2021 Annual Inspection Report

Gavin Power, LLC

Residual Waste Landfill

Gavin Power Plant
Cheshire, Ohio

7 January 2022

Project No.: 0589450

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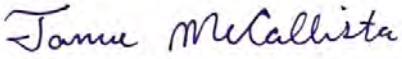
 James Hemme, P.E., L.R.S., M.B.A. *Professional Engineer*		 Tanner McCallister, E.I.T., M.B.A. *Consultant I, Engineering*

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CONTENTS

List of Tables

List of Attached Figures

Acronyms and Abbreviations

CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
Charah	Charah Solutions, Inc.
ERM	ERM Consulting & Engineering, Inc.
FGD	Flue Gas Desulfurization
OEPA	Ohio Environmental Protection Agency
Plant	Gavin Power Plant
PTI	Permit to install
PVC	Polyvinyl chloride
RWL	Residual Waste Landfill

1. INTRODUCTION

The Residual Waste Landfill (RWL) at the Gavin Power Plant (Plant) in Cheshire, Ohio, is subject to the Code of Federal Regulations (CFR) Title 40, Part 257, Subpart D, "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," commonly referred to as the Coal Combustion Residuals (CCR) Rule. The CCR Rule requires an annual inspection and reporting for operating CCR landfills. In addition, any lateral expansion of the CCR unit that occurs between annual inspection reports must be examined and included in the subsequent annual inspection report.

This Annual Inspection Report of the RWL has been prepared by ERM Consulting & Engineering, Inc. (ERM) to comply with these requirements of the CCR Rule, 40 CFR § 257.84.

1.1 Summary of Conditions of Annual Inspection

The annual inspection of the RWL was performed by Mr. James Hemme, P. E., the certifying Professional Engineer in the State of Ohio, Mr. Luis Velasquez, and Mr. Tanner McCallister, E.I.T., all of ERM. Mr. Colin McKean, Landfill Process Owner at Gavin Power, is the facility contact and supported the inspection activities. Other members of the Gavin Power team, including their contractors, assisted with logistics and provided data for the completion of the inspection and report.

The inspection for the RWL was performed on 6 October 2021. Weather was partly sunny with light wind, high humidity, and temperatures ranged from 70 degrees Fahrenheit to 81 degrees Fahrenheit. The inspection was initiated with a safety briefing from Mike Varney, Safety Officer for Charah (operations contractor to Gavin Power).

The RWL is currently undergoing horizontal and vertical expansion and construction activities were observed during the inspection. The inspection route started at the Southern end of the RWL at Pond No. 1 and associated vertical flow wetlands, then proceeded North and East towards Pond No. 3 and No. 5, including the vertical flow wetlands, and progressed East to Pond No. 2 and the associated vertical flow wetland. Following Pond No. 2, the inspection continued across the RWL near the newly constructed Pond No. 6 and finished at the center of the RWL. Pond 6 was under construction at the time of the 2021 annual inspection and has not been completed or certified by the Ohio Environmental Protection Agency OEPA (OEPA). Pond 6 includes a high-density polyethylene (HDPE) geomembrane liner and fiber reinforced concrete floor and side slopes up to normal pool elevation to protect liner during future cleaning operations. The expansion construction activities for the RWL were active and were observed from the roadway at a safe distance during the inspection. CCR material was actively being hauled to the Phase H area (approved by OEPA in January 2019) at the time of the inspection. Maintenance activities near the ponds and on the roadways were observed as documented in the report.

1.2 Regulatory Cross-Reference Table

In compliance with 40 CFR § 257.84(b)(1), this inspection and inspection report for the RWL was completed by James Hemme, a qualified Professional Engineer in the State of Ohio. **Table 1**, below, is a regulatory cross-reference table that describes the inspection requirements and the location of these requirements in this report.

Table 1: Federal Regulatory Requirement Cross-Reference Table

Federal Regulatory Requirement Summary	Location in the Annual Report
§ 257.84(b)—Annual inspections by a qualified professional engineer	Sections 1.1 and 1.2
§ 257.84(b)(1)(i)—A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections)	Section 4
§ 257.84(b)(1)(ii)—A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit	Section 3
§ 257.84(b)(2)(i)—Any changes in geometry of the structure since the previous annual inspection	Section 3
§ 257.84(b)(2)(ii)—The approximate volume of CCR contained in the unit at time of the inspection	Section 2.1
§ 257.84(b)(2)(iii)—Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR	Section 3; Appendix A
§ 257.84(b)(2)(iv)—Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection	Section 5.3; Appendix A

2. GAVIN PLANT INFORMATION

2.1 Facility Overview

The Gavin Power Plant is located in Gallia County, Ohio, immediately south of Cheshire, Ohio, and adjacent to State Route 7. The Plant is also adjacent to the western shoreline of the Ohio River. Nearby towns include Addison, Ohio, and Point Pleasant, West Virginia. The RWL is located northwest of the Plant, as depicted on **Figure 1**; the currently permitted waste boundaries are indicated.

