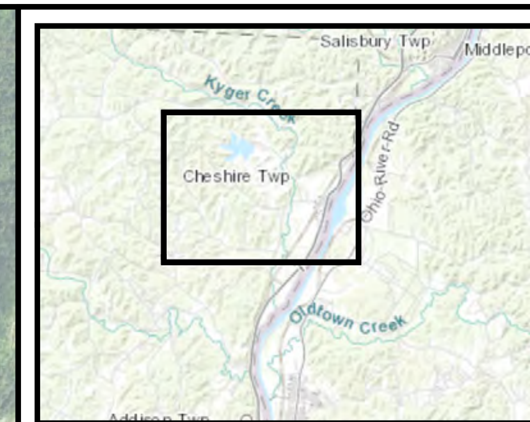
FIGURES





Legend

- Morgantown Downgradient Monitoring Well
- Cow Run Downgradient Monitoring Well
- Fly Ash Reservoir Approximate Edge of Final Cover
- Gavin Property Boundary

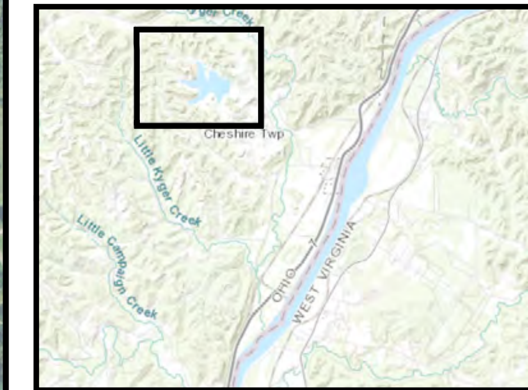
NOTE:
1. Edge of Final Cover from FAR Closure Plan (Geosyntec 2016)

N

0 500 1,000 2,000 3,000 4,000
Feet

Figure 1-1: Fly Ash Reservoir Location
Gavin Generating Station
Cheshire, Ohio

ERM



Legend

- Federal Sampling Program Monitoring Well (Morgantown Sandstone)
- Federal Sampling Program Monitoring Well (Cow Run sandstone)
- Monitoring Well Decommissioned in Fall 2019
- Fly Ash Reservoir Approximate Edge of Final Cover

NOTES:
1. Locations are approximate
2. Aerial Imagery: USA NAIP 2019
3. Edge of Final Cover from FAR Closure Plan (Geosyntec 2016)

0 170 340 680 1,020 1,360
Feet

Figure 2-1: Monitoring Well Network Map

Gavin Generating Station
Cheshire, Ohio

ERM

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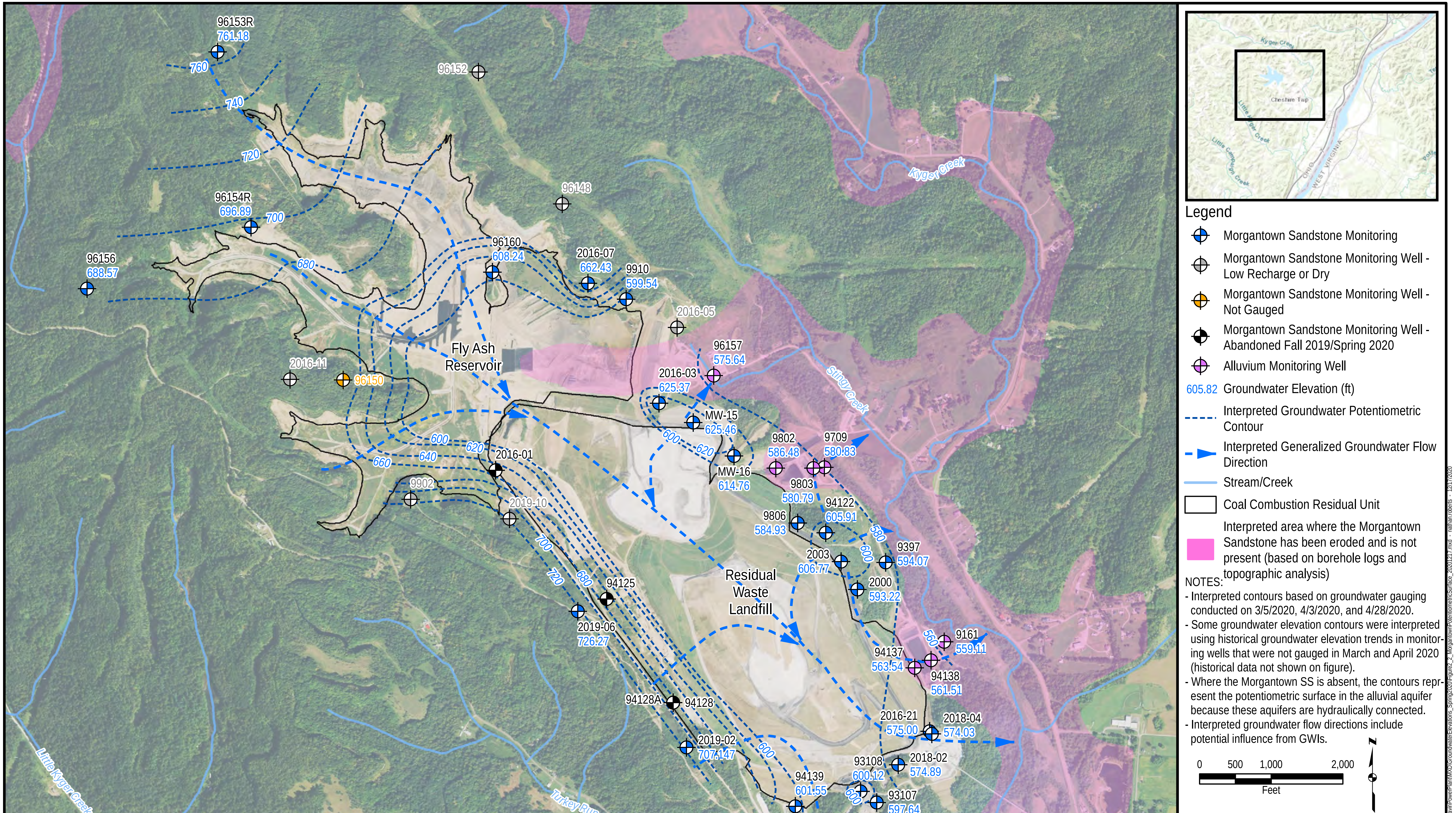
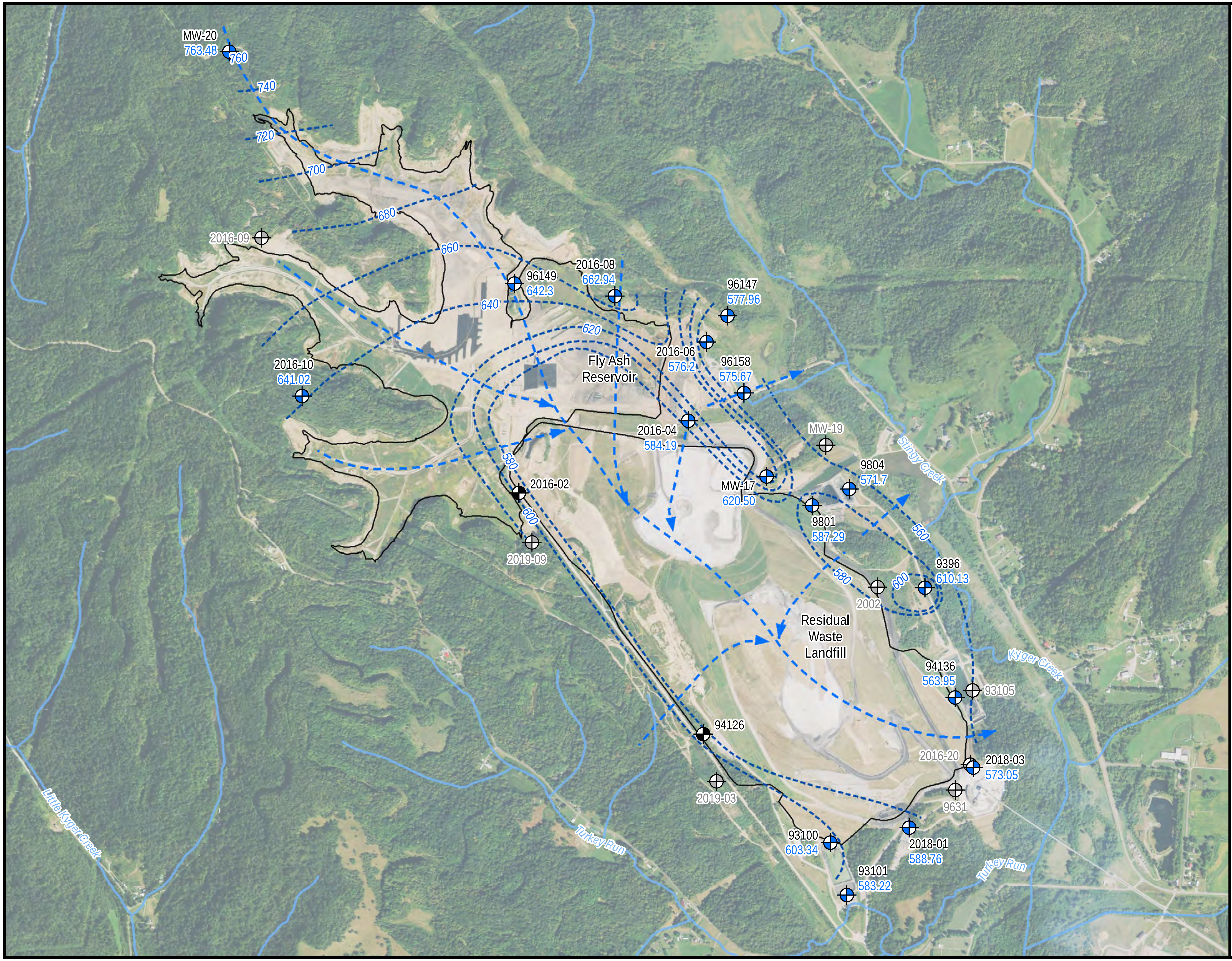
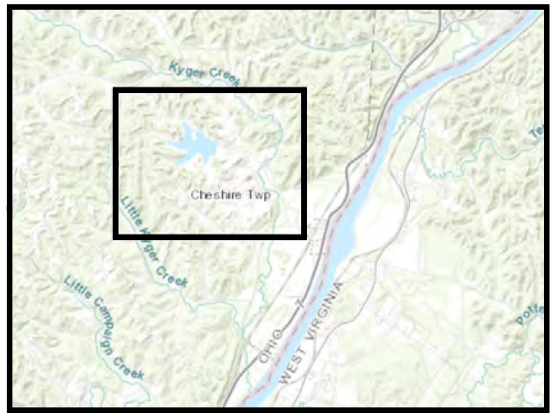


NOTES:
- Interpreted contours based on groundwater gauging conducted on 3/5/2020, 4/3/2020, and 4/28/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in March and April 2020 (historical data not shown on figure).
- Where the Morgantown SS is absent, the contours represent the potentiometric surface in the alluvial aquifer because these aquifers are hydraulically connected.
- Interpreted groundwater flow directions include potential influence from GWIs.

Figure 3-1: Morgantown Sandstone Potentiometric Surface Map
March and April 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Cow Run Sandstone Monitoring Well
- Cow Run Sandstone Well - Dry or Low Recharge
- Cow Run Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit

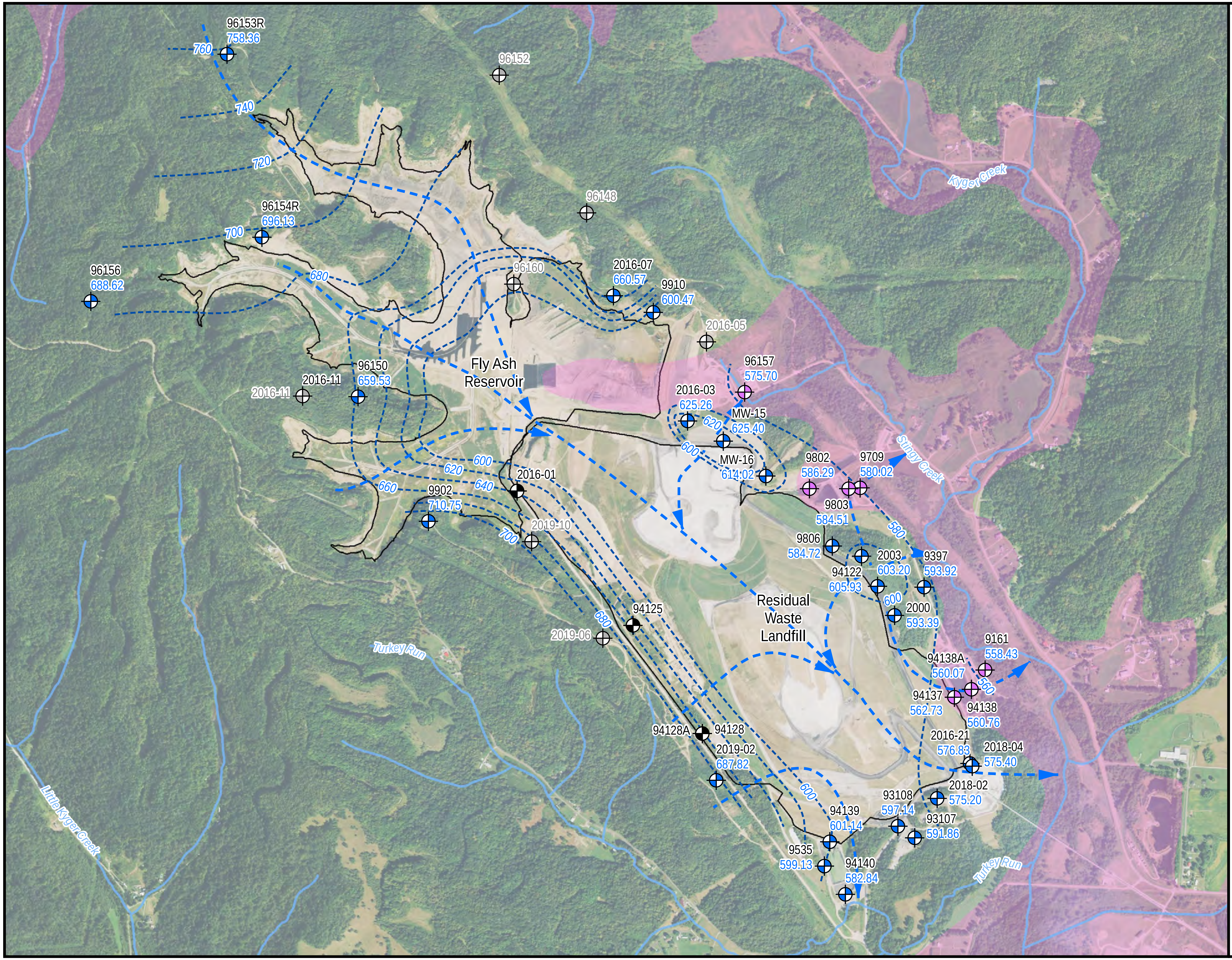
NOTES:
- Cow Run Sandstone is present through entire site.
- Interpreted contours based on groundwater gauging conducted on 3/5/2020, 4/3/2020, and 4/28/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in March and April 2020 (historical data not shown on figure).

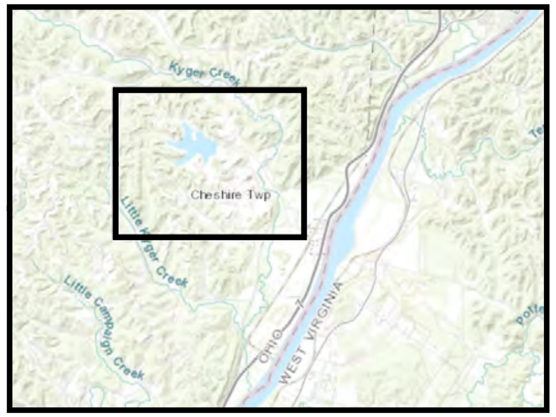
N

0 500 1,000 2,000
Feet

Figure 3-2: Cow Run Sandstone Potentiometric Surface Map March and April 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Morgantown Sandstone Monitoring
- Morgantown Sandstone Monitoring Well - Low Recharge, Dry, or Data Anomaly
- Morgantown Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- Alluvium Monitoring Well
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual
- Interpreted area where the Morgantown Sandstone has been eroded and is not present (based on borehole logs and topographic analysis)

NOTES:

- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).
- Where the Morgantown SS is absent, the contours represent the potentiometric surface in the alluvial aquifer because these aquifers are hydraulically connected.
- Interpreted groundwater flow directions include potential influence from GWIs.