The RWL is permitted by the OEPA to accept and dispose of CCR material in accordance with Ohio Administrative Code 3745-30. Approximately 98 percent of this material is FGD by-product (consisting of scrubber cake, fly ash, and lime) and 2 percent other approved disposal materials (bottom ash, lime ball mill rejects, coal pulverizer rejects, bottom ash pond sediments, and sand/moss mixture from the vertical flow wetlands).

In 1994, the RWL was permitted for a capacity of 49 million cubic yards. In 2014, the RWL was authorized to expand horizontally and vertically, under Permit-to-Install (PTI) #06-08447, increasing the capacity of the RWL by 45.5 million cubic yards to a total of 94.5 million cubic yards. In 2021, the facility reported an estimated disposal volume of 2.32 million cubic yards (~2.9 million tons) of CCR. The RWL currently contains approximately 59.3 million cubic yards of CCR.

Construction under the PTI has been ongoing since 2016, performed and certified by a third party in phases until completion. The RWL has to-date completed construction of the leachate/sedimentation Pond No. 5 and vertical flow wetlands associated with the landfill pond outfalls for Ponds 1, 2 and 3. Since the 2020 inspection, the RWL has continued engaging in lateral expansion construction activities for Phase I and has completed installation of the leachate/sedimentation Pond No. 6 in the approximate areas depicted on **Figure 2**.

Since the inspection in 2020, Phase H, located in the northeast sector of the landfill, has continued being filled uniformly with FGD by-product. The active surface of the FGD was generally observed to be mildly sloped (estimated at 1 to 2%) and appeared to be maintaining positive drainage for surface-water run-off. The height of the active surface was several feet above the level of the surrounding access road compared to the 2020 annual report.

The liner system utilized in Phase H and currently under construction in Phase I consists of the following layers in descending order:

- A minimum top protective layer of 18” to protect leachate collection layer;
- A geonet composite leachate collection/drainage layer on the slopes and a 12-inch thick rounded gravel leachate collection layer on flatter sections around the leachate collection piping;
- A 30-mil polyvinyl chloride (PVC) geomembrane; and
- A reinforced geosynthetic clay liner overlying a prepared soil subgrade consisting of native soil materials including a top 6” minimum of “select subgrade” clay cushion layer.

The liner system components were visually observed along the perimeter tie-in between Phase H and Phase I (Appendix A, Photograph 21) during the 2021 annual inspection. The geonet composite layer was visible and in other layers where the geonet layer was not installed, the gravel leachate collection layer was visible.

In January of 2019, the Plant received approval from OEPA to construct Phase I of the RWL prior to Phase G. Bulk excavation activities observed during the 2019 and 2020 inspections indicate that mass excavation for Phase I is complete and final grading and liner system construction activities were observed during this inspection.

A stockpile of cohesive soils derived from the Fly Ash Reservoir embankment during its decommissioning previously observed north of where liner expansion materials were stockpiled between Phase H and Fly Ash Reservoir was no longer present. It is ERM's understanding that those cohesive soils were excavated and then placed as select subgrade layer within the new construction of Phase I.

2.2 Residual Waste Landfill Operations

Charah is the current contractor for RWL operations. Daily operation and site maintenance activities include hauling and distributing CCR, dredging accumulated solids from within the settling ponds and channels, placing cover material, and maintaining vegetation. These activities are documented on a daily log that is maintained by Gavin Power. Fugitive dust controls for the landfill operations are implemented based on current site conditions and include watering, using chemical suppressants, controlling the speed of construction vehicles, and cleaning paved roads. On-site haul roads are maintained on a daily basis through the use of motor grader/roller equipment. Bottom ash from the Bottom Ash Pond is applied to the active haul roads and roadways as needed to establish and maintain a smooth and stable surface for traffic. Gavin Power conducts weekly and monthly inspections and reports deficiencies to Charah for repair.

3. RESIDUAL WASTE LANDFILL VISUAL INSPECTION

The 2021 annual visual inspection conducted for the RWL is summarized below. Photographs referenced herein are located in **Appendix A**. The approximate locations where the photographs were taken are indicated on **Figure 3**. Qualitative terms used herein to describe the inspection are summarized in **Appendix B**.

Overall, the RWL, the roads, and the construction activities associated with the lateral expansion, to the extent they were observable, were in satisfactory condition (as defined in **Appendix B**) and activities are progressing in general conformance with the 2012 Final Permit-To-Install Application Expansion of the Gavin Plant Residual Waste Landfill Section C.8. ERM personnel did not observe evidence of obvious settlement, misalignment, significant erosion, tension cracks, or other signs of possible instability, movement, or significant erosion along any of the slopes. ERM did not observe visual evidence indicating that storm water was impounding in the designated RWL area (except in small sedimentation collection traps) or along roadways. Since the 2020 annual inspection, Phase H has been the predominant location for placement of CCR. Changes in geometry of the RWL were observed during the inspection. The vertical expansion areas (Phase F2 and J) increased in height in isolated areas since the last inspection. CCR placement within the lateral expansion area (Phase H) has continued up to several feet above the height of the surrounding access road.