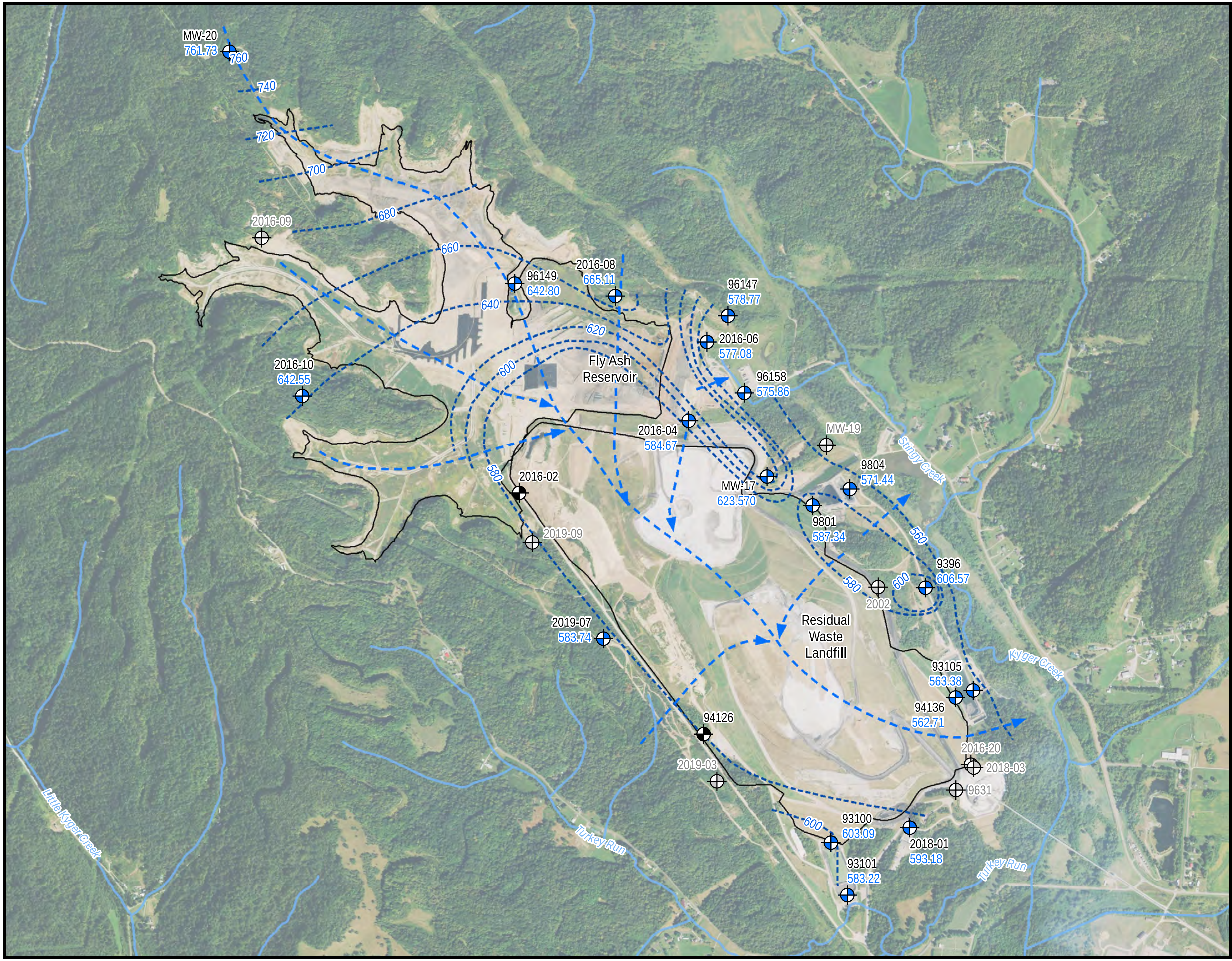
N

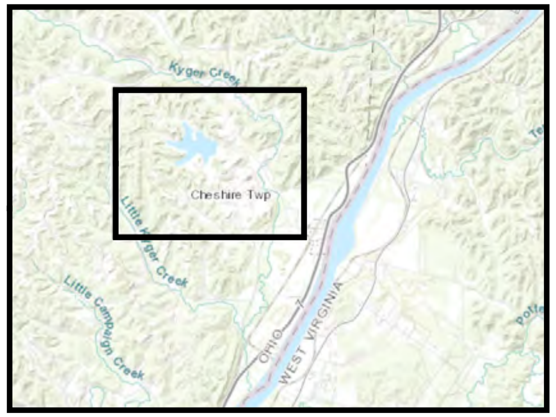
0 500 1,000 2,000

Feet

Figure 3-3: Morgantown Sandstone Potentiometric Surface Map
September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Cow Run Sandstone Monitoring Well
- Cow Run Sandstone Well - Low Recharge, Dry, or Data Anomaly
- Cow Run Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit

NOTES:
- Cow Run Sandstone is present through entire site.
- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).

N

0 500 1,000 2,000
Feet

Figure 3-4: Cow Run Sandstone Potentiometric Surface Map
September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM

APPENDIX A GAVIN FLY ASH RESERVOIR FIRST SEMIANNUAL SAMPLING EVENT OF 2020 ALTERNATE SOURCE DEMONSTRATION REPORT

Gavin Fly Ash Reservoir

Gavin Power, LLC

First Semiannual Sampling Event of 2020
Alternate Source Demonstration Report

Gavin Power Plant
Cheshire, Ohio

27 August 2020

Project No.: 0545239

The business of sustainability

ERM

Signature Page

27 August 2020

Gavin Fly Ash Reservoir

First Semiannual Sampling Event of 2020 Alternate Source Demonstration Report

Gavin Power Plant
Cheshire, Ohio

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Acronyms and Abbreviations

Name	Definition
ASD	Alternate Source Demonstration
bgs	Below ground surface
CCR	Coal Combustion Residuals
CCR Rule	Coal Combustion Residuals in Landfills and Surface Impoundments
CCR Unit	Fly Ash Reservoir CCR Surface Impoundment
CFR	Code of Federal Regulations
FAR	Fly Ash Reservoir
Gavin	Gavin Power, LLC
µg/L	Micrograms per Liter
Plant	General James M. Gavin Power Plant
RWL	Residual Waste Landfill
SSI	Statistically significant increase
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

1.1 Regulatory and Legal Framework

In accordance with 40 Code of Federal Regulations (CFR) Part 257 Subpart D—Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments (CCR Rule)—Gavin Power, LLC (Gavin) has been implementing the groundwater monitoring requirements of 40 CFR § 257.90 et seq. for its Fly Ash Reservoir (FAR) CCR Surface Impoundment at the General James M. Gavin Power Plant (Plant). Gavin calculated background levels and conducted statistical analyses for Appendix III constituents in accordance with 40 CFR § 257.93(h). Currently, Gavin is performing detection monitoring at the FAR in accordance with 40 CFR § 257.94. A statistically significant increase (SSI) over background concentrations was detected in a downgradient monitoring well for one Appendix III constituent for the first half of 2020 and is discussed in this First Semiannual Sampling Event of 2020 Alternate Source Demonstration (ASD) report.

An SSI for one or more Appendix III constituents is a potential indication of a release of constituents from the CCR unit to groundwater. In the event of an SSI, the CCR Rule provides that "the owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality" (40 CFR § 257.94(e)(2)). If it can be demonstrated that the SSI is due to a source other than the CCR unit, then the CCR unit may remain in the Detection Monitoring Program instead of transitioning to an Assessment Monitoring Program. An ASD must be made in writing and the accuracy of the information must be verified through certification by a qualified Professional Engineer (40 CF § 257.94(e)(2)).

The United States Environmental Protection Agency (USEPA) guidance document, "Solid Waste Disposal Facility Criteria Technical Manual, USEPA 530-R-93-017, Subpart E" (USEPA 1993), specifies six lines of evidence (listed below) that must be addressed to determine whether an SSI resulted from a source other than the regulated disposal unit.

1. An alternative source exists.
2. A hydraulic connection exists between the alternative source and the well with the significant increase.
3. Constituent(s) (or precursor constituents) are present at the alternative source or along the flow path from the alternative source prior to possible release from the unit.
4. The relative concentration and distribution of constituents in the zone of contamination are more strongly linked to the alternative source than to the unit when the fate and transport characteristics of the constituents are considered.
5. The concentration observed in groundwater could not have resulted from the unit given the waste constituents and concentrations in the unit leachate and wastes and the site hydrogeologic conditions.
6. The data supporting conclusions regarding the alternative source are historically consistent with the hydrogeologic conditions and findings of the monitoring program.

This ASD Report addresses each of these lines of evidence for the SSI detected in the groundwater beneath the FAR.

1.2 Background

The Plant is a coal-fired generating station located along the Ohio River in Gallia County in Cheshire, Ohio, (Figure 1-1). The FAR is one of three CCR units at the Plant that are subject to regulation under the CCR Rule. The FAR is approximately 300 acres and is located about 2.5 miles northwest of the Plant (Figure 1-2). From the mid-1970s until January 1995, fly ash was sluiced from the Plant to the former Stingy Run stream valley. The settled CCR materials were retained behind the Stingy Run Fly Ash Dam that formed the FAR.

A Groundwater Monitoring Network Evaluation was performed to provide an assessment of the compliance of the groundwater monitoring network with 40 CFR §257.91. This evaluation identified an uppermost aquifer composed of sandstone and interbedded clay shale units, specifically the Morgantown Sandstone and Cow Run Sandstone, and indicated groundwater flows to the south and east (Geosyntec 2016). A prediction limit approach was used to identify potential impacts to groundwater, consistent with the CCR Rule and the Groundwater Monitoring Plan developed for Gavin (ERM 2017). Upper and lower prediction limits were established based on the upgradient groundwater data. A number of reports were previously prepared and posted to identify alternate sources for SSIs during their respective sampling periods (ERM 2018a-2019b; ERM 2020b).

This ASD Report addresses one SSI for samples collected in March 2020 from the Morgantown and Cow Run monitoring wells, as summarized in Tables 1-1 and Table 1-2, respectively.

Table 1-1: SSIs in FAR Morgantown Monitoring Wells

Analyte	2016-07 (03/15/20)*	2016-07 (03/24/20)	9910
Boron	ϕ	ϕ	ϕ
Calcium	ϕ	ϕ	ϕ
Chloride	ϕ	ϕ	ϕ
Fluoride	ϕ	ϕ	ϕ
pH	ϕ	X	ϕ
Sulfate	ϕ	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ	ϕ

ϕ = No SSI; X = SSI
Samples collected on 15 March at 2016-07 were collected but misplaced and the well was resampled on 24 March. The original samples were then found and analyzed. Both results are presented and discussed in this report.
Well 2016-01 was abandoned in fall 2019 due to landfill expansion.

Table 1-2: SSIs in FAR Cow Run Monitoring Wells

Analyte	2016-08 (3/15/20)*	2016-08 (3/24/20)
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ

ϕ = No SSI; X = SSI
Samples collected on 15 March at 2016-07 were collected but misplaced and the well was resampled on 24 March. The original samples were then found and analyzed. Both results are presented and discussed in this report.
Well 2016-02 was abandoned in fall 2019 due to landfill expansion.

The locations of wells 2016-07, 2016-08 and 9910 are presented in Figure 1-2. This ASD Report identifies an alternate source for the SSI of pH in well 2016-07. Supporting information and discussions of each of the lines of evidence in Section 1.1 are presented in subsequent sections of this report.

2. HYDROGEOLOGIC INTERPRETATION

A detailed interpretation of hydrogeological conditions can be found in the Gavin FAR ASD Report (ERM 2018a). Key conclusions from that analysis, and a review of the most recent potentiometric surface map presented in Figure 2-1, are listed below.

- The section of the aquifer under the southeastern portion of the FAR and extending toward the southeast under the Residual Waste Landfill (RWL) in the Morgantown Sandstone contains a region of lower hydraulic pressure (in comparison to the surrounding areas), as depicted on Figure 2-1. This area of lower hydraulic head (i.e., pressure) is located under portions of the FAR and RWL that have received CCR materials which act to reduce infiltration due to their lower permeability and where an engineered geosynthetic liner system has been installed beneath the RWL. The forested and pastured areas surrounding the FAR and RWL are more permeable and exhibit greater infiltration than the fine-grained, compacted material within the FAR and RWL. Groundwater flows from the areas of higher pressure surrounding the FAR and RWL toward areas of lower pressure below the FAR and RWL.
- On the western side of the FAR, groundwater flows from west to east toward the groundwater trough and then turns to the southeast, flowing toward the Ohio River.
- On the northeastern boundary of the FAR, groundwater flows from north to south and then turns to the southeast, flowing toward the Ohio River.

3. DESCRIPTION OF ALTERNATE SOURCES

3.1 pH

A pH value above the upper prediction limit was identified at Morgantown well 2016-07 for the sample collected on 24 March 2020. Morgantown monitoring well 2016-07 and Cow Run monitoring well 2016-08 were installed in close proximity to each other, as a well couplet. During well installation on 23 March 2016, well 2016-08 was installed with a screened interval of 182-192 ft below ground surface (bgs) and sand filled the annular space between the well screen and borehole. Bentonite chips sealed the annular space above the sand pack (175–182 ft bgs) and the remainder of the annular space between the well riser and borehole was filled with cement-bentonite grout (0–175 ft bgs). Given that the cement-bentonite grout was pumped into the annular space between the monitoring well riser and the borehole, the cement-bentonite grout may have penetrated the fractures within the bedrock surrounding well 2016-08. Three days later, on 29 March 2016, well 2016-07 was installed approximately 10 ft away with the screened interval from 93-103 ft bgs. This means the screened interval of well 2016-07 is within the same interval as the portion of the 2016-08 borehole that was sealed with cement-bentonite grout.

During sampling events, monitoring wells are purged to draw groundwater through their screened intervals. When wells are purged for longer durations or multiple times in a short period, the radius of influence (the zone from which water is extracted) increases around the screened interval of the well. During purging of well 2016-07 on 15 March 2020, the pH of the extracted groundwater increased from 8.86 to 9.85, and when the same monitoring well was purged again on 24 March 2020, the pH increased from 10.06 to 11.98. These data suggest that the multiple purging events likely resulted in the extraction of groundwater impacted by cement-bentonite grout associated with nearby well 2016-08.

Impacts on groundwater quality caused by cement-bentonite grout are typically associated with groundwater pH values above 10 (Pohlmann and Alduino 1992). In low-permeability formations, the impacts of grout materials may persist for significant periods of time due to the slower rate of flushing of the well screen by migrating groundwater (Pohlmann and Alduino 1992; Barcelona et al. 1988). Based on the elevated pH values observed at this well between August 2016 and March 2020, it appears that close proximity well construction permitted interwell interference; thus, the alternate source of the elevated pH is likely cement-bentonite grout used during well construction.

Additionally, cement-bentonite grout-impacted groundwater tends to have elevated concentrations of potassium and calcium relative to typical groundwater (Barcelona and Helfrich 1986; Gradient 2013). Consistent with this trend, when the analytical results of the 15 March 2020 sample are compared to the 24 March 2020 sample results, calcium increased from 6,000 micrograms per liter (μg/L) to 34,000 μg/L and potassium increased from 4,300 μg/L to 7,400 μg/L. These concentration increases at well 2016-07 support the likelihood that the larger sampling radius was drawing groundwater impacted by cement-bentonite grout used to construct well 2016-08.

4. HYDRAULIC CONNECTIONS TO THE ALTERNATE SOURCES

4.1 pH

As described in Section 3.1, the source of the elevated pH in well 2016-07 is postulated to be cement-based grout used to construct well 2016-08. The cement-based grout pumped into 2016-08 during construction could have migrated into fractures intersected by the borehole. Groundwater migrating through these fractures could contact the grout and be subsequently captured during the sampling of nearby well 2016-07. Thus, the alternate source of elevated pH (cement-bentonite grout) is likely hydraulically connected with groundwater entering well 2016-07.

5. CONSTITUENTS ARE PRESENT AT THE ALTERNATE SOURCES OR ALONG FLOW PATHS

5.1 pH

Cement mixtures are strongly basic and can have a pH between 12 and 13 (Portland Cement Association 2018). Groundwater purged from well 2016-07 likely contacted uncured cement-bentonite grout surrounding well 2016-08 and the elevated pH has persisted 4 years after well installation due to the naturally low groundwater velocity of the Morgantown formation and the limited flushing of the well screen interval. Thus, the alternate source (cement-bentonite grout at 2016-08) is present along the flow path of groundwater entering well 2016-07.

6. LINKAGES OF CONSTITUENT CONCENTRATIONS AND DISTRIBUTIONS BETWEEN ALTERNATE SOURCES AND DOWNGRADIENT WELLS

6.1 pH

As discussed in Section 5, the pH of the groundwater detected at monitoring well 2016-07 is consistent with the typical pH of cement used for well construction.

7. A RELEASE FROM THE FAR IS NOT SUPPORTED AS THE SOURCE

7.1 Piper Diagrams

The geochemical fingerprints of Morgantown groundwater from monitoring wells located near the FAR, seepage from the FAR and discharge from the FAR were determined using a piper diagram. The piper diagram is a graphical procedure commonly used to interpret sources of dissolved constituents in water and evaluate the potential for mixing of waters from different sources (Piper 1944). The samples presented on the diagram presented in Figure 7-1 were collected from 2012 through 2020. The FAR discharge and FAR seepage results represent water that has been in contact with CCR. Specifically, the discharge samples are collected from standing water within the FAR. The seepage samples represent FAR water collected from the engineered collection system at the toe of the dam. The primary observations based on the FAR piper diagram are the following:

- FAR discharge and FAR seepage results plot in the upper portion of the piper diagram and have a fingerprint characterized by proportionately higher calcium and sulfate concentrations.
- Groundwater from the Morgantown Sandstone, both upgradient and downgradient of the FAR, generally exhibits elevated proportions of sodium, carbonate, and chloride.

One exception to these observations is 96153R, which is an upgradient well and only coincidentally has a chemical signature similar to the leachate due to the elevated sulfate concentrations associated with nearby coal mines. The groundwater chemical signature from the Morgantown monitoring wells is distinctly different from the FAR discharge and FAR seepage chemical signatures. If water in contact with fly ash (e.g., seepage water or discharge water) was released from the FAR and mixed with groundwater, the signature of the resulting mixture would become more similar to the discharge and seepage signatures (i.e., plot higher in the diamond portion of the piper diagram).

Based on the data presented on Figure 7-1, the groundwater in the Morgantown Sandstone has not mixed with FAR discharge or seepage since they plot in distinct regions on the piper diagram. This indicates that the FAR is not the source of the pH SSI detected in well 2016-07.

7.2 Leachate pH versus Groundwater pH

If the FAR experienced a release and seepage or discharge mixed with groundwater, the concentrations of individual analytes in the resulting mixture would depend on the volume and initial concentration of the release. In order for a release to result in an increase in the concentration or value of an analyte in groundwater, the concentration of the analyte in the seepage or discharge would need to be higher than the respective existing background concentrations in groundwater. However, at the FAR, the opposite conditions exist: the historical maximum pH values in the FAR discharge and FAR seepage are lower than the minimum historical pH for well 2016-07 (Table 7-1).

Table 7-1: Comparison of FAR Discharge, FAR Seepage and 2016-07 Groundwater pH

	2016-07 (2016-2020)	FAR Seepage (2016-2019)	FAR Discharge (2016-2020)
Max	11.98	7.94	8.50
Min	9.10	6.80	6.30
Median	10.01	7.57	7.24

All pH values given in standard units

Based on this information, the FAR seepage or discharge are unlikely to be the source of the pH SSI observed at well 2016-07.

7.3 Sodium and Sulfate in Leachate versus Groundwater

FAR Seepage and Discharge has a cationic signature dominated by sulfate, and groundwater from Morgantown Sandstone wells near the FAR tend to have an anionic signature dominated by sodium and potassium, as presented in Figure 7-1. Taking advantage of these defining characteristics, Figure 7-2 presents sodium and sulfate results for FAR Seepage, FAR Discharge and monitoring well 2016-07.

As depicted in the top chart in Figure 7-2, the concentration of sodium is relatively stable for the FAR Seepage and FAR Discharge. At monitoring well 2016-07, the sodium concentration increased in 2016 and early 2017 to a maximum in April 2017, and has exhibited a declining trend in the sampling events since.

The center graph in Figure 7-2 presents the concentrations of sulfate for FAR Seepage, FAR Discharge and monitoring well 2016-07. As expected based on the Piper Diagrams (Figure 7-1), the FAR Discharge and FAR Seepage exhibit higher sulfate concentrations than groundwater from monitoring well 2016-07. Monitoring well 2016-07 has lower sulfate concentrations compared to the leachate samples and exhibits a declining trend in sulfate over the period from 2016 to 2020.

The bottom graph in Figure 7-2 presents the sulfate to sodium ratio for FAR Seepage, FAR Discharge and monitoring well 2016-07. The sulfate to sodium ratio in groundwater at well 2016-07 has been consistently below a ratio of 1, while the sulfate to sodium ratios in FAR Seepage and FAR Discharge have been consistently above 1 and often above a ratio of 10. If leachate from the RWL were to mix with groundwater, the sulfate to sodium ratio in groundwater would be expected to increase; however, the data suggest no appreciable change in the ratio over the period from 2016 to 2020. These results support the conclusion that the FAR is not the source of the pH SSI detected in well 2016-07.

8. ALTERNATE SOURCE DATA ARE HISTORICALLY CONSISTENT WITH HYDROGEOLOGIC CONDITIONS

8.1 pH

The elevated pH that has been observed at well 2016-07 since it was constructed in March 2016 is consistent with the use of cement-bentonite grout during well construction at 2016-08. In addition, the persistence of the elevated pH is consistent with the generally low hydraulic conductivity of the Morgantown Sandstone, and the expected low rate of groundwater migration through the screened interval of well 2016-07.

9. CONCLUSIONS

The SSI identified in this report was from a single sample collected in March 2020 from FAR downgradient monitoring well 2016-07. The data were reviewed for quality assurance, statistically analyzed, and reported to Gavin on 05 June 2020. In response to the SSI, this ASD Report was prepared within the required 90-day period in accordance with 40 CFR § 257.94(e)(2).

The pH SSI at well 2016-07 was determined to have resulted from an alternate source of cement-bentonite grout used to construct well 2016-08. Table 9-1 summarizes the six lines of evidence supporting this alternate source.

Table 9-1: FAR ASD Summary

Line of Evidence	pH
Alternate source	Elevated pH results from cement-bentonite grout used during well construction of adjacent well 2016-08.
Hydraulic connection	Cement-bentonite grout from well construction of adjacent well 2016-08 is in contact with groundwater within the screened interval of 2016-07.
Constituent present at source or along flow path	Cement-bentonite grout from well construction of adjacent well 2016-08 is in contact with groundwater within screened interval of 2016-07.
Constituent distribution more strongly linked to alternate source	The observed pH levels are consistent with the expected pH of groundwater in contact with cement.
Constituent exceedance could not have resulted from the FAR	Piper diagrams suggest different chemical fingerprints between FAR discharge/seepage and groundwater. FAR discharge/seepage pH values are below what is observed at well 2016-07.
Data are historically consistent with hydrogeological conditions	Timing of well installation is consistent with likely impacts from cement.

In conclusion, the FAR is not the source of the SSI identified in the first semiannual groundwater sampling event of 2020; thus, the Plant will continue detection monitoring at the FAR in accordance with 40 CFR § 257.94(e)(2).

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PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I, or an agent under my review, have prepared this Alternate Source Demonstration Report for the Fly Ash Reservoir and it meets the requirements of 40 CFR § 257.94(e)(2). To the best of my knowledge, the information contained in this report is true, complete, and accurate.

James A. Hemme, P.E.
State of Ohio License No.: 72851

Date: 08/27/2020

FIGURES

Figure 1-1: Gavin Plant Location
Gavin Generating Station
Cheshire, Ohio

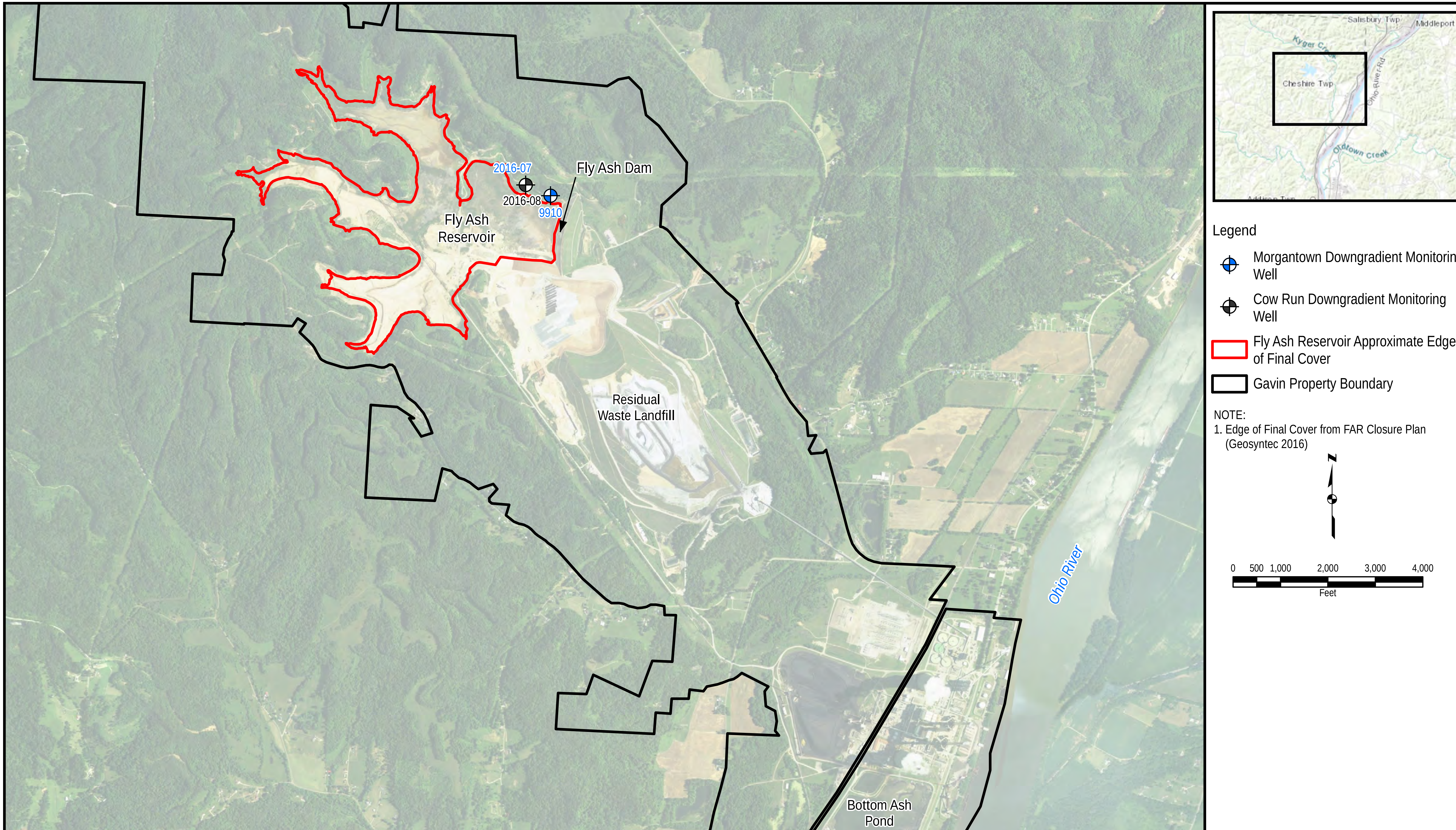
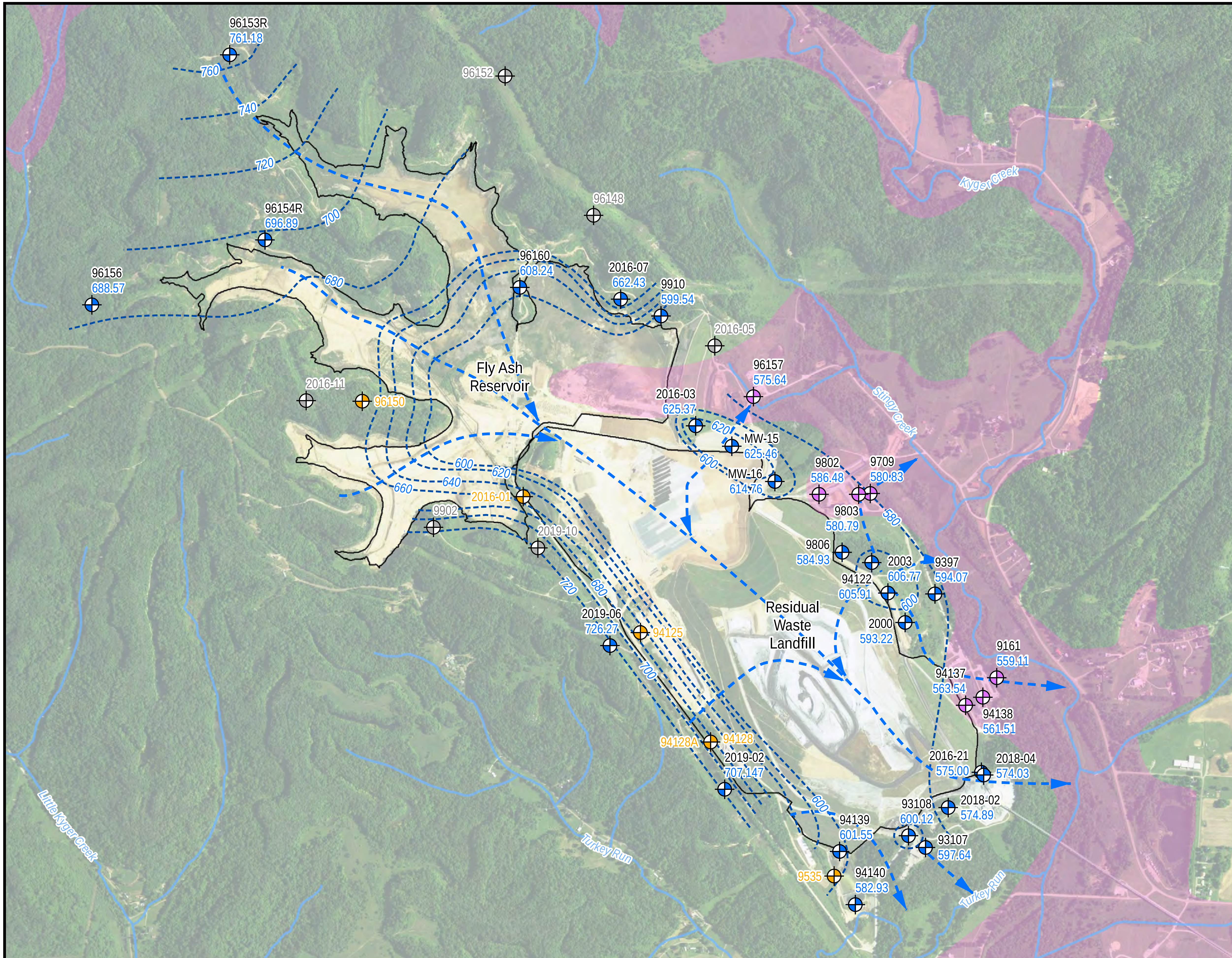
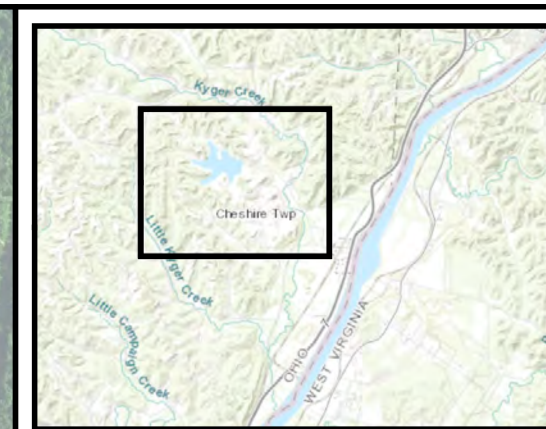


Figure 1-2: Fly Ash Reservoir Location
Gavin Generating Station
Cheshire, Ohio

ERM





Legend

- Morgantown Sandstone Monitoring Well
- Morgantown Sandstone Monitoring Well - Low Recharge or Dry*
- Morgantown Sandstone Monitoring Well - Not Gauged*
- Alluvium Monitoring Well
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit
- Interpreted area where the Morgantown Sandstone has been eroded and is not present (based on borehole logs and topographic analysis)

NOTES:
- Potentiometric surface interpretation based on groundwater gauging conducted on 3/5/2020, 4/3/2020, and 4/28/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in March and April 2020.
- In areas where the Morgantown Sandstone is absent, on the east side of the landfill, the contours represent the potentiometric surface in the alluvial aquifer because these two aquifers are hydraulically connected.