3.1 Haul and Access Roads

The haul roads in active areas of CCR placement use bottom ash as a base course (as observed in Photographs 1, 2, and 3). This base course compacts well and withstands repeated heavy equipment traffic based on experience. The haul roads observed by ERM appeared to be stable during the site drive/walkthrough, and there was no visual evidence of significant distress (i.e., rutting or pumping). The roads had positive drainage from the centerline or are sloped to an adjacent drainage channel and there was no visible evidence of ponding water on the roadway surface. Drainage channels paralleling the roadways also capture storm water runoff from adjacent slopes, which is directed to stable outlets that ultimately discharge to the surrounding site treatment ponds. ERM observed sporadic evidence of minor erosion in the channel bottoms or at the connection point/confluence of drainage berms that collect water from the landfill side slopes. Overall, roadside channels appeared well maintained. ERM observed active cleaning of roadside channels along the eastern haul road during the site visit, reportedly completed as needed.

There were several sections of permanent roads that have a gravel base course, as depicted in Photographs 4, 6, 8, and 9. These roads also were observed to be stable with no visible evidence of distress. More frequently used roadways incorporate robust drainage channels adjacent to slopes, which were positively graded and include rock check dams (Photograph 6 and 7). The drainage channels on the eastern slopes had marginal sediment buildup near the rock check dams (Photograph 7) but cleanout capacity had not been reached and maintenance was not needed at the time of the inspection.

The roadside drainage channels on the southwestern slopes exhibited minor signs of erosion and rilling into the underlying FGD material in areas with temporary vegetated cover. ERM recommends that these individual areas continue to be repaired and monitored in accordance with the ongoing maintenance program. If issues persist, increasing the number of rock check dams to reduce channel flow velocities and adding supplemental riprap reinforcement should be considered and installed as needed. ERM also recommends continued maintenance of the sediment traps below areas where erosion has been noted.

3.2 Slopes and Slope Cover

Approximately 75 percent of the existing slope surface area has received final cover, and 25 percent of the surface area has received intermediate cover. In general, intermediate cover consisted of a 6- to 12-inch-thick layer of soil. The western and northern slopes have received intermediate cover that is well vegetated (Photographs 4, 5, 8, and 14). As portions of the lateral expansion are constructed and filled with CCR, this intermediate cover of soil will be removed and reused for cover in other areas of the landfill. This activity was observed by ERM to be on-going on the northern slope as the level of CCR in Phase H increases in elevation (Photograph 11,12, and 13).

There were no visual observations of actual structural weakness within the RWL (e.g., slips, soil tension cracks, sinkholes) noted during the annual inspection. No indications of residual waste movement changes that might alter the geometry of finished slopes or overall stability of the RWL were identified.

The areas with final cover included a reported minimum 3-foot-thick cap consisting of a 2-foot layer of barrier soil and a 1-foot layer of soil capable of supporting vegetation (Photograph 4, 5, and 8). The areas that had received final cover exhibited well-established vegetation.

There were infrequent instances where notable erosion rills/gullies were observed (Photograph 17 and 18) in the surface of the intermediate cover. Sedimentation was fully contained in these areas and directed toward the facility treatment ponds. There was no visible evidence that these isolated areas of erosion have the potential to disrupt the operation and safety of the RWL or that observed erosion features were creating an unstable situation. These erosion areas should be repaired and reseeded in the Spring of 2022. In the interim, to the extent practical, upslope runoff should be minimized in these areas through common industry standard maintenance practices such as reworking the area with temporary seeding or through run-off diversion to prevent water from breaking over the top of slope.

In the past, the Gavin Power Plant team performed direct seeding of FGD material, which was only partially successful in establishing vegetation. The Gavin Power Plant team thereafter began covering these areas with soil to promote more vigorous stands of vegetation. Some areas with FGD direct seeding still exhibit poor vegetative growth, as indicated in Photographs 3 and 9 (right side of photo), but this was observed to a much-reduced extent when compared to previous inspections. These isolated areas of the slopes, where direct seeding of the placed FGD was attempted, continue to be covered incrementally with an intermediate layer of soil to aid in the establishment of vegetation. The application of this intermediate soil layer as slopes are completed or meet their interim grades are observed in Photograph 9 (left side of photo).

In stormwater channels, the Gavin Power Plant team has successfully utilized riprap, periodic rock check dams, and outlet protection to reduce storm water velocity and minimize the potential for erosion. There are isolated instances where sedimentation has filled the voids of placed riprap, which is maintained as needed to minimize sediments reaching the ponds. Erosion rills and gullies were observed in isolated areas but was not identified as a systemic issue (Photographs 17 and 18). The overall stability of the cover, good vegetative practices and proper functioning of the storm water channels provide evidence that the Gavin Power Plant team has successfully controlled storm water flow on graded slopes within the RWL.

At the summit of the RWL in the center of vertical Phase F2 expansion, an interim elevation of approximately 932 feet has been reached. It will remain at that elevation until FGD fills in adjacent constructed cells achieves an equivalent elevation of 932 feet. Surface water at the summit of Phase F2 is managed by chimney drains (Photographs 19) that are connected and flow to the leachate collection system at the bottom of the landfill.