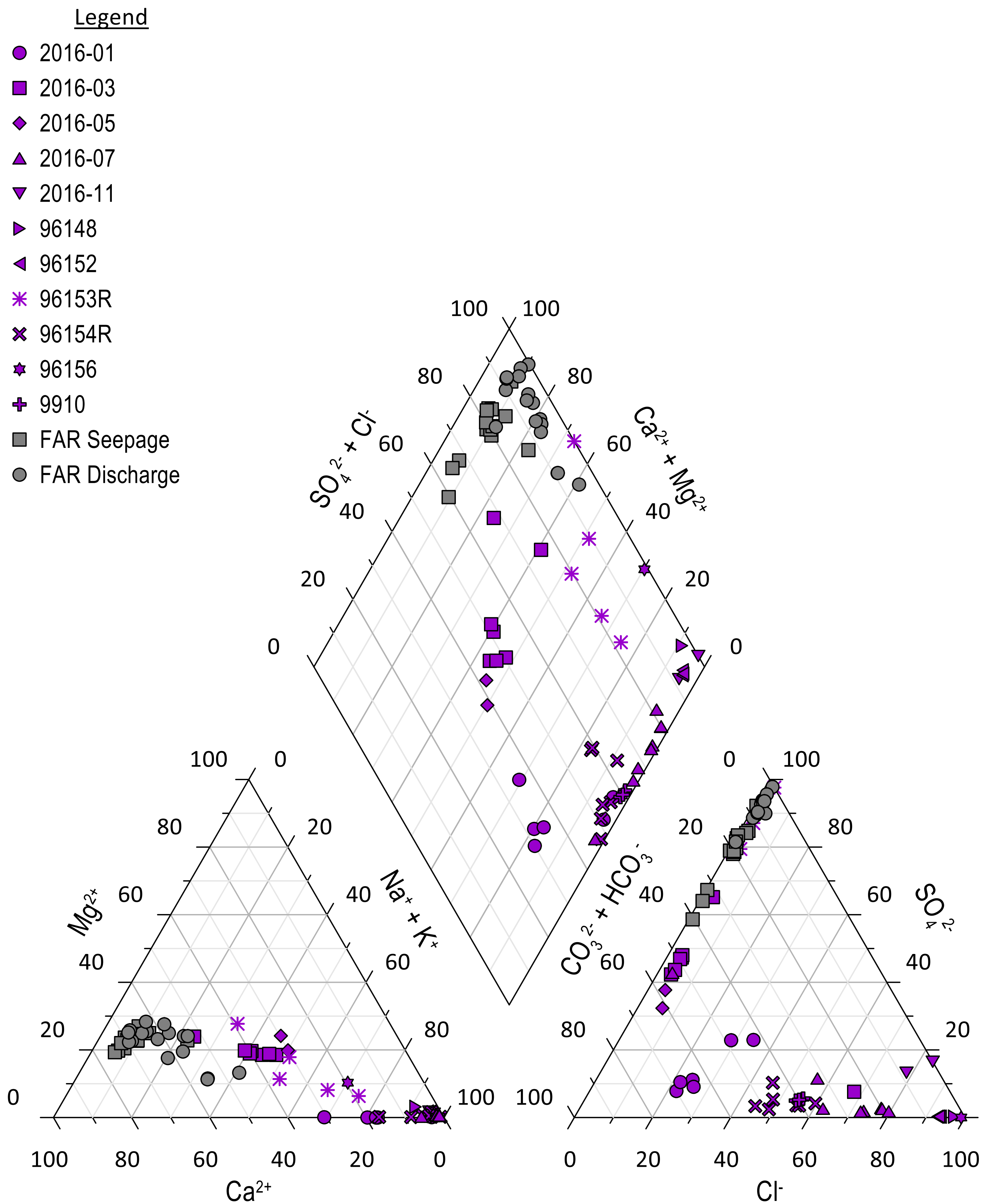
N

0 500 1,000 2,000
Feet

Figure 2-1: Morgantown Sandstone Potentiometric Surface Map March and April 2020

Gavin Generating Station
Cheshire, Ohio

ERM



NOTES:
1. Date Range: March 2012 to March 2020
2. Only wells with complete data including all 8 piper diagram analytes are presented

Figure 7-1: FAR Piper Diagram for Morgantown Sandstone
March 2020
Gavin Generating Station
Cheshire, Ohio

ERM

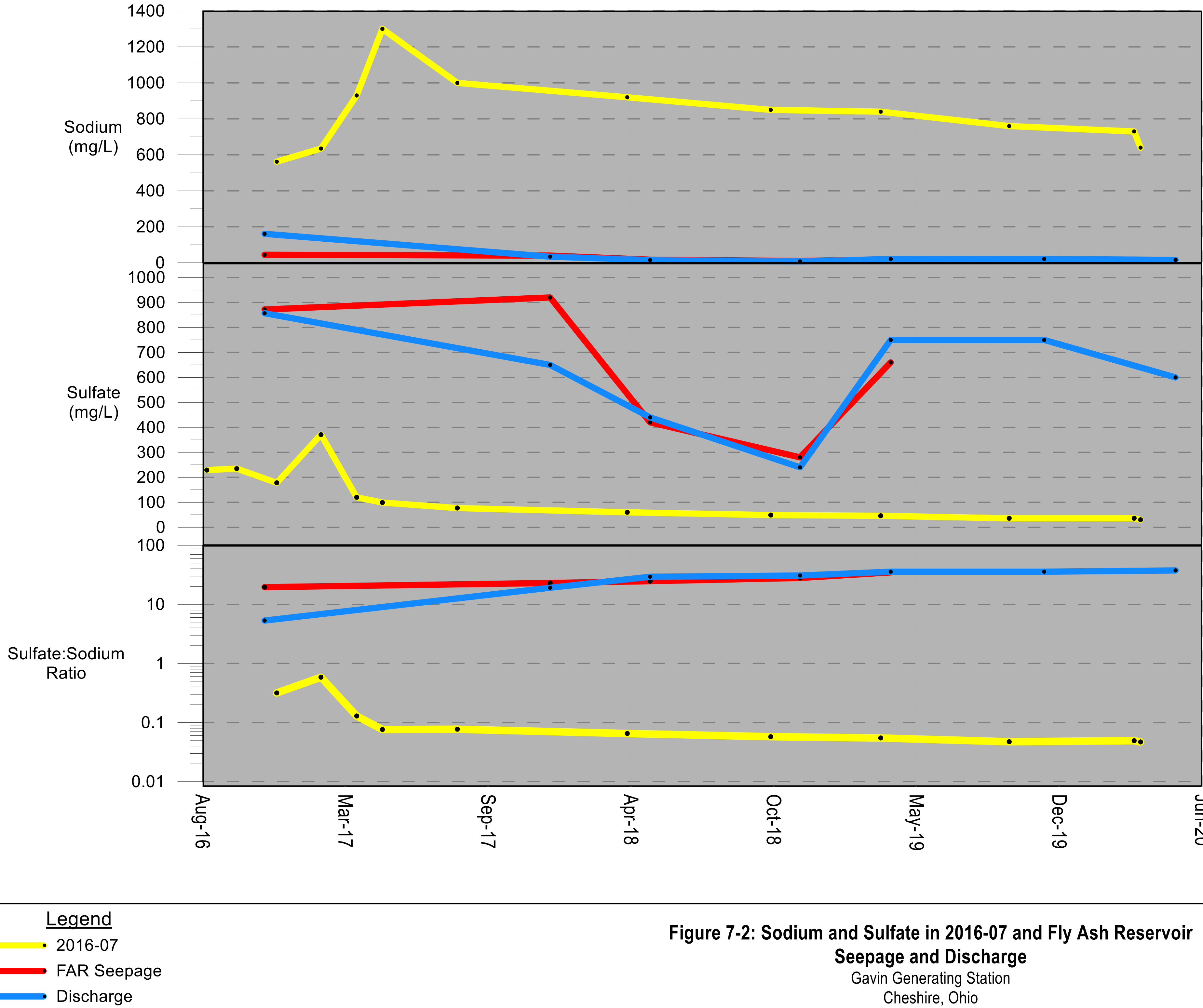


Figure 7-2: Sodium and Sulfate in 2016-07 and Fly Ash Reservoir Seepage and Discharge

Gavin Generating Station

Cheshire, Ohio

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APPENDIX B ANALYTICAL SUMMARY

Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-01	2016-02
	Date	2016-08-24	2016-10-05	2016-11-30	2017-01-31	2017-03-22	2017-04-26	2017-06-07	2017-07-13	2018-03-19	2018-09-25	2019-03-15	2019-09-21	2016-08-24
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L			700	529					660	800	740 B	670	
Aluminum	mg/L					9.3 J	0.86	3.1	3.8					
Antimony	mg/L	0.00092	0.00091	0.00088	0.00045	0.0019 J	0.00085 J	0.00068 J	0.002 U					0.0003 J
Arsenic	mg/L	0.0158	0.0188	0.0187	0.00739	0.0055	0.0051	0.0043 J	0.0061					0.0149
Barium	mg/L	0.098	0.0908	0.071	0.0823	0.12 JB	0.071	0.094	0.094					1.06
Beryllium	mg/L	3E-05 J	8E-05 U	3.50E-05	0.000134	0.001 U	0.001 U	0.00032 J	0.00037 J					0.0002 U
Bicarbonate Alkalinity as CaCO3	mg/L									5 U	5 U	5 U	5 U	
Boron	mg/L	0.243	0.228	0.263	0.267	0.23	0.26	0.3	0.35	0.25	0.25	0.21	0.22	0.396
Bromide	mg/L			1.2	0.807	0.93 J	5 U	5 U	5 U					
Cadmium	mg/L	7E-05	3E-05 J	4E-05	0.00017	0.00052 J	0.001 U	0.0003 J	0.0003 J					9E-05 J
Calcium	mg/L	14.4	18.9	13.9	15.6	5.5 B	4.1	7.3 J	8.6	140	78	84	68	400
Carbonate Alkalinity as CaCO3	mg/L									110	110	64	96	
Chloride	mg/L	247	297	294	302	260	230	220	210	180	180	170	190	10500
Chromium	mg/L	0.0014	0.0023	0.00159	0.00139	0.01 J	0.0015 J	0.0037	0.0048					0.0013
Cobalt	mg/L	0.000358	0.000396	0.000326	0.000893	0.0018	0.00066 J	0.00072 J	0.001					0.00279
Conductivity, Field	uS/cm	4632	4252	2448	2624					4521				28478
Copper	mg/L					0.042 JB	0.014	0.027 B	0.028 B					
Dissolved Oxygen, Field	mg/L	1.99	1.43	1.77	1.38					1.99				1.78
Dissolved Solids, Total	mg/L	1840	1830	1700	1500	1300	1300 J	990	950 J	1300	1100	1100	1200	17000
Fluoride	mg/L	2.8	2.85	3.34	8.34	11	13 J	17	16	7.9	5.8	4.3	4.9	0.74
Iron	mg/L					3.1 JB	0.38	1.1	1.5					
Lead	mg/L	0.000671	0.000487	0.000718	0.00204	0.0062 J	0.00093 J	0.0029	0.0036					0.00167
Lithium	mg/L	0.435	0.317	0.238	0.15	0.23 J	0.23 J	0.25 J	0.25					0.171
Magnesium	mg/L			0.273	0.955	1.4 B	1 U	0.55 J	0.71 J	0.22 J	1 U	1 U	1 U	
Manganese	mg/L					0.059 B	0.013	0.02	0.026					
Mercury	mg/L	8E-06	7E-06	2.4E-05	3.5E-05	0.0002 UJ	0.0002 U	0.0002 U	0.0002 U					4E-06 J
Molybdenum	mg/L	0.11	0.124	0.137	0.18	0.18 J	0.18	0.16	0.15					0.195
Nickel	mg/L					0.0075	0.0029	0.0038	0.0047					
pH, Field	pH units	12.24	12	12.06	11.41	11.9	10.96	11.06	11.03	12.38	12.2	12.4	12.3	7.18
Potassium	mg/L			71.5	40.7	41 JB	33	29 J	26	39	30	24	16	
Radium-226	pCi/L	0.485	0.67	0.278	0.698	0.567	0.6	0.37	0.405 J					1.25
Radium-226/228	pCi/L	0.887	2.58	0.562	0.938	0.896	1.44	0.578	0.482					4.82
Radium-228	pCi/L	0.402	1.91	0.284	0.24	0.329 U	0.837	0.209 U	0.0768 U					3.57
Redox Potential, Field	mV	-100.3	-34.5	-118.2	-79.5									-118.7
Selenium	mg/L	0.0011	0.0015	0.0013	0.0009	0.0026 J	0.0015 J	0.00094 J	0.0024 J					0.0003 J
Silver	mg/L					0.00035 J	0.001 U	9.4E-05 J	0.00016 J					
Sodium	mg/L			454	439	430 JB	410	380 B	340 B	340	420	380	360	
Strontium	mg/L			0.778	0.757	0.7 JB	0.65	0.61 JB	0.72 B					
Sulfate	mg/L	333	364	317	273	220	180 J	160 J	150	110	86	110	90	228
Temperature, Field	deg C	15.6	14.8	13.2	12.5					14				14.3
Thallium	mg/L	2E-05 J	4E-05 J	3E-05 J	5E-05 J	0.001 U	0.001 U	0.001 U	0.001 U					0.000956
Turbidity, Field	NTU	20.3	13.2	28.6	35.6	23.8	34.9	16.5	30.3	6.8	2.9		4	48.3
Vanadium	mg/L					0.016								
Zinc	mg/L					0.012 J	0.02 U	0.02 U	0.02 U					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
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Empty cells = Not analyzed

Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02	2016-02
	Date	2016-10-05	2016-11-30	2017-01-31	2017-03-22	2017-03-22	2017-04-26	2017-04-26	2017-06-07	2017-06-07	2017-07-13	2017-07-13	2018-03-19	2018-09-25
		N	N	N	FD	N	FD	N	FD	N	FD	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L		210	196									150	150
Aluminum	mg/L				0.034 J	0.048 J	0.05 U	0.05 U	0.071	0.25 U	0.12	0.074		
Antimony	mg/L	0.0001 J	0.0005 U	7E-05	0.00057 J	0.0016 J	0.002 U	0.002 U	0.01 U	0.01 U	0.002 U	0.002 U		
Arsenic	mg/L	0.00732	0.012	0.00988	0.011 J	0.012 J	0.0093	0.0097	0.0057	0.009 J	0.012 J	0.011 J		
Barium	mg/L	0.606	0.807	0.752	0.95 JB	1 JB	0.84	0.83	0.87	0.88	1.4	1.4		
Beryllium	mg/L	8E-05 U	0.0002 U	1E-05 J	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.00039 J	0.001 U		
Bicarbonate Alkalinity as CaCO3	mg/L												150	150
Boron	mg/L	0.355	0.406	0.457	0.54	0.55	0.52	0.51	0.57	0.62	0.52	0.53	0.47	0.48
Bromide	mg/L		43.2	44.4	46	46	63	55	87	51	49 J	46 J		
Cadmium	mg/L	0.00032	5E-05 J	9E-06 J	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.005 U	0.00025 J	0.001 U		
Calcium	mg/L	313	348	358	410 B	420 B	360	360	400	380	490	480	850	730
Carbonate Alkalinity as CaCO3	mg/L												5 U	5 U
Chloride	mg/L	9310	8700	9740	9600	9600	15000	13000	19000	11000	11000	10000	14000	14000
Chromium	mg/L	0.0007	0.000682	0.000832	0.0023 J	0.00078 J	0.002 U	0.002 U	0.0012 J	0.01 U	0.0014 J	0.002 U		
Cobalt	mg/L	0.00171	0.00174	0.00114	0.0015	0.0018	0.0016	0.0017	0.0029	0.0029 J	0.0026	0.0025		
Conductivity, Field	uS/cm	31865	20661	28545									37033	
Copper	mg/L				0.0018 JB	0.0016 JB	0.002 U	0.002 U	0.0024 B	0.01 U	0.002 U	0.002 U		
Dissolved Oxygen, Field	mg/L	0.41	0.73	1.3									0.23	
Dissolved Solids, Total	mg/L	15900	15300	15700	14000	13000	18000 J	100 J	13000	16000	19000 J	17000 J	20000	19000
Fluoride	mg/L	0.94	2 U	0.9 J	0.94 J	0.88 J	5 U	5 U	5 U	5 U	5 U	5 U	2.5 U	2.5 U
Iron	mg/L				4.7 JB	4.8 JB	3.2	3.3	4.6	5.4	6.1	6		
Lead	mg/L	0.00154	0.0002 J	0.00121	0.00053 J	0.00084 J	0.001 U	0.001 U	0.00048 J	0.00066 J	0.00088 J	0.00047 J		
Lithium	mg/L	0.141	0.177	0.221	0.13	0.15	0.16	0.17	0.17	0.17	0.19	0.19		
Magnesium	mg/L		100	112	140 B	140 B	120	120	190	150	170	170	220	250
Manganese	mg/L				2 B	2.1 B	2	2	2.7	2.7	3.2	3.2		
Mercury	mg/L	1E-05	1.5E-05	4E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L	0.107	0.203	0.29	0.29 J	0.3 J	0.3	0.3	0.23	0.28	0.15	0.14		
Nickel	mg/L				0.0033	0.0017 J	0.0021	0.002	0.009	0.01 U	0.006	0.0053		
pH, Field	pH units	7.16	7.06	7.07		7.24		7.09		7.21		7.09	7.11	7.04
Potassium	mg/L		30.8	30.2	15 JB	15 JB	14	14	13	13	16	15	18	19
Radium-226	pCi/L	1.91	2.61	2.37	1.89	1.93	2.15	1.72	1.74	1.93	2.23 J	2.18 J		
Radium-226/228	pCi/L	7.68	8	8.25	4.46	4.49	7.99	6.63	5.93	5.73	6.97 J	7.5 J		
Radium-228	pCi/L	5.77	5.39	5.88	2.57	2.56	5.84	4.92	4.19	3.8	4.74	5.32		
Redox Potential, Field	mV	-144.6	-100.7	-118.7										
Selenium	mg/L	0.0004 J	0.0005 J	0.0001	0.0012 J	0.0025 J	0.005 U	0.005 U	0.025 U	0.025 U	0.0022 J	0.0016 J		
Silver	mg/L				0.00078 J	0.001 U	0.001 U	0.001 U	9.2E-05 J	0.005 U	5.4E-05 J	0.001 U		
Sodium	mg/L		1570	1710	6000 JB	6000 JB	4900	4800	5300 B	5600 B	5300 B	5500 B	7000	7400
Strontium	mg/L		25.6	26.9	30 JB	32 JB	30	30	26 B	23 B	33 B	35 B		
Sulfate	mg/L	351	302	325	330	340	300	280	720	380	200	240	120	140
Temperature, Field	deg C	15.6	13.6	11.5									13.3	
Thallium	mg/L	0.0002 U	0.0002 J	5.6E-05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		
Turbidity, Field	NTU	4.4	5.8	9.3		4.5		2.2		2.8		7.5	4.3	4.9
Vanadium	mg/L				0.00065 J	0.005 U								
Zinc	mg/L				0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.1 U	0.02 U	0.02 U		

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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-02	2016-02	2016-02	2016-03	2016-03	2016-03	2016-03	2016-03	2016-03	2016-03	2016-03	2016-03	2016-03
	Date	2019-03-15	2019-09-21	2019-09-21	2016-08-24	2016-10-03	2016-12-01	2017-01-31	2017-03-27	2017-04-27	2017-06-07	2017-07-14	2018-03-21	2018-09-25
		N	FD	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	170 B	150	140			482	443					430	430
Aluminum	mg/L								0.03 J	0.05 U	0.05 U	0.045 J		
Antimony	mg/L				0.00096	0.00041	0.0004	0.00026	0.002 U	0.002 U	0.002 U	0.002 U		
Arsenic	mg/L				0.00059	0.00092	0.0007	0.00063	0.00058 J	0.001 J	0.00082 J	0.00088 J		
Barium	mg/L				0.0321	0.0383	0.0256	0.0241	0.026 JB	0.024	0.026	0.025		
Beryllium	mg/L				1E-05 J	7.20E-05	1E-05 J	6E-06 J	0.001 U	0.001 U	0.001 U	0.001 U		
Bicarbonate Alkalinity as CaCO3	mg/L	170 B	150	140									430	430
Boron	mg/L	0.64	0.54	0.51	0.43	0.35	0.361	0.416	0.43	0.44 B	0.45	0.44	0.43	0.43
Bromide	mg/L						0.614	3.5	0.4 J	2.5 U	2.5 UJ	2.5 U		
Cadmium	mg/L				0.00012	0.0001	0.00016	6E-05	0.001 U	0.001 U	0.001 U	0.001 U		
Calcium	mg/L	460	690	780	149	129	128	134	140 B	140	150	140	140	140
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U									5 U	5 U
Chloride	mg/L	11000	13000	13000	21.7	21.8	22.7	867	22	23	22 J	22	24	23
Chromium	mg/L				0.0002	0.0002	0.000162	0.000852	0.00064 JB	0.002 U	0.002 U	0.002 U		
Cobalt	mg/L				0.000403	0.000563	0.0005	0.000246	0.00029 J	0.00055 J	0.00019 J	0.00034 J		
Conductivity, Field	uS/cm				1564	1599	1595	1328					1511	
Copper	mg/L								0.0018 JB	0.002 U	0.002 U	0.002 U		
Dissolved Oxygen, Field	mg/L				4.38	1.15	1.77	2.38					0.26	
Dissolved Solids, Total	mg/L	28000	28000	26000	1090	1080	1020	1990	1100	1100 J	1000	1000 J	1100	1000
Fluoride	mg/L	0.54	2.5 U	2.5 U	0.2	0.18	0.16	2.33	0.21 J	0.19 J	0.21 J	0.19 J	0.24	0.22
Iron	mg/L								0.087 JB	0.068 J	0.064 J	0.087 J		
Lead	mg/L				0.000324	0.000456	0.000213	0.000105	0.00026 J	0.001 U	0.001 U	0.001 U		
Lithium	mg/L				0.03	0.03	0.034	0.031	0.029	0.034	0.029	0.034		
Magnesium	mg/L	170	230	250			38.6	40.5	40 B	40	46	40	40	41
Manganese	mg/L								0.051 B	0.1	0.11	0.061		
Mercury	mg/L				1.1E-05	4E-05	3.9E-05	1.8E-05	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L				0.0154	0.00646	0.00649	0.00523	0.0049 J	0.0043 J	0.004 J	0.0038 J		
Nickel	mg/L								0.0015 JB	0.002 U	0.002 U	0.002 U		
pH, Field	pH units	7.31		7.21	7.07	6.91	6.99	6.93	6.93	6.9	6.88	6.93	7.03	7
Potassium	mg/L	17	18	18			4.63	5.03	4.3 JB	4.4	4.8	4.6	4.6	4.6
Radium-226	pCi/L				0.306	0.225	0.266	0.854	0.194	0.195	0.201	0.207		
Radium-226/228	pCi/L				0.409	1.295	0.44	1.121	0.456	0.541	0.59	1.02		
Radium-228	pCi/L				0.103	1.07	0.174	0.267	0.262 U	0.347	0.389	0.816		
Redox Potential, Field	mV				20.9	48.2	50.5	73.5						
Selenium	mg/L				0.0002	0.0003	0.0001	0.0001	0.005 U	0.005 U	0.005 U	0.005 U		
Silver	mg/L								3E-05 J	0.001 U	0.00041 J	0.00044 J		
Sodium	mg/L	6700	7200	7600			171	156	150 JB	160 B	150 B	150 B	160	150
Strontium	mg/L						2.95	3.25	3.6 JB	3.7	4.4 B	3.4 J		
Sulfate	mg/L	410	300	210	446	445	362	132	390	420	440 J	400	400	410
Temperature, Field	deg C				15.8	15.6	12.8	13					12.6	
Thallium	mg/L				2E-05 J	3E-05 J	2E-05 J	2E-05 J	0.001 U	0.001 U	0.001 U	0.001 U		
Turbidity, Field	NTU			7	6.4	9	8.1	4.9	2.1	1.3	1.4	6.4	1	1.68
Vanadium	mg/L													
Zinc	mg/L								0.02 U	0.02 U	0.02 U	0.02 U		

Notes:

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mg/L = Milligrams per liter
mV = Milivolts
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-03	2016-03	2016-03	2016-03	2016-04	2016-04	2016-04	2016-04	2016-04	2016-04	2016-04	2016-04	2016-04
	Date	2019-03-15	2019-09-24	2020-03-25	2020-09-21	2016-08-24	2017-01-31	2017-03-27	2017-04-27	2017-06-07	2017-07-14	2018-03-22	2018-09-11	2019-03-15
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	440 B	450	500	340		50.7						250	290 B
Aluminum	mg/L							0.39 J	0.05 U	0.058	0.05 U			
Antimony	mg/L					0.00116	0.00033	0.00067 JB	0.00087 J	0.002 U	0.00097 J		0.002 U	0.002 U
Arsenic	mg/L					0.00421	0.00259	0.0054	0.0044 J	0.0019 J	0.0039 J		0.0016 J	0.0015 J
Barium	mg/L					0.117	0.065	0.14 JB	0.16	0.41	0.24		0.091	0.077
Beryllium	mg/L					4E-05 U	2.20E-05	0.001 U	0.001 U	0.001 U	0.00038 J		0.00058 J	0.00085 J
Bicarbonate Alkalinity as CaCO3	mg/L	440 B	450	500	340								250	290 B
Boron	mg/L	0.41	0.39	1.6	1.7	0.343	0.227	0.27	0.27 B	0.36	0.3		0.38	0.39
Bromide	mg/L						0.896	4 J	7.4 J	9.3 J	4.8 J			1
Cadmium	mg/L					5E-05	7E-05	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.00021 J
Calcium	mg/L	120	130	290	330	9.88	47.6	22 B	18	33	24		87	93
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U	5 U								5 U	5 U
Chloride	mg/L	23	24	32	50	1060	204	820	1700	2100 J	1100		240	180
Chromium	mg/L					0.0305	0.00651	0.0054 JB	0.0027	0.002 U	0.0016 J		0.002 U	0.002 U
Cobalt	mg/L					0.000641	0.000173	0.00026 J	0.001 U	0.001 U	0.00027 J		0.001 U	0.00031 J
Conductivity, Field	uS/cm			2101	2232	6270	1328					2138		
Copper	mg/L							0.0024 B	0.002 U	0.002 U	0.002 U			
Dissolved Oxygen, Field	mg/L					1.04	2.38					3.92		
Dissolved Solids, Total	mg/L	1000	1000	1300	1800	2630	952	1900	3300 J	3600	2400 J		1100	1200
Fluoride	mg/L	0.19	0.23	0.19	0.13	1.28	0.5	1.4	1.2	1.2 J	1.1		0.36	0.29
Iron	mg/L							0.38 JB	0.1 U	0.1 U	0.1 U			
Lead	mg/L					0.000238	0.000454	0.00043 J	0.001 U	0.001 U	0.00055 J		0.001 U	0.001 U
Lithium	mg/L					0.236	0.035	0.044	0.072	0.066	0.066		0.053	0.05
Magnesium	mg/L	40	42	81	81		6.97	3.8 B	4.2	13	5.8			
Manganese	mg/L							0.0083 B	0.005	0.022	0.01			
Mercury	mg/L					1.3E-05	7E-06	0.0002 U	0.0002 U	0.0002 U	0.0002 U		0.0002 U	0.0002 U
Molybdenum	mg/L					0.0864	0.0728	0.12 J	0.11	0.051	0.093		0.015	0.01
Nickel	mg/L							0.0034 B	0.002 U	0.002 U	0.0015 J			
pH, Field	pH units	7.13	7.27	6.93	6.82	8.4	6.93	7.79	7.82	7.8	8.22	7.75	7.62	7.62
Potassium	mg/L	8.4	5.3	6.2	6.3		7.01	7.3 JB	13	7.2	9.3			
Radium-226	pCi/L					0.656	0.617	0.823	0.651	0.481	0.552 J		0.247	0.307
Radium-226/228	pCi/L					1.08	1.328	1.51	1.27	1.19	1.21		0.512	0.482
Radium-228	pCi/L					0.424	0.711	0.689	0.614	0.71	0.663		0.265 U	0.175 U
Redox Potential, Field	mV					-174.3	73.5							
Selenium	mg/L					0.0021	0.0007	0.0026 J	0.0022 J	0.005 U	0.0032 J		0.005 U	0.005 U
Silver	mg/L							0.00016 J	0.001 U	0.00017 J	7E-05 J			
Sodium	mg/L	190	190	150	110		219	670 JB	710	1400 B	880 B			
Strontium	mg/L						1.34	0.94 JB	1.3	1.5 B	1.5			
Sulfate	mg/L	400	360	980	1200	252	326	330	230	190 J	290		420	410
Temperature, Field	deg C			14	14	15.2	13					12.3		
Thallium	mg/L					3E-05 J	1E-05 J	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U
Turbidity, Field	NTU		4	1	4	9.1	4.9	6.4	2.8	2.8	6.4	3	1.28	
Vanadium	mg/L													
Zinc	mg/L							0.02 U	0.02 U	0.02 U	0.02 U			

Notes:
FD = Field duplicate sample
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NTU = Nephelometric Turbidity Unit
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		2016-04	2016-04	2016-04	2016-05	2016-05	2016-05	2016-05	2016-05	2016-05	2016-05	2016-05	2016-05	2016-06
Date		2019-09-24	2020-03-25	2020-09-21	2016-06-08	2016-08-25	2016-10-05	2016-12-01	2017-02-01	2017-03-27	2017-04-27	2017-06-08	2017-07-14	2016-08-25
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	300	340	280				229	211					
Aluminum	mg/L									0.3 J	0.05 U	0.5	0.55	
Antimony	mg/L					0.00015	0.0001 J	8E-05	4E-05 J	0.002 U	0.00072 J	0.00067 J	0.002 U	0.00019
Arsenic	mg/L					0.00078	0.00074	0.00051	0.00028	0.005 U	0.005 U	0.00088 J	0.00079 J	0.00225
Barium	mg/L					0.052	0.0432	0.0382	0.0331	0.049 JB	0.043	0.044 B	0.038	0.0707
Beryllium	mg/L					0.000107	6E-05 J	3.40E-05	8E-06 J	0.001 U	0.001 U	0.00067 J	0.001 U	0.000198
Bicarbonate Alkalinity as CaCO3	mg/L	300	340	280										
Boron	mg/L	0.39	0.87	0.75		0.116	0.088	0.088	0.11	0.1	0.1 JB	0.11	0.1	0.501
Bromide	mg/L							0.552	0.155	0.17 J	0.15 J	0.23 J	0.26 J	
Cadmium	mg/L					3E-05	2E-05 J	1E-05 J	8E-06 J	0.001 U	0.001 U	0.001 U	0.001 U	1E-05 J
Calcium	mg/L	96	120	120		40.2	35.8	45	39.7	66 B	53	40	31	5.87
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U										
Chloride	mg/L	200	380	1000		16.3	17.2	16.9	11.4	9.2	9.6	14	16	545
Chromium	mg/L					0.0015	0.0012	0.000802	0.000582	0.0017 JB	0.002 U	0.0033	0.0025	0.0092
Cobalt	mg/L					0.00299	0.00267	0.00158	0.000274	0.00042 J	0.00028 J	0.0011	0.00088 J	0.00208
Conductivity, Field	uS/cm		2822	6404		717	670	694	708					2898
Copper	mg/L									0.00073 JB	0.002 U	0.0039	0.0042 B	
Dissolved Oxygen, Field	mg/L					7.62	8.64	7.9	9.83					0.6
Dissolved Solids, Total	mg/L	920	1500	2400		474	406	430	388	500	460 J	410	400 J	1560
Fluoride	mg/L	0.32	0.45	0.73		0.19	0.19	0.19	0.18	0.2	0.21	0.22	0.22	5.28
Iron	mg/L									0.45 JB	0.1 U	0.93	0.78	
Lead	mg/L					0.00194	0.00137	0.000848	0.000206	0.00036 J	0.001 U	0.0012	0.00077 J	0.00371
Lithium	mg/L					0.019	0.016	0.011	0.012	0.011	0.013	0.012	0.014	0.029
Magnesium	mg/L	38	39	36				18.1	19.6	22 B	20	19	16	
Manganese	mg/L									0.0099 B	0.005 U	0.022	0.02	
Mercury	mg/L					8E-06	1E-05	1.7E-05	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	5E-06 J
Molybdenum	mg/L					0.00109	0.00115	0.00231	0.00071	0.00064 J	0.01 U	0.0012 J	0.01 U	0.0595
Nickel	mg/L									0.0013 JB	0.002 U	0.0026	0.0027	
pH, Field	pH units	7.71	7.76	8.56	7.88	7.89	7.93	7.79	7.8	7.48	7.82		8.01	8.51
Potassium	mg/L	8.6	7.4	16				2.72	2.35	2.4 JB	2.3	2.5	2.3	
Radium-226	pCi/L					0.5	0.369	0.299	0.4	0.176	0.14	0.0681 U	0.13	0.325
Radium-226/228	pCi/L					1.027	0.703	1.429	0.40713	0.365 U	0.0784 U	0.0846 U	0.575	0.756
Radium-228	pCi/L					0.527	0.334	1.13	0.00713	0.189 U	-0.0618 U	0.0165 U	0.445	0.431
Redox Potential, Field	mV					162.5	206.5	119.4	162.7					72.2
Selenium	mg/L					0.0005	0.0005	0.0002	0.0001	0.005 U	0.005 U	0.005 U	0.005 U	0.0003
Silver	mg/L									0.001 U	0.001 U	0.001 U	0.0013	
Sodium	mg/L	260	380	980				84.5	69.3	71 JB	74 B	82	74 B	
Strontium	mg/L							0.879	0.89	1.1 JB	1.1	0.87 B	0.81	
Sulfate	mg/L	390	520	750		138	120	116	132	150	160	140	130	103
Temperature, Field	deg C		13	14		18.2	16.8	13	11.8					19.1
Thallium	mg/L					2E-05 J	0.0002 U	2E-05 J	3E-05 J	0.001 U	0.001 U	0.001 U	0.001 U	3E-05 J
Turbidity, Field	NTU	4	60.9		8.5	280.1	160.9	56.6	9.6	5.4	13.6		7.7	99.6
Vanadium	mg/L													
Zinc	mg/L									0.02 U	0.02 U	0.02 U	0.02 U	

Notes:
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NTU = Nephelometric Turbidity Unit
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06	2016-06
	Date	2016-10-03	2016-12-01	2017-02-01	2017-03-27	2017-04-27	2017-06-08	2017-07-14	2018-03-22	2018-09-25	2018-09-25	2019-03-26	2019-09-22	2020-03-15
		N	N	N	N	N	N	N	N	FD	N	N	N	FD
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L		490	554						490	490	510	500	510
Aluminum	mg/L				3.7 J	0.17	3.6	1.7						
Antimony	mg/L	0.00025	0.00023	0.00026	0.00047 JB	0.00078 J	0.002 U	0.002 U						
Arsenic	mg/L	0.0023	0.00195	0.00214	0.0034 J	0.0017 J	0.0026 J	0.0024 J						
Barium	mg/L	0.0649	0.0525	0.0515	0.068 JB	0.05	0.064 B	0.059						
Beryllium	mg/L	0.000143	3.40E-05	6.80E-05	0.001 U	0.001 U	0.00035 J	0.001 U						
Bicarbonate Alkalinity as CaCO3	mg/L									460	470	460	470	470
Boron	mg/L	0.424	0.418	0.463	0.5	0.52 B	0.52	0.5		0.48	0.49	0.5	0.45	0.46
Bromide	mg/L		2.18	1.85	2.4 J	2.1 J	2.3 J	2.1 J						
Cadmium	mg/L	2E-05 J	3E-05	4E-05	0.00061 J	0.001 U	0.001 U	0.001 U						
Calcium	mg/L	5.51	4.6	4.45	5 B	3.5	4.1	4		4.4	4.8	4.9	4.4	4.1
Carbonate Alkalinity as CaCO3	mg/L									26	23	41	35	36
Chloride	mg/L	560	515	548	550	550	570	540		600	620	580	540	650
Chromium	mg/L	0.077	0.0205	0.0625	0.068 JB	0.022	0.058 J	0.062						
Cobalt	mg/L	0.00283	0.00156	0.00106	0.0019	0.00068 J	0.0038	0.0018						
Conductivity, Field	uS/cm	2931	3126	2933					2792					2888
Copper	mg/L				0.005 JB	0.002 U	0.0071	0.007 B						
Dissolved Oxygen, Field	mg/L	0.58	1.02	1.4					0.38					
Dissolved Solids, Total	mg/L	1560	1570	1540	1600	1600 J	1700	1600 J		1400	1400	1600	1500	1600
Fluoride	mg/L	5.09	4.89	5.2	6	5.9	6.3	6.1		5.8	5.7	5.6	5.8	5.5
Iron	mg/L				3.4 JB	0.24	3.3	1.7						
Lead	mg/L	0.00151	0.00039	0.000607	0.0016 J	0.001 U	0.0013	0.00083 J						
Lithium	mg/L	0.024	0.027	0.034	0.034	0.032	0.031	0.032						
Magnesium	mg/L		1.28	1.4	1.7 B	1	1.8	1.3		1.4	1.4	1.6	1.4	1.3
Manganese	mg/L				0.022 B	0.0068	0.019	0.018						
Mercury	mg/L	1.1E-05	1.6E-05	3E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 U						
Molybdenum	mg/L	0.0952	0.0674	0.0804	0.091 J	0.076	0.074	0.073						
Nickel	mg/L				0.031 B	0.029	0.13	0.05						
pH, Field	pH units	8.36	8.36	8.45	8.44	8.49	8.39	8.28	8.43		8.24	8.52	8.59	8.47
Potassium	mg/L		3.45	10.5	7.2 JB	6	5.6	4.8		3	3.4	4.8	3.8	2.7
Radium-226	pCi/L	0.818	0.392	0.252	0.163	0.163	0.195	0.152						
Radium-226/228	pCi/L	2.268	1.052	0.604	0.381	0.395	0.362 U	0.651						
Radium-228	pCi/L	1.45	0.66	0.352	0.217 U	0.232 U	0.167 U	0.498						
Redox Potential, Field	mV	60.6	79.4	107.6										
Selenium	mg/L	0.0002	0.0003	0.0003	0.005 U	0.005 U	0.005 U	0.001 J						
Silver	mg/L				0.0012	0.001 U	9.1E-05 J	0.00017 J						
Sodium	mg/L		637	499	610 JB	620	590	600 B		600	610	600	590	600
Strontium	mg/L		0.274	0.269	0.3 JB	0.29	0.24 B	0.27						
Sulfate	mg/L	96.5	95.1	94.8	110	110	120	110		100	100	110	110	100
Temperature, Field	deg C	16	12.9	12					13.3					13
Thallium	mg/L	2E-05 J	2E-05 J	2E-05 J	0.001 U	0.001 U	0.001 U	0.001 U						
Turbidity, Field	NTU	45.2	52.9	48.5	43.5	68.6	59.1	30.7	49		43.9		71	37.6
Vanadium	mg/L													
Zinc	mg/L				0.0097 J	0.02 U	0.02 U	0.02 U						