3.3 Sedimentation/Leachate Ponds

Five pond units, specifically Pond Nos. 1, 2, 3, 5, and 6, currently manage sedimentation and storm water, and treat leachate generated by the RWL.

Pond No. 1 is located in the Southwest corner of the RWL and is the oldest treatment pond at the facility. It consists of a primary treatment pond and clarifying pond. The clarifying pond discharges into an associated duplex vertical flow wetland treatment system.

Pond No. 2 is located on the Southeast portion of the facility and also consists of a primary treatment pond and clarifying pond. The clarifying pond discharges into an adjacent duplex vertical flow wetland treatment system.

Pond No. 3 is located to the East of the RWL and also consists of a primary treatment pond and clarifying pond. The clarifying pond discharges into an adjacent duplex vertical flow wetland treatment system.

The vertical flow wetland treatment systems for Ponds No. 1, No. 2 and No.3/No.5 were installed in 2016 and 2017 and have been designed to perform as additional filtration systems to remove target pollutants not completely removed by the preceding treatment processes. Flow from the clarifying ponds are directed into the vertical flow wetlands through an inlet structure. The effluent from the various vertical flow wetland systems is discharged through a weir and flow meter station off-site in accordance with the Plant National Pollutant Discharge Elimination System permit. Photographs 24–28 from Pond No. 1 depict the vertical wetlands, inlet structure, and flow meter station, which is the same system at Ponds No. 2 and 3.

Pond No. 6 is located to the northwest of Phase H and I, is the most recently constructed pond, and consists of both a primary treatment and clarifying pond, but is not included on this inspection report, because construction activities are not complete and it was not in service at the time of the inspection.

3.3.1 Pond No. 1

Pond No. 1 on the south side of the RWL observed to be functioning properly during the annual inspection. The sedimentation/treatment portion of Pond No. 1 was observed to contain varying depths of solids, as observable in Photographs 29, 30, and 31. This pond is routinely cleaned of accumulated solids, typically through the use of extended-reach excavators or a floating dredge. Based on a visual assessment, Pond No. 1 was noted to have accumulated sediments above the 2020 levels. The pond was also noted to have a more whitish coloration (Photograph 29) than in 2020, which is due to the flocculation of particles because of water treatment processes.

A build-up of sediments, aggregate, and vegetation was observed in the north end of the pond near the two inflow channels (Photograph 30). For maintenance purposes, these materials should be removed and properly disposed. Stone from the access roadway was observed to be deposited in these inflow channels areas. It is recommended that steps be taken to mitigate the tracking of stone from the roadway by vehicles and during the application of maintenance aggregate to the surface. Also, several small tears in the runout portion of the geomembrane at the west embankment of Pond No. 1 were observed; however, these small tears were located above the normal operating level of the pond (Photograph 33). Additionally, there were multiple small tears and holes identified around the perimeter of Pond No. 1; however, were also above the operating water level. No water was standing against these tears, and no discharge through these tears was observed. The small tears identified in the liner noted in the previous inspection have been repaired. ERM recommends that the new tears be repaired by a similar procedure as part of routine maintenance. The 2020 patched repairs were observed in Pond No. 1 (Photograph 31).

The vertical flow wetlands for Pond No. 1 observed to be in general working order (Photographs 24, 25, 26, 27 and 28).

3.3.2 Pond No. 2

Pond No. 2 on the southeast side of the RWL was observed and appeared to be functioning properly during the inspection. To assist with the removal of FGD solids derived from the stack-out pad and to minimize dredging, Gavin Power operates a concrete settling basin at Pond No. 2 (Photograph 34). This basin is routinely cleaned with an extended-reach excavator.

The primary treatment pond observed to be in satisfactory working condition following the maintenance adjustments that continued after the 2020 annual inspection. During 2020 and early 2021 significant spot repairs were made to the geomembrane liner system of this pond. The length of these repairs were inspected and a few minor punctures or rips were identified above the water level. Patch repairs that addressed previous issues throughout the Primary Pond No. 2 are noted (Photograph 37). Additional minor repairs should be addressed in the Northeast corner of Primary Pond No. 2.

The clarifying pond was observed to be in satisfactory condition with only a few minor rips or holes identified in the geomembrane above the water level (Photographs 35). Orange staining was observed on the southern side slope of the pond liner that was the result of pumping water from the primary treatment pond across the berm into the clarifying pond during previous maintenance.

The vertical flow wetlands for Pond No. 2 were observed to be in satisfactory condition. The turbid water that was noted in 2020 has been rectified and was not present during this inspection (Photograph 39). The westernmost wetland was observed to be functioning as designed. The rock ditch line to the West of the vertical flow wetlands did not exhibit significant erosion and was observed to be functioning properly.

3.3.3 Pond No. 3

Pond No. 3 on the northeast side of the RWL was observed to be functioning satisfactorily for treatment but poor conditions were observed regarding overall containment in the clarifying portion of the pond. Within the primary treatment pond there was significant sediment accumulation and vegetation observed within the central portion and along multiple embankments as indicated in Photographs 40 and 41, having increased from observations in the 2020 inspection. This is based on observation that the solids level appeared to be just below the operating water level in several locations. Hydrogen peroxide was observed being added at the leachate inflow point to this pond resulting in elemental sulphur and white colored solids accumulating at the pond (Photograph 41). A small number of minor holes and tears were noted above the operating level of the main pond.