Notes:

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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-06	2016-06	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07	2016-07
	Date	2020-03-15	2020-09-17	2016-08-24	2016-10-05	2016-11-30	2017-01-31	2017-03-22	2017-04-27	2017-08-10	2018-04-05	2018-10-23	2019-03-26	2019-09-22
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	510	480			514	483				360	300	430	320
Aluminum	mg/L							57 J	9.8	40				
Antimony	mg/L			0.00126	0.00091	0.00079	0.00045	0.0015 J	0.0024	0.0017 JB				
Arsenic	mg/L			0.00772	0.00705	0.00666	0.0042	0.016	0.0034 J	0.016				
Barium	mg/L			0.107	0.141	0.115	0.188	0.83 JB	0.7	1.3				
Beryllium	mg/L			0.000368	0.00027	0.000183	0.000428	0.0026	0.00091 J	0.0028				
Bicarbonate Alkalinity as CaCO3	mg/L	470	460								190	120	72	59
Boron	mg/L	0.48	0.46	0.313	0.297	0.348	0.365	0.4	0.42 B	0.44	0.45	0.42	0.38	0.39
Bromide	mg/L					5.48	0.308	4.5 J	8 J	5.5				
Cadmium	mg/L			7E-05	8E-05 J	0.0001	8E-05	0.001 U	0.001 U	0.00059 J				
Calcium	mg/L	4.2	5.1	13.3	11.5	8.2	9.9	15 B	25	41	12	12	6.3	7.8
Carbonate Alkalinity as CaCO3	mg/L	36	24								170	180	350	260
Chloride	mg/L	660	630	421	609	643	23.6	1000	1900	1200	1200	1100	810	1000
Chromium	mg/L			0.0015	0.0022	0.00163	0.00322	0.063 J	0.011	0.059				
Cobalt	mg/L			0.00105	0.000905	0.000573	0.00167	0.016	0.0028	0.015				
Conductivity, Field	uS/cm	2888	2979	2883	3250	2246	3388				4913			
Copper	mg/L							0.044 JB	0.0079	0.04 B				
Dissolved Oxygen, Field	mg/L			3.47	3.81	3.75	1.94				2.48			
Dissolved Solids, Total	mg/L	1600	1400	1740	1850	1900	1000	2300	3900 J	2500 J	2300	1800	2100	1900
Fluoride	mg/L	5.5	5.5	1.89	2.04	1.94	0.18	2.3	1.6	2.6	2.8	2.9	2.6	3.3
Iron	mg/L							49 JB	8.5	47				
Lead	mg/L			0.00336	0.00292	0.00215	0.00336	0.031 J	0.0054	0.036 B				
Lithium	mg/L			0.235	0.193	0.202	0.163	0.16	0.062	0.19				
Magnesium	mg/L	1.4	1.5			1.36	2.83	11 B	8.3	12	3.9	3.4	2.6	2.3
Manganese	mg/L							0.24 B	0.075	0.31				
Mercury	mg/L			1.2E-05	1.7E-05	8E-06	5E-05 J	0.0002 U	0.0002 U	0.0002 U				
Molybdenum	mg/L			0.0808	0.0841	0.0953	0.0689	0.092 J	0.056	0.11 B				
Nickel	mg/L							0.043	0.0086	0.051				
pH, Field	pH units	8.47	8.52	10.86	10.56	10.61	10.01	9.94	9.44	9.1	9.49	9.75	10.41	10.4
Potassium	mg/L	2.9	2.9			33.9	24.1	23 JB	6.5	19	6.6	6.8	8.4	4.4
Radium-226	pCi/L			0.427	0.977	1.13	1.18	2.63	6.4	3.74 J				
Radium-226/228	pCi/L			0.427	3.077	2.17	2.84	4.35	12.7	8.09 J				
Radium-228	pCi/L				2.1	1.04	1.66	1.72 G	6.29 G	4.34 G				
Redox Potential, Field	mV			6.4	63	20.4	22							
Selenium	mg/L			0.0008	0.001	0.0007	0.0008	0.004 J	0.0015 J	0.0052				
Silver	mg/L							0.00078 J	0.00019 J	0.0037				
Sodium	mg/L	610	610			562	635	930 JB	1300	1000	920	850	840	760
Strontium	mg/L					0.624	0.815	1.3 JB	2.3	2.8 B				
Sulfate	mg/L	100	99	229	235	178	371	120	99	77	60	49	46	36
Temperature, Field	deg C	13	14	15.6	15.3	14.1	12.8				13.8			
Thallium	mg/L			8.4E-05	9E-05 J	4E-05 J	6.1E-05	0.00052 J	0.001 U	0.00066 J				
Turbidity, Field	NTU	37.6	24.1	213	98.2	88.1	455.1	850	13721	1037	174	81.4		32
Vanadium	mg/L							0.066						
Zinc	mg/L							0.12	0.02	0.12				

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Fly Ash Reservoir
Gavin Power Plant

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	Location ID	2016-07	2016-07	2016-07	2016-08	2016-08	2016-08	2016-08	2016-08	2016-08	2016-08	2016-08	2016-08	2016-08
	Date	2020-03-15	2020-03-24	2020-09-17	2016-08-24	2016-10-05	2016-11-30	2017-01-31	2017-03-22	2017-04-27	2017-06-07	2018-09-25	2019-03-26	2019-09-22
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	360	320	350			1580	1400				1700	2000	1800
Aluminum	mg/L								4.7 J	0.39	8.1			
Antimony	mg/L				0.00134	0.00083	0.00095	0.00078	0.0012 J	0.0051	0.0013 J			
Arsenic	mg/L				0.00795	0.00691	0.00652	0.00489	0.0054	0.0075	0.014			
Barium	mg/L				0.312	0.279	0.416	0.446	0.97 JB	0.7	0.76			
Beryllium	mg/L				4E-05 U	0.000182	0.000123	5.9E-05 J	0.001 U	0.001 U	0.005 U			
Bicarbonate Alkalinity as CaCO3	mg/L	45	5 U	160								5 U	5 U	5 U
Boron	mg/L	0.41	0.28	0.41	0.318	0.286	0.294	0.279	0.22	0.28 B	0.32	0.1	0.056 J	0.071 J
Bromide	mg/L						5.56	2.93	3.1 J	25 U	5 J			
Cadmium	mg/L				2E-05 J	3E-05 J	5E-05	1E-05 J	0.001 U	0.001 U	0.001 U			
Calcium	mg/L	6	34	9.7	33.8	48.9	57	80.6	190 B	140	140	340	450	390
Carbonate Alkalinity as CaCO3	mg/L	310	110	190								140	70	100
Chloride	mg/L	1100	970	1100	452	645	650	879	700	890	1200 J	920	510	610
Chromium	mg/L				0.0012	0.0033	0.00434	0.00374	0.011 J	0.0027	0.015 J			
Cobalt	mg/L				0.000353	0.00278	0.00172	0.00095	0.0024	0.00039 J	0.0037			
Conductivity, Field	uS/cm	3442	4166	4034	8521	8800	5904	7708						
Copper	mg/L								0.026 JB	0.019	0.043 B			
Dissolved Oxygen, Field	mg/L				10.52	5.81	6.2	4.23						
Dissolved Solids, Total	mg/L	1800 J	1900	1800	2480	2660	2730	2750	2700	2900 J	3000	2400	2900	2700
Fluoride	mg/L	3.1	2.5	3.1	1.92	1.85	1.56	2.03	2	1.8 J	2.3 J	1.4	0.99	1.1
Iron	mg/L								4.5 JB	0.1 U	8.6			
Lead	mg/L				0.000143	0.00216	0.00207	0.000987	0.0044 J	0.001 U	0.006			
Lithium	mg/L				0.665	0.6	0.702	0.652	0.85	0.75	0.64			
Magnesium	mg/L	2.3	0.88 J	3.1			0.41	0.162	0.75 JB	1 U	1.4	1 U	1 U	1 U
Manganese	mg/L								0.031 B	0.005 U	0.051			
Mercury	mg/L				2.4E-05	7E-06	3.7E-05	9E-06	0.0002 U	0.0002 U	0.0002 U			
Molybdenum	mg/L				0.121	0.0735	0.0982	0.102	0.094 J	0.12	0.14			
Nickel	mg/L								0.01	0.004	0.013			
pH, Field	pH units	9.85	11.98	9.65	12.52	12.41	12.59	12.45	12.65	12.35	12.42	12.45	12.67	12.43
Potassium	mg/L	4.3	7.4	4.3			92.4	99.3	110 JB	77	59	44	48	44
Radium-226	pCi/L				0.768	1.06	0.975	1.43	4.8	4.25	2.11			
Radium-226/228	pCi/L				1.898	2.97	2.005	2.62	6.4	5.53	2.43			
Radium-228	pCi/L				1.13	1.91	1.03	1.19	1.6	1.27	0.319 U			
Redox Potential, Field	mV				-71.6	-38.5	-81.2	-89.5						
Selenium	mg/L				0.0028	0.0022	0.0019	0.0012	0.002 J	0.0022 J	0.0043 J			
Silver	mg/L								0.001 U	0.001 UJ	0.00026 J			
Sodium	mg/L	730	640	790			704	747	920 JB	1100	1200 B	830	680	740
Strontium	mg/L						3.59	4.23	7.2 JB	6.7	5.7 B			
Sulfate	mg/L	36	30	27	133	126	120	90.4	71	70	89 J	27	14	16
Temperature, Field	deg C	13	14	15	16	16.2	13.8	13.1						
Thallium	mg/L				9E-05 J	7E-05 J	5E-05 J	3E-05 J	0.001 U	0.001 U	0.001 U			
Turbidity, Field	NTU	9.8	14.1	7.1	871	253.7	121.7	110.9	108.8	627.3	380.4	17.6		94
Vanadium	mg/L								0.017					
Zinc	mg/L								0.1 U	0.02 U	0.03			

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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		2016-08	2016-08	2016-08	2016-09	2016-09	2016-09	2016-09	2016-09	2016-09	2016-09	2016-09	2016-09	2016-09
Date		2020-03-15	2020-03-24	2020-09-17	2016-08-23	2016-10-03	2016-11-29	2017-01-30	2017-03-21	2017-04-25	2017-06-06	2017-07-12	2018-03-22	2018-09-13
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	1100	1900	620			1250	1830	1400					820
Aluminum	mg/L									1.3	3.3	1.9 B		
Antimony	mg/L				0.00076	0.00087	0.00082	0.00078	0.0014 J	0.0012 J	0.02 U	0.001 JB		
Arsenic	mg/L				0.0117	0.0145	0.0149	0.0144	0.026 J	0.016	0.016 J	0.016		
Barium	mg/L				0.684	0.566	0.49	0.433	0.42 JB	0.52	0.53	0.52		
Beryllium	mg/L				8.50E-05	3E-05 J	2E-05 J	2E-05 U	0.001 U	0.001 U	0.001 UJ	0.001 U		
Bicarbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U										5 U
Boron	mg/L	0.24	0.029 J	0.16	0.093	0.411	0.126	0.131	0.19	0.16 J	0.18 B	0.16 B		
Bromide	mg/L						6.45	5.69	5.8 J	50 U	7.5	5.8 J		
Cadmium	mg/L				6E-05 U	6E-05 U	4E-05 J	1E-05 J	0.001 U	0.001 U	0.01 U	0.001 U		
Calcium	mg/L	190	510	190	78.6	202	49.7	42.3	30 B	35	47	55		16
Carbonate Alkalinity as CaCO3	mg/L	63	48	100										180
Chloride	mg/L	1500	270	1400	1500	1520	1490	1520	1600	2000	1700	1600		1800
Chromium	mg/L				0.0455	0.0371	0.0299	0.0256	0.027 J	0.025	0.029 J	0.025		
Cobalt	mg/L				0.00056	0.000324	0.000245	0.000208	0.00092 J	0.00032 J	0.01 U	0.00071 J		
Conductivity, Field	uS/cm	8027	8693	7699	14047	13957	15285	12613					9465	
Copper	mg/L									0.013	0.022 B	0.017		
Dissolved Oxygen, Field	mg/L				5.1	2.86	2.39	2.91					0.32	
Dissolved Solids, Total	mg/L	2300 J	1700	2300	4820	4480	4180	3900	4100	4300 J	4300	3900 J		
Fluoride	mg/L	1.6	0.69	1.4	1.67	1.58	1.02	1.39	1.9 J	2.1 J	1.8	1.5 J		2
Iron	mg/L									0.1 U	1.2	0.55		
Lead	mg/L				0.00215	0.000743	0.000281	0.000118	0.0021 J	0.001 U	0.001	0.00068 J		
Lithium	mg/L				0.561	0.082	0.392	0.324	0.23	0.3	0.27	0.25		
Magnesium	mg/L	1 U	1 U	1 U			0.058	0.006 J		1 U	10 U	0.22 J		1 U
Manganese	mg/L								0.016 B	0.005 U	0.05 U	0.0041 J		
Mercury	mg/L				1.2E-05	4E-06 J	6E-06	5E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L				0.18	0.155	0.149	0.137	0.19 J	0.17	0.17	0.16		
Nickel	mg/L									0.0015 J	0.02 U	0.0031		
pH, Field	pH units	11.89	12.67	12	12.49	12.6	12.64	12.66	12.55	12.44	12.46	12.49	12.59	12.07
Potassium	mg/L	23	36	17			55	48.8	28 JB	31	29	24		15
Radium-226	pCi/L				1.06	0.889	1.34	1.65	1.95	1.33	1.93	1.83 J		
Radium-226/228	pCi/L				1.924	2.559	1.729	2.472	2.69	2.29	3.76	2.61 J		
Radium-228	pCi/L				0.864	1.67	0.389	0.822	0.744 U	0.966	1.83	0.772 J		
Redox Potential, Field	mV				-68.6	-135.4	-113.7	-112.6						
Selenium	mg/L				0.0042	0.0038	0.0037	0.0029	0.0051 J	0.0029 J	0.05 U	0.0034 JB		
Silver	mg/L									0.001 U	0.00031 J	0.00074 J		
Sodium	mg/L	1100	310	1100			591	997	1700 JB	1600	1700 B	1500		1600
Strontium	mg/L						2.74	2.34	1.8 JB	2.6	1.4 B	2.2		
Sulfate	mg/L	28	12	23	77.1	72.2	73	61.7	64	88 J	65	85		74
Temperature, Field	deg C	12	14	15	15.9	15	13.5	9.3					12.8	
Thallium	mg/L				7E-05 J	4E-05 J	0.0002 U	4E-05 J	0.001 U	0.001 U	0.001 U	0.001 U		
Turbidity, Field	NTU	6.2	4.2	4.1	8.7	8.6	6.8	2.1	22.3	56.3	35.1	61.3	9	20.8
Vanadium	mg/L													
Zinc	mg/L									0.02 U	0.2 U	0.02 U		