Within the clarifying pond, numerous holes and tears were identified in the geomembrane during the inspection with some exhibiting vegetative growth from beneath. Surficial layers of a protective PVC geomembrane were also suggesting significant levels of deterioration such as material stiffness due to UV exposure over time and rips/tears. This surficial PVC geomembrane was installed at some time in the past for ultraviolet protection over the primary geomembrane in the Pond No. 3 clarifying pond (Photograph 42, 43 and 44), and therefore is deemed to be a sacrificial layer. The tears and holes identified in the liner within the clarifying pond were observed to be above the normal operating level. Repair of the visible damage to the primary treatment and clarifying pond geomembrane may be necessary during suitable weather in 2022 based on testing results. Water levels within this pond should be kept below visible defects such as small holes and tears in the geomembrane until repairs can be made.

The vertical flow wetlands for Pond No. 3/Pond No. 5 were undergoing maintenance during the inspection. The northernmost wetland cell was being used for treatment while the southernmost cell was being excavated and filter media being replaced (Photograph 48). The overall discharge was observed to be functioning properly as evidenced by no observable discoloration, scour, or outlet instability below the permitted outfall (Photograph 47).

3.3.4 Pond No. 5

Pond No. 5 (Photographs 45 and 46) on the northeast side of the RWL, adjacent to Pond No. 3, was observed to be functioning satisfactorily with respect to water flow and sedimentation during the annual inspection. There was no indication of tearing of the geomembrane within the basin. During this inspection it was noted, similar to the 2020 inspection, that there was accumulated water under the Pond No. 5 liner system along a limited section of the southwest edge adjacent to Pond No. 3. This accumulation was evidenced by floating liner at the water interface at the pond operating level. The facility has installed a slit in the geomembrane several feet above the operating level of the pond for purposes of inserting a suction withdrawal pipe for removal of accumulating water originating from beneath the geomembrane. A small pump is utilized to withdraw this water as needed to avoid stress and uplift pressures on the liner system from accumulated water. The facility monitors this accumulation and has continued to utilize personnel to withdraw this water and discharge into the pond on an as needed basis. This water is reportedly clear and appeared to be groundwater, but was not observed during the inspection. It appears, based on the continued reappearance of this condition that a perched groundwater condition may exist with a connection to the Pond 5 area. The source of this water has not been identified but is apparently not from the pond, since it accumulates above the operating level within the pond, and groundwater results from down gradient monitoring wells do not indicate a release from Pond No. 5. There were minor punctures noted in the geomembrane near the concrete inflow channel to Pond No. 5 (Photograph 49) that may be the result of animal hoofs. The holes appeared to be above the operating level of the pond and away from concentrated inflow of stormwater. These holes should be repaired as weather conditions allow in 2022.

3.4 Operation

Daily landfill operations are conducted and managed by Charah and overseen by Gavin Power. During the time of the inspection, general maintenance operations were occurring within the facility limits. As required by the PTI issued by OEPA, Gavin Power maintains daily logs of operations and performs daily inspections of the RWL.

Photographs 50 and 51 depict operating conditions at the FGD stack-out pad during the annual inspection. There was minimal FGD production on the day of the inspection, and the material was satisfactorily handled and contained on the pad prior to being loaded into haul trucks for disposal in Phase H.

New activities during 2021 included the continued filling activities in Phase H and a minor amount in Phase F2. Disposal in Phase F2 was limited to small areas to achieve final slope grades prior to covering with soil (Photograph 1). The vertical phase for Phase F2 was completed in 2020 as the FGD material met the interim maximum height of approximately 965 feet. A soil cover was placed on the top of the FGD summit and vegetation is currently being established. Photographs 10 and 19 depict the placement of the soil cover at this location and the different stages of this process. A series of chimney drains that are connected to the leachate collection system at the bottom of the landfill were observed within the summit area to assist in draining excess surface water.

4. REVIEW OF CCR OPERATING RECORD DOCUMENTS AND PREVIOUS INSPECTION ITEMS

As required by 40 CFR § 257.84(b)(1)(i), a review of the operating record regarding the status and condition of the CCR unit includes the results of inspections by a qualified person and results of previous annual inspections. The following documents were reviewed as part of the CCR operating record:

- Ohio EPA Phase "I" before "G" Alteration Request, approval dated 2 January 2019;
- 2019 Landfill Annual Inspection Report, ERM dated 8 January 2020;
- 2020 Landfill Annual Inspection Report, ERM dated 8 January 2021;
- Seven-day qualified person inspection checklists for the RWL;
- American Electric Power Service Corporation (2016). *Gavin Plant Residual Waste Landfill Closure Plan.* Gavin Plant, Cheshire Ohio.
- Gavin Residual Waste Landfill PTI Alteration Request, dated 13 October 2014;
- 2021 OEPA Solid Waste Facility License, processed 25 November 2020; and
- Stability and Settlement Analysis Report pursuant to Ohio Administrative Code 3745-30-05(C)(5), dated 2 November 2012; and
- Final Permit-To-Install Application Expansion of the Gavin Plant Residual Waste Landfill dated 2 November 2012

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Addressing 2020 Annual Inspection Items

ERM reviewed operational photographs and periodic repairs specified in the 2020 Annual Inspection Report. This included placing the final cap where final grades have been reached as required by OEPA; repairing identified minor geomembrane perforations, seeding and mulching areas to establish vegetation; repairing erosional areas noted at the permanent capped areas; and continuing to remove sediments from all ponds on an as-needed basis. Based on the 2021 annual inspection and a review of weekly inspection reports, the above-identified repair items from the 2020 annual inspection were generally completed or observed as being underway as part of on-going maintenance and repairs. In particular, identified necessary repairs to the Pond No. 2 liner system and minor repairs in Pond No. 1 observed in 2020 were completed. Further, Gavin Power Plant has consistently addressed items requiring attention that were identified in the weekly inspection reports.

5.2 Recommendations for 2021

ERM provides the following recommendations for the RWL based on the 2021 inspection:

1. Deficiencies identified during weekly inspections should continue to be documented and addressed in a timely manner as a Best Management Practice. This includes but is not limited to erosion rills, check dam sediment accumulation, roadway surfacing and leachate seeps.
2. Complete the placement of intermediate soil cover, seed, and mulch on areas of direct FGD seeding where poor vegetative growth has been experienced. Soil pH and nutrient tests are recommended to target appropriate amounts of lime and fertilizer application to accomplish successful vegetative growth while minimizing the potential for over application.
3. Seed and fertilize localized bare soil areas along completed slopes to aid in the revegetation process, adding soil amendments and lime as needed.
4. Repair erosion gullies within the intermediate cover on the northwest end of Phase F2.
5. Continue to monitor stormwater channels such as the roadside drainage channels on the southwestern slopes and clean out as necessary, adding rock check dams as necessary in severe erosion areas. Continue to maintain check dams and continue maintenance of the sediment traps where erosion has been noted.
6. Fill erosional gullies within and at confluences of stormwater conveyance channels and berms adding rock soil and vegetating as appropriate. Add riprap armoring as needed to localized areas where FGD has been exposed.
7. Continue to schedule maintenance and replacement of media in the vertical flow wetlands for Pond No. 1, Pond No. 2, and Pond Nos. 3 and 5.
8. Schedule and commence removal of vegetative growth and sediments from inside Pond No. 3 and No. 1 in an appropriate sequence with other ongoing maintenance and repairs. Clean channel inlets on both Pond No. 1 and No. 3 to remove sediment buildup.
9. Pond No. 1 has a fabriform-lined ditch outfall with riprap near the outfall location. Steps should be taken to mitigate the tracking of stone from the roadway by vehicles and during the application of maintenance aggregate to the surface to prevent stone placement into Primary Pond. No. 1. The stone should be removed in conjuncture with vegetative and sediment removal.
10. Repair small tears and minor perforations identified in the geomembranes at Pond No. 1, No. 2, and No. 5. Remove any vegetation prior to repairs. Routinely monitor all ponds for any additional tears

and promptly repair when identified. Pond No. 1 and No. 2 should be repaired with similar (i.e. PVC/"Hypalon" product) geomembrane using either welding or adhesive techniques. Pond No. 5 is HDPE and will require spot welding techniques (i.e. extrusion gun or similar). Repairs should be completed prior to the next annual inspection in October 2022. The facility should continue to maintain current water operating levels below the level of identified perforations.

11. Given the noticeable increase in geomembrane imperfections with this inspection, particularly in the clarifying portion of Pond No. 3, a testing program to assess the material properties of the current in place geomembrane(s) is recommended. This testing program would consist of a representative coupon of material being cut from each of the ponds for strength and puncture testing. These results would be compared to the original material properties to estimate the level of deterioration and aid the facility in scheduling repairs or replacement of the geomembrane liner.
12. The primary portion of Pond No. 3 should have identified minor repairs conducted promptly similar to that specified in Item 11. To the extent determined by the testing described in Item 11 above, the clarifying portion of Pond No. 3 may require more significant repairs and more detailed recommendation will be provided based on the results of Item 11. Conduct recommended coupon testing as soon as practical in 2022 based on weather and when a suitable temporary patch can be made.
13. Replace or repair damaged fence near the fabriform-lined ditch leading into Ponds No. 3 and No. 5. Consider extending the fence to minimize potential for wildlife to access the head of Pond No. 5.
14. Maintain drainage stone around the existing current chimney drains and protect these from sedimentation as intermediate and final cover is placed.
15. Drain water from underneath the pond liner system on the southwest and northwest corner of Pond No. 5 via dewatering perforations. Continue to monitor these portions of the pond for water buildup and drain water buildup when identified to avoid the addition of tension into the geomembrane until a permanent solution is implemented. During 2022, it is recommended to further assess the source of the water gaining entrance underneath the liner system and identify potential steps to prevent the build-up of water under the liner system from occurring in the future. If a correction is identified and implemented, repair the geomembrane dewatering perforations using appropriate patching and leak detection methods once the water source has been identified and further build-up is mitigated.
16. Trim brush and grassy vegetation along and above the northern and Western slopes of Pond No. 5 to prevent progression to woody vegetation in close proximity to the facility.