Notes:
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2016-09	2016-09	2016-09	2016-10	2016-10	2016-10	2016-10	2016-10	2016-10	2016-10	2016-10	2016-10	2016-10
	Date	2019-09-24	2020-03-12	2020-09-14	2016-08-23	2016-10-03	2016-11-29	2017-01-30	2017-03-21	2017-04-25	2017-06-06	2017-07-12	2018-04-06	2018-10-01
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	1100	1400	1400			217	199	170				180 B	140
Aluminum	mg/L									0.05 U	0.5 U	0.035 JB		
Antimony	mg/L				0.00027	9E-05 J	0.0002 J	0.00023	0.002 U	0.002 U	0.02 U	0.002 U		
Arsenic	mg/L				0.00323	0.00281	0.00304	0.00443	0.0037 J	0.0025 J	0.05 U	0.0039 J		
Barium	mg/L				0.235	0.183	0.162	0.339	0.17 JB	0.17	0.25	0.24		
Beryllium	mg/L				8E-05 U	0.0001 U	0.0002 U	1E-05 J	0.001 U	0.001 U	0.001 UJ	0.001 U		
Bicarbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U									180 B	140
Boron	mg/L	0.24	0.21	0.13	0.449	0.386	0.438	0.421	0.56	0.49	0.57 B	0.54 B	0.55	0.52
Bromide	mg/L						30.4	35.8	35	53	50	49		
Cadmium	mg/L				4E-05 J	0.0001 U	4E-05 J	0.00026	0.001 U	0.001 U	0.01 U	0.001 U		
Calcium	mg/L	18	230	79	179	209	254	344	380 B	390	440	500	610	650
Carbonate Alkalinity as CaCO3	mg/L	120	120	180									50 U	5 U
Chloride	mg/L	1200	630	760	3600	5000	6040	7380	7800	12000	11000	12000	14000	16000
Chromium	mg/L				0.0007	0.0003	0.00461	0.00983	0.00071 J	0.002 U	0.02 U	0.0011 J		
Cobalt	mg/L				0.000699	0.000869	0.00198	0.00275	0.0015	0.0013	0.0069 J	0.0046		
Conductivity, Field	uS/cm		8091	8864	8802	16158	15133	19419					35660	
Copper	mg/L									0.002 U	0.02 U	0.002 U		
Dissolved Oxygen, Field	mg/L				3.72	2.77	6.96	4.79					1.53	
Dissolved Solids, Total	mg/L	2100	2300	2200	6820	9040	11000	12600	9600	17000 J	17000	15000 J	20000	23000
Fluoride	mg/L	1.9	1.1	0.92	0.66	0.5	0.5 J	0.7 J	2.5 U	5 U	1.3 U	2.5 U	5 U	2.5 U
Iron	mg/L									0.13	2.9	2.8		
Lead	mg/L				0.00143	0.000325	0.000492	0.00257	0.00056 J	0.001 U	0.001 U	0.001 U		
Lithium	mg/L				0.138	0.142	0.189	0.246	0.21	0.23	0.29	0.29		
Magnesium	mg/L	1.2	0.75 J	0.33 J			67.4	91.1		110	160	160	200	210
Manganese	mg/L								0.68 B	0.52	1.8	1.4		
Mercury	mg/L				4E-06 J	5E-06 U	2E-06 J	3E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L				0.0367	0.0128	0.0278	0.0258	0.011 J	0.015	0.011 J	0.016		
Nickel	mg/L									0.0053	0.02 U	0.024		
pH, Field	pH units	12.45	12.61	12.6	9.79	7.48	8.29	7.68	7.31	7.21	7.51	7.86	7.1	7.11
Potassium	mg/L	13	21	12			30.8	42.9	26 JB	28	29	29	28	29
Radium-226	pCi/L				1.31	1.47	1.32	0.874	0.869	1.05	1.47	1.61 J		
Radium-226/228	pCi/L				2.85	2.5	3.15	2.304	1.71	2.19	3.93	4.91 J		
Radium-228	pCi/L				1.54	1.03	1.83	1.43	0.839	1.14	2.45	3.29		
Redox Potential, Field	mV				70.1	104.1	122.9	103.2						
Selenium	mg/L				0.001	0.0002 J	0.0005 J	0.0003	0.0015 J	0.005 U	0.05 U	0.0014 JB		
Silver	mg/L									0.001 U	0.0008 J	0.00062 J		
Sodium	mg/L	1200	870	930			1510	1370	4700 JB	4400	5900 B	6000	7300	7100 B
Strontium	mg/L						12.1	16.2	20 JB	21	27 B	26		
Sulfate	mg/L	56	71	53	874	857	897	834	790	1100	640	670	540	560
Temperature, Field	deg C		13	14	16.8	15.9	15	11.3					13.5	
Thallium	mg/L				7E-05 J	0.0002 U	5E-05 U	8E-05 J	0.001 U	0.001 U	0.001 U	0.001 U		
Turbidity, Field	NTU	103	90.4	37.7	30.6	8.7	2.4	21.9	4.1	77.3	10.1	10.3	4	2.62
Vanadium	mg/L													
Zinc	mg/L									0.02 U	0.2 U	0.02 U		

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Fly Ash Reservoir
Gavin Power Plant

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	Location ID	2016-10	2016-10	2016-10	2016-10	2016-10	2016-11	2016-11	2016-11	2016-11	2016-11	96147	96147	96147
	Date	2019-03-27	2019-09-24	2020-03-30	2020-09-14	2020-09-14	2016-08-23	2016-08-26	2017-01-30	2017-03-21	2017-04-25	2016-08-24	2016-10-05	2016-11-30
		N	N	N	FD	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	150	130	150	120	120			326	290				925
Aluminum	mg/L										0.05 U			
Antimony	mg/L						0.00533		0.00068	0.002 U	0.00081 J	0.00017	0.0002 U	5E-05 J
Arsenic	mg/L						0.0038		0.00586	0.0049 J	0.0022 J	0.00241	0.00906	0.00467
Barium	mg/L						0.154		0.681	0.33 JB	0.41	0.77	0.929	0.464
Beryllium	mg/L						4E-05 U		9.20E-05	0.001 U	0.001 U	0.000155	0.00926	0.00294
Bicarbonate Alkalinity as CaCO3	mg/L	150	130	150	120	120								
Boron	mg/L	0.51	0.47	0.48	0.5	0.48	0.278		0.3	0.36	0.35	0.438	0.48	0.397
Bromide	mg/L								10.5	10	11 J			2.99
Cadmium	mg/L						0.0002		0.00027	0.00035 J	0.001 U	0.00067	0.00198	0.00022
Calcium	mg/L	550	710	730	680	700	10.3		25	28 B	34	31.1	85.6	21.5
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U	5 U	5 U								
Chloride	mg/L	13000	15000	18000	16000	15000		403	2170	2400	2800	3240	1650	332
Chromium	mg/L						0.0349		0.00944	0.037 J	0.002 U	0.0013	0.0062	0.00233
Cobalt	mg/L						0.000731		0.00238	0.00076 J	0.0013	0.00113	0.0255	0.00586
Conductivity, Field	uS/cm			36786	37634	37634	7110		7954				8060	3243
Copper	mg/L										0.003			
Dissolved Oxygen, Field	mg/L						7.22		3.52				3.65	4.01
Dissolved Solids, Total	mg/L	16000	24000	37000	26000	26000		3060	4400	5200	4900 J	5760	3840	2660
Fluoride	mg/L	2.9	2.5 U	2.5 U	0.31 J	0.33 J		2.21	2.01	2.4	2.2 J	1.78	2.54	3.53
Iron	mg/L										0.1 U			
Lead	mg/L						0.00261		0.00424	0.0054 J	0.001 U	0.00737	0.0574	0.0332
Lithium	mg/L						0.593		0.086	0.08	0.074	0.077	0.075	0.03
Magnesium	mg/L	190	330	220	230	220			9.05		11			5.81
Manganese	mg/L									0.031 B	0.039			
Mercury	mg/L						8E-06		8E-06	0.0002 U	0.0002 U	4E-05	0.00167	0.00013
Molybdenum	mg/L						0.223		0.248	0.14 J	0.14	0.00729	0.00114	0.0125
Nickel	mg/L										0.038			
pH, Field	pH units	7.25	7.27	7.35	7.46	7.46	12.23		8.5	8.95	8.35		7.93	8.01
Potassium	mg/L	31 F1	42	31	32	29			32.5	21 JB	15			3.69
Radium-226	pCi/L						1.44		1.07	0.934	1	1.2	0.989	0.0683
Radium-226/228	pCi/L						2.62		2.041	1.81	1.56	3.94	5.469	4.8483
Radium-228	pCi/L						1.18		0.971	0.872	0.564	2.74	4.48	4.78
Redox Potential, Field	mV						-93.7		40.3				-37.1	182.7
Selenium	mg/L						0.0054		0.0007	0.003 J	0.005 U	0.0002 J	0.0013	0.0006
Silver	mg/L										0.0001 J			
Sodium	mg/L	6900	7600	7400	7900	8100			911	1800 JB	1800			777
Strontium	mg/L								1.72	2.1 JB	2.7			1.17
Sulfate	mg/L	550	350	400	320	350		529	497	560	750	25.3	82.1	101
Temperature, Field	deg C			14	15	15	16.2		12.1				15.5	16.3
Thallium	mg/L						0.000266		0.000105	0.001 U	0.001 U	8E-05 J	0.000836	0.000267
Turbidity, Field	NTU		7	14	1.3	1.4	7.1		67.4	22.4	73.2		3569.2	4054.1
Vanadium	mg/L													
Zinc	mg/L										0.015 J			

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Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	96147	96147	96147	96147	96147	96147	96147	96147	96147	96148	96148	96152	96152
	Date	2017-01-31	2017-03-22	2017-04-27	2017-06-07	2017-07-13	2018-03-28	2018-10-04	2018-10-23	2020-03-26	2019-09-26	2020-10-27	2019-03-28	2019-09-22
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	881					900		780	780	350	360	450	450
Aluminum	mg/L		75 J	0.65	68	97								
Antimony	mg/L	8E-05	0.00097 J	0.0012 J	0.0011 J	0.001 J								
Arsenic	mg/L	0.00379	0.013	0.0042 J	0.013	0.021								
Barium	mg/L	0.372	0.43 JB	0.18	0.34	0.64								
Beryllium	mg/L	0.00206	0.0032	0.001 U	0.0027 J	0.0075								
Bicarbonate Alkalinity as CaCO3	mg/L						860		780	780	350	360	450	450
Boron	mg/L	0.445	0.46	0.48 B	0.49	0.5	0.48		0.46	0.46	0.48	0.52	0.43	0.41
Bromide	mg/L	2.81	2.8 J	2.4 J	2.9 J	2 J								
Cadmium	mg/L	0.00018	0.001 U	0.001 U	0.00057 J	0.00036 J								
Calcium	mg/L	18.9	15 B	11	14	19	9.1		10	27	270	250	85	61
Carbonate Alkalinity as CaCO3	mg/L						34		5 U	5 U	5 U	5 U	5 U	5 U
Chloride	mg/L	659	600	570	690 J	460	700		640	1800	9100	8900	4900	4300
Chromium	mg/L	0.00105	0.077 J	0.002 U	0.071 J	0.13								
Cobalt	mg/L	0.0028	0.017	0.00066 J	0.018	0.037								
Conductivity, Field	uS/cm	2933					3868			6671				
Copper	mg/L		0.16 JB	0.0044	0.39 B	0.35 B								
Dissolved Oxygen, Field	mg/L	4.8					1							
Dissolved Solids, Total	mg/L	3040	2200	2100 J	2000	1800 J	2200		1900	3800	15000	8400	6400	6200
Fluoride	mg/L	4.21	4.8	5.3	5.2 J	4.6	4.6		5.6	3.8	0.64	0.67	0.84	0.91
Iron	mg/L		43 JB	0.45	38	88								
Lead	mg/L	0.0227	0.044 J	0.00081 J	0.051	0.088								
Lithium	mg/L	0.034	0.082	0.034	0.084	0.15								
Magnesium	mg/L	4.04	12 B	3.8	12	19	2.8		2.6	8.1	90	80	28	24
Manganese	mg/L		0.28 B	0.063	0.28	0.47								
Mercury	mg/L	0.000206	0.0002 U	0.0002 U	0.0002	0.00027								
Molybdenum	mg/L	0.0179	0.046 J	0.05	0.053	0.04								
Nickel	mg/L		0.044	0.002 U	0.04	0.098								
pH, Field	pH units	8.1	8.02	7.95	8.22	7.95	7.99	8		7.71	7.21		7.71	7.55
Potassium	mg/L	4.54	12 JB	2.4	9.4	14	2.2		2.4	3.4	13	12	14	11
Radium-226	pCi/L	1.98	3.23	1.89	1.87	4.59 J								
Radium-226/228	pCi/L	9.87	7.29	4.65	4.72	12 J								
Radium-228	pCi/L	7.89	4.05 G	2.76 G	2.85	7.41 G								
Redox Potential, Field	mV	102.3												
Selenium	mg/L	0.0003	0.0024 J	0.005 U	0.0027 J	0.0089								
Silver	mg/L		6.6E-05 J	9.6E-05 J	9.3E-05 J	0.00016 J								
Sodium	mg/L	638	770 JB	1100	860 B	720 B	820		880	1300	4900	4800	2800	2500
Strontium	mg/L	0.974	1 JB	1	0.74 B	1.3 B								
Sulfate	mg/L	99.6	110	110	110 J	140	140		130	180	32	63	19	16
Temperature, Field	deg C	13					13.5			14				
Thallium	mg/L	0.000142	0.00085 J	0.001 U	0.001	0.0013								
Turbidity, Field	NTU	1533.1	3297	1687.1	537.7	2269.5	52	20.8		71.1	20			252
Vanadium	mg/L		0.074											
Zinc	mg/L		0.24	0.02 U	0.3	0.46								

Notes:

FD = Field duplicate sample
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deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

Analyte	Program / Location ID / Date / Unit	FEDERAL 96152 2020-03-26 N	FEDERAL 96152 2020-09-17 N	FEDERAL 96153R 2016-08-23 N	FEDERAL 96153R 2016-10-03 N	FEDERAL 96153R 2016-11-29 N	FEDERAL 96153R 2017-03-21 N	FEDERAL 96153R 2017-04-25 N	FEDERAL 96153R 2017-06-06 N	FEDERAL 96153R 2017-07-12 N	FEDERAL 96153R 2018-03-22 N	FEDERAL 96153R 2018-09-13 N	FEDERAL 96153R 2019-03-29 N	FEDERAL 96153R 2019-09-19 N
Alkalinity, Total as CaCO3	mg/L	470	550			262	84					71	140	5 U
Aluminum	mg/L							0.56	0.47	0.085 B				
Antimony	mg/L			0.00059	0.00036	0.00024	0.00085 J	0.002 U	0.00057 J	0.002 U		0.002 U		
Arsenic	mg/L			0.00237	0.00142	0.0013	0.0044 J	0.005 U	0.005 U	0.005 U		0.005 U		
Barium	mg/L			0.0315	0.0901	0.136	0.061 JB	0.027	0.037	0.03		0.028		
Beryllium	mg/L			0.000515	0.000196	0.00019	0.012	0.0048	0.00038 J	0.001 U		0.0052		
Bicarbonate Alkalinity as CaCO3	mg/L	470	550									71	140	5 U
Boron	mg/L	0.43	0.43	0.448	0.423	0.463	0.23	0.25	0.48 B	0.48 B		0.32	0.39	0.18
Bromide	mg/L					0.2 U	5 U	5 U	5 U	5 U				
Cadmium	mg/L			8E-05	0.0001	2E-05 J	0.00036 J	0.00024 J	0.001 U	0.001 U		0.00027 J		
Calcium	mg/L	64	50	189	208	177	210 B	200	72	130		150	150	160
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U									5 U	5 U	5 U
Chloride	mg/L	4800	3400	34.3	16.1	11.6	16	20	35	19		19	21	20
Chromium	mg/L			0.0034	0.0027	0.00261	0.0028 J	0.002 U	0.002 U	0.002 U		0.002 U		
Cobalt	mg/L			0.0234	0.0266	0.00693	0.3	0.29	0.012	0.0063		0.2		
Conductivity, Field	uS/cm	12690	10609	3013	2934	2473					2256			
Copper	mg/L							0.002 U	0.002 U	0.0034				
Dissolved Oxygen, Field	mg/L			4.65	3.74	1.71					0.12			
Dissolved Solids, Total	mg/L	6600	4500	2300	2160	1700	1800	1900 J	1800	1600 J		1600	1500	1600
Fluoride	mg/L	0.86	0.97	0.8	0.72	0.67	2.3	2.3	1.4	1.2		1.4	1.1	2.6
Iron	mg/L							30	0.94	0.14				
Lead	mg/L			0.00648	0.00278	0.00277	0.0014 J	0.001 U	0.00045 J	0.001 U		0.001 U		
Lithium	mg/L			0.096	0.081	0.053	0.18	0.2	0.069	0.054		0.16		
Magnesium	mg/L	23	17			33.6		73	17	26			53	69
Manganese	mg/L						18 B	17	1.6	0.99				
Mercury	mg/L			8E-06	2E-06 J	1.5E-05	0.0002 U	0.0002 U	0.0002 U	0.0002 U		0.0002 U		
Molybdenum	mg/L			0.0126	0.0114	0.00812	0.0065 J	0.0042 J	0.02	0.0068 J		0.003 J		
Nickel	mg/L							0.27	0.018	0.0061				
pH, Field	pH units	7.75	7.68	7.18	6.99	7.35	6.46	6.19	7.2	7.49	7.14	6.04	6.59	5.31
Potassium	mg/L	11	9.3			6.7	10 JB	11	5.3	5.8			15	11
Radium-226	pCi/L			0.634	0.403	0.968	0.476	0.475	0.335	0.05 U		0.328		
Radium-226/228	pCi/L			2.434	1.963	1.64	0.764	0.926	0.607	0.702		0.72		
Radium-228	pCi/L			1.8	1.56	0.672	0.288 U	0.451	0.272 U	0.652 J		0.393 U		
Redox Potential, Field	mV			36.1	136.7	227.2								
Selenium	mg/L			0.0009	0.0005	0.0006	0.0053 J	0.0017 J	0.0014 J	0.001 JB		0.005 U		
Silver	mg/L							0.001 U	0.001 U	0.001 U				
Sodium	mg/L	2500	2100			287	160 JB	190	490 B	330			280	150
Strontium	mg/L					3.22	1.5 JB	1.4	1.3 B	2.6				
Sulfate	mg/L	20	28	1290	1320	973	1200	1700	1000	1000		1100	1100	1100
Temperature, Field	deg C	15	14	14.3	14.6	13.3					12.2			
Thallium	mg/L			5E-05 J	8E-05 J	2E-05 J	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U		
Turbidity, Field	NTU	230	76.1	141.2	65	49.6	113.6	87.4	19.2	30.7	7	69.4		85
Vanadium	mg/L													
Zinc	mg/L							0.61	0.018 J	0.02 U				