5.3 Conclusions

The annual inspection and document review indicated that the RWL is in satisfactory operating condition and stable, as required by 40 CFR § 257.84(b)(1). ERM observed that the lateral expansion excavation for Phase I is being completed and current operational phases are being operated in a satisfactory manner. The facility exhibited satisfactory housekeeping measures. Operators were observed to be performing satisfactory maintenance operations. No changes were observed or identified since the last annual inspection which may affect the stability of the RWL.

The majority of recommendations made above are not critical to the current stability of the RWL, but should be addressed under the Gavin Power Plant maintenance program or as otherwise indicated. The repair of pond liner systems should continue as was demonstrated with Pond No. 2 during 2020 and 2021. In particular Pond No. 3 should be prioritized for repair in 2022 and be appropriately documented. The source of water under the Pond No. 5 liner system should also be explored to alleviate the need for continued attention to withdraw water. The facility should continue to frequently inspect for new

perforations after currently proposed repairs are complete and anticipate additional geomembrane maintenance requirements in the future.

FIGURES

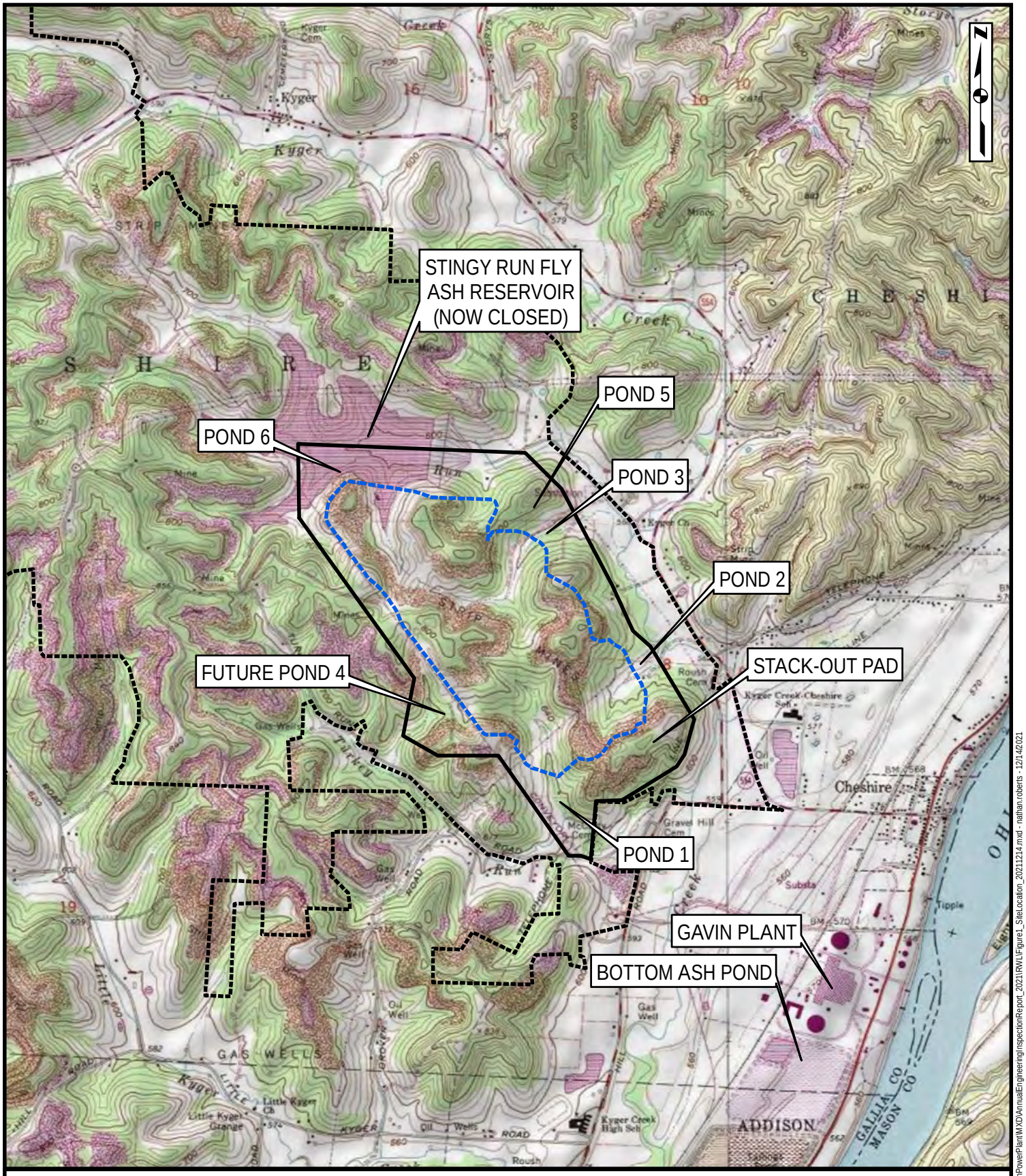

Figure 1: Site Location Map
Gavin Power LLC
Cheshire, Ohio

SOURCE: USGS scanned topographic quad maps provided by National Geographic Society (© 2021).