Notes:
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pCi/L = Picocuries per liter
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	96153R	96153R	96153R	96154R	96154R	96154R	96154R	96154R	96154R	96154R	96154R	96154R	96154R
	Date	2020-03-15	2020-03-24	2020-09-15	2016-08-23	2016-10-03	2016-11-29	2017-01-30	2017-03-21	2017-04-25	2017-06-06	2017-07-12	2018-03-22	2018-09-13
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	280	270	230			558	607	600					460
Aluminum	mg/L									0.42	1.4	0.96 B		
Antimony	mg/L				0.00091	0.00098	0.00046	0.00078	0.0014 J	0.0014 J	0.002 U	0.0006 JB		
Arsenic	mg/L				0.00644	0.00668	0.00409	0.00277	0.0049 J	0.0093	0.0022 J	0.0025 J		
Barium	mg/L				0.13	0.115	0.219	0.194	0.28 JB	0.067	0.12	0.11		
Beryllium	mg/L				0.000546	0.000319	0.000679	0.000166	0.001 U	0.001 U	0.001 UJ	0.001 U		
Bicarbonate Alkalinity as CaCO3	mg/L	280	270	230										110
Boron	mg/L	0.54	0.51	0.5	0.441	0.395	0.504	0.454	0.49	0.5	0.53 B	0.53 B		
Bromide	mg/L						1.48	1.36	1.5 J	1.4 J	2.4	1.8 J		
Cadmium	mg/L				5E-05	2E-05	4E-05	4E-05	0.001 U	0.001 U	0.001 U	0.001 U		
Calcium	mg/L	92	120	140	9.41	5.34	10.5	22.1	31 B	2.1	4.8	4.3		3.2
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U										350
Chloride	mg/L	31	14	15	413	452	410	446	410	410	470	490		410
Chromium	mg/L				0.0022	0.0057	0.0121	0.00249	0.0051 J	0.002 U	0.0078 J	0.0013 J		
Cobalt	mg/L				0.00204	0.00176	0.00443	0.000799	0.00095 J	0.00037 J	0.00042 J	0.00022 J		
Conductivity, Field	uS/cm	2396	2274	2131	2462	2602	2562	2549					2650	
Copper	mg/L									0.002 U	0.0043 B	0.002 U		
Dissolved Oxygen, Field	mg/L				0.68	0.59	1.16	1.02					0.15	
Dissolved Solids, Total	mg/L	1500 J	1700	1500	1940	1550	1850	1590	1400	1400 J	1500	1500 J		
Fluoride	mg/L	1.2	1	0.81	3.32	3.36	3.4	3.33	4.2	4.5	4.1	4.5		4.4
Iron	mg/L									0.29	1.4	0.64		
Lead	mg/L				0.00565	0.00371	0.00967	0.0031	0.0021 J	0.001 U	0.00077 J	0.00048 J		
Lithium	mg/L				0.08	0.054	0.04	0.137	0.24	0.19	0.048	0.049		
Magnesium	mg/L	19	23	28			4.24	1.48		0.55 J	1.5	1.4		0.51 J
Manganese	mg/L								0.02 B	0.011	0.013	0.0053		
Mercury	mg/L				2.5E-05	1E-05	3E-05	1.8E-05	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L				0.0557	0.102	0.0724	0.0692	0.09 J	0.093	0.1	0.1		
Nickel	mg/L									0.002 U	0.0028	0.002 U		
pH, Field	pH units	7.42	7.36	7.23	9.5	9.36	8.67	9.64	10.67	10.32	8.76	8.82	9.85	10.11
Potassium	mg/L	5.5	5.8	6			7.64	33.8	58 JB	41	6	6.1		12
Radium-226	pCi/L				1.21	0.53	1.68	0.96	0.696	0.664	0.251	0.213		
Radium-226/228	pCi/L				1.566	1.434	2.328	1.762	1.21	0.894	0.655	0.577		
Radium-228	pCi/L				0.356	0.904	0.648	0.802	0.51	0.23 U	0.405	0.364 UJ		
Redox Potential, Field	mV				97.1	54.8	175.9	139.8						
Selenium	mg/L				0.001	0.001	0.002	0.0006	0.00096 J	0.005 U	0.005 U	0.005 U		
Silver	mg/L									0.001 U	0.0017	0.00021 J		
Sodium	mg/L	420	350	330			478	449	540 JB	510	540 B	590		450
Strontium	mg/L						0.425	1.37	2.6 JB	0.57	0.36 B	0.38		
Sulfate	mg/L	1200	1100	910	99.2	87.4	125	66.8	64	60	100	100		42
Temperature, Field	deg C	13	13	14	16.5	14.4	13.3	11.2					12.6	
Thallium	mg/L				6.4E-05	0.000144	0.000121	0.000114	0.001 U	0.001 U	0.001 U	0.001 U		
Turbidity, Field	NTU	4	10.5	9.8	737	209.7	642.7	349.1	98.6	63.9	44.8	16.2	6	6.23
Vanadium	mg/L													
Zinc	mg/L									0.02 U	0.02 U	0.02 U		

Notes:
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mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program Location ID Date	FEDERAL 96154R 2019-03-29 FD	FEDERAL 96154R 2019-03-29 N	FEDERAL 96154R 2019-09-19 N	FEDERAL 96154R 2020-03-12 N	FEDERAL 96154R 2020-09-14 N	FEDERAL 96156 2016-08-23 N	FEDERAL 96156 2016-10-03 N	FEDERAL 96156 2016-11-29 N	FEDERAL 96156 2017-01-30 N	FEDERAL 96156 2017-03-21 N	FEDERAL 96156 2017-04-25 N	FEDERAL 96156 2017-06-06 N	FEDERAL 96156 2017-07-12 N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	350	350	280	560	530				165	150			
Aluminum	mg/L											0.05 U	0.079	0.084 B
Antimony	mg/L						0.0001 J	0.00141	0.00208	0.00022	0.0025	0.002 U	0.0017 J	0.0012 JB
Arsenic	mg/L						0.0141	0.0184	0.0398	0.00202	0.0035 J	0.0042 J	0.0043 J	0.0036 J
Barium	mg/L						16.2	17.4	17.7	14.8	16 JB	16	16	15
Beryllium	mg/L						0.0002 U	0.000129	0.0003 J	2E-05 U	0.00043 J	0.001 U	0.001 UJ	0.001 U
Bicarbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U	280	470								
Boron	mg/L	0.38	0.38	0.39	0.43	0.45	0.394	0.357	0.375	0.379	0.46	0.4	0.43 B	0.4 B
Bromide	mg/L									58.6	57	73	67	51
Cadmium	mg/L						0.00022	0.00221	0.00419	0.0001	0.00043 J	0.00027 J	0.00088 J	0.0015
Calcium	mg/L	61	61	26	17	7	409	354	399	346	380 B	380	390	370
Carbonate Alkalinity as CaCO3	mg/L	130	130	180	280	58								
Chloride	mg/L	340	330	350	490	470	11700			12000	13000	17000	12000	12000
Chromium	mg/L						0.0011	0.0195	0.0598	0.000629	0.0011 J	0.002 U	0.0077 J	0.016
Cobalt	mg/L						0.00194	0.00371	0.00517	0.00145	0.0021	0.0016	0.0015	0.0017
Conductivity, Field	uS/cm				2483	2545	30150	32283	17682	30266				
Copper	mg/L											0.82	1.3 B	1.3
Dissolved Oxygen, Field	mg/L						2.61	2.64	5.31	4.89				
Dissolved Solids, Total	mg/L	860	850	900	1400	1400	18300			18100	15000	19000 J	21000	15000 J
Fluoride	mg/L	3.3	3.3	3.9	4	4.2	0.33			2 U	2.5 U	5 U	1.3 U	2.5 U
Iron	mg/L											4.5	7.7	2.7
Lead	mg/L						0.00236	0.0218	0.0455	0.00115	0.0022 J	0.001 U	0.0055	0.0033
Lithium	mg/L						0.269	0.252	0.296	0.294	0.22	0.25	0.25	0.23
Magnesium	mg/L	0.34 J	0.41 J	0.24 J	1.5	1.3			117	111		130	140	130
Manganese	mg/L										0.93 B	0.75	0.79	0.74
Mercury	mg/L						5E-06 U	0.0002 U	2.1E-05	1.1E-05	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L						0.00987	0.017	0.0225	0.0054	0.0056 J	0.0073 J	0.017	0.0086 J
Nickel	mg/L											0.0045	0.0049	0.055
pH, Field	pH units		12.06	11.7	9.76	8.93	7.07	6.83	7.23	6.77	8.93	8.32	7.26	8.04
Potassium	mg/L	20	20	10	7.2	3.6			36.5	47.4	22 JB	22	22	21
Radium-226	pCi/L						33.8			51.2	94	86.5	64.4	59.3 J
Radium-226/228	pCi/L						75.85	41.96		122.3	189	189	138	119 J
Radium-228	pCi/L						42.05	41.96		71.1	95.2	103	73.4	60.2
Redox Potential, Field	mV						-82.4	-66.3	176.5	102.7				
Selenium	mg/L						0.0006 J	0.0004 J	0.001 J	0.0001	0.0013 J	0.005 U	0.00091 J	0.0011 JB
Silver	mg/L											6.6E-05 J	0.001 U	8.9E-05 J
Sodium	mg/L	340	340	320	520	500			2620	1400	6800 JB	6100	1 U	6400
Strontium	mg/L								30.4	25.3	31 JB	33	31 B	27
Sulfate	mg/L	29	29	33	33	36	1.9			1 J	50 U	100 U	25 U	50 U
Temperature, Field	deg C				13	14	15.2	16.1	15.7	9.1				
Thallium	mg/L						0.0005 U	0.0002 J	0.0002 J	3E-05 J	0.001 U	0.001 U	0.001 U	0.001 U
Turbidity, Field	NTU			41	140	87.9	9	38.2	123.8	64.8	81.7	72.5	83.2	48
Vanadium	mg/L													
Zinc	mg/L											0.19	0.18	0.16

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NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
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Empty cells = Not analyzed

Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	96156	9910	9910	9910	9910	9910	9910	MW-20	MW-20	MW-20	MW-20	MW-20	MW-20
	Date	2018-03-26	2016-10-03	2018-09-25	2019-03-26	2019-09-22	2020-03-15	2020-09-17	2016-08-23	2016-10-05	2016-12-01	2017-04-25	2017-06-06	2017-07-14
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L			830	860	850	870	840			259			
Aluminum	mg/L											0.05 U	0.043 J	0.15
Antimony	mg/L								4E-05 J	0.0002 U	0.0001 U	0.002 U	0.002 U	0.002 U
Arsenic	mg/L								0.00938	0.01	0.00917	0.0048 J	0.0086	0.013
Barium	mg/L								0.0274	0.0228	0.0233	0.025	0.027	0.029
Beryllium	mg/L								0.000234	0.000265	0.000276	0.00032 J	0.00055 J	0.00088 J
Bicarbonate Alkalinity as CaCO3	mg/L			830	840	840	850	840						
Boron	mg/L			0.52	0.52	0.49	0.51	0.51	0.126	0.272	0.104	0.15 J	0.19 B	0.15
Bromide	mg/L										0.422	5 U	0.5 U	5 U
Cadmium	mg/L								8E-05	2E-05 J	4E-05 U	0.001 U	0.001 U	0.001 U
Calcium	mg/L			12	13	13	11	14	495	483	465	500	500	500
Carbonate Alkalinity as CaCO3	mg/L			5 U	23	6.9	19	5 U						
Chloride	mg/L			840	880	800	850	850	60.1	25.2	16.4	11	6.5	8.2 J
Chromium	mg/L								0.0028	0.0018	0.00121	0.002 U	0.0018 J	0.0025
Cobalt	mg/L								0.128	0.134	0.143	0.13	0.13	0.14
Conductivity, Field	uS/cm	32509	4918				4626	4577	2819	3042	2935			
Copper	mg/L											0.002 U	0.002 U	0.002 U
Dissolved Oxygen, Field	mg/L	0.24	1.58						2.93	1.5	4.67			
Dissolved Solids, Total	mg/L			2400	2900	2700	2900	2300	2660	2710	2620	2500 J	2600	2600 J
Fluoride	mg/L			2	1.9	2	2	2	0.95	1	1	1.2	0.93	0.9
Iron	mg/L											27	32	37
Lead	mg/L								0.000201	0.00013	3E-05 J	0.001 U	0.001 U	0.00089 J
Lithium	mg/L								0.174	0.171	0.188	0.16	0.16	0.16
Magnesium	mg/L			4	4.2	4.3	3.9	4.3			106	100	100	110
Manganese	mg/L											15	15	16
Mercury	mg/L								5E-06 U	5E-06 U	5E-06 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L								0.0089	0.00543	0.00249	0.0016 J	0.002 J	0.0027 J
Nickel	mg/L											0.1	0.11	0.12
pH, Field	pH units	7.4	7.58	7.64	7.76	7.8	7.88	7.8	6.88	6.52	6.5	6.51	6.52	6.51
Potassium	mg/L			2.9	3.2	3	3	3			9.01	7.8	7.8	8
Radium-226	pCi/L								0.31	0.344	0.322	0.181	0.192	0.327
Radium-226/228	pCi/L								0.684	1.494	0.866	0.594	0.425	0.73
Radium-228	pCi/L								0.374	1.15	0.544	0.413	0.234 U	0.404
Redox Potential, Field	mV		208.7						-41	-55.5	-47.5			
Selenium	mg/L								0.0001 J	0.0002 J	0.0001 J	0.005 U	0.005 U	0.0015 J
Silver	mg/L											0.001 U	0.001 U	0.001 U
Sodium	mg/L			1100	1100	1000	980	980			64.6	52	51 B	53 B
Strontium	mg/L										3.08	3.6	3.3 B	3.2 B
Sulfate	mg/L			110	120	100	110	94	1610	1810	1610	2200	1700	1600
Temperature, Field	deg C	12.7	16.7				13	14	16.53	15.4	12.1			
Thallium	mg/L								0.000598	0.00033	9E-05 J	0.001 U	0.001 U	0.001 U
Turbidity, Field	NTU	1	184.3	46.5		69	85.3	26	42.4	9.6	9.2	6.1	1.4	4.8
Vanadium	mg/L													
Zinc	mg/L											0.02 U	0.02	0.038

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
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pCi/L = Picocuries per liter
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Appendix B
Analytical Data Summary
Fly Ash Reservoir
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	MW-20	MW-20	MW-20	MW-20	MW-20
	Date	2018-03-26	2019-09-19	2020-03-15	2020-03-24	2020-09-15
		N	N	N	N	N
Analyte	Unit					
Alkalinity, Total as CaCO3	mg/L		150	170	170	160
Aluminum	mg/L					
Antimony	mg/L					
Arsenic	mg/L					
Barium	mg/L					
Beryllium	mg/L					
Bicarbonate Alkalinity as CaCO3	mg/L		150	170	170	160
Boron	mg/L		0.12	0.19 U	0.16	0.1
Bromide	mg/L					
Cadmium	mg/L					
Calcium	mg/L		470	470	470	450
Carbonate Alkalinity as CaCO3	mg/L		5 U	5 U	5 U	5 U
Chloride	mg/L		1.9	2	2.1	1.8
Chromium	mg/L					
Cobalt	mg/L					
Conductivity, Field	uS/cm	2817		2523	2455	2402
Copper	mg/L					
Dissolved Oxygen, Field	mg/L	1.76				
Dissolved Solids, Total	mg/L		2600	2500 J	2100	2100
Fluoride	mg/L		1.3	1.3	1.2	1.3
Iron	mg/L					
Lead	mg/L					
Lithium	mg/L					
Magnesium	mg/L		110	110	110	100
Manganese	mg/L					
Mercury	mg/L					
Molybdenum	mg/L					
Nickel	mg/L					
pH, Field	pH units	6.56	6.35	6.4	6.81	6.36
Potassium	mg/L		6.4	6.4	6.4	5.6
Radium-226	pCi/L					
Radium-226/228	pCi/L					
Radium-228	pCi/L					
Redox Potential, Field	mV					
Selenium	mg/L					
Silver	mg/L					
Sodium	mg/L		26	28	28	27
Strontium	mg/L					
Sulfate	mg/L		1700	1800	1700	1500
Temperature, Field	deg C	12.4		12	13	14
Thallium	mg/L					
Turbidity, Field	NTU	1	67	456	248	123
Vanadium	mg/L					
Zinc	mg/L					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
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NTU = Nephelometric Turbidity Unit
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