ERM

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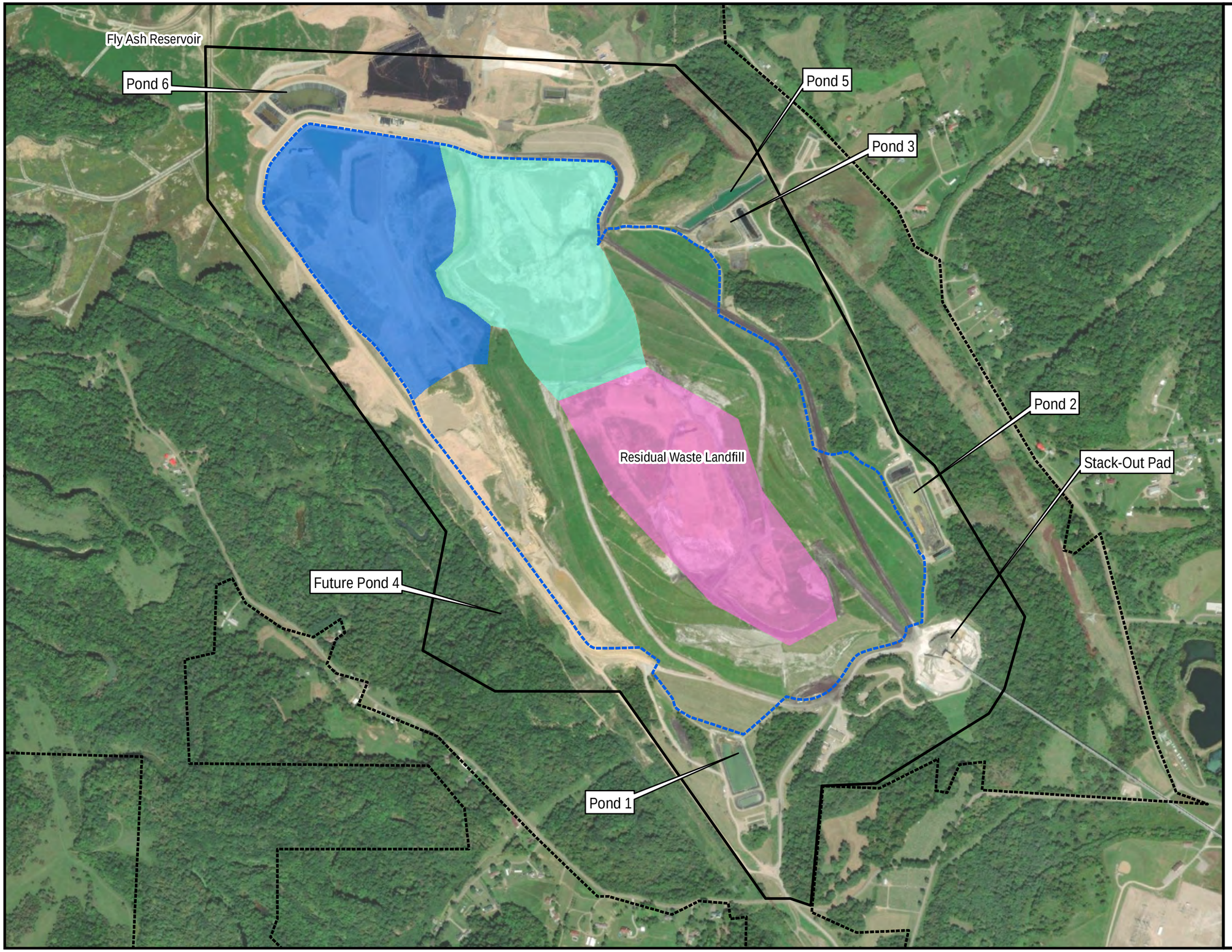

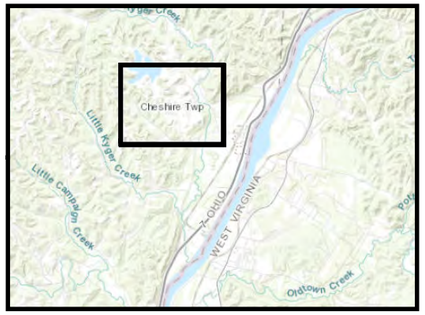

Legend

- Phase F2 and J Vertical Expansion
- Phase H Lateral Expansion
- Phase I Excavation
- Permitted Residual Waste Landfill Boundary
- Permitted Facility Boundary
- Gavin Power LLC Property Boundary

NOTES:

1. Locations are approximate
2. Aerial Imagery: Esri Wolrd Imagery
   Reproduced under license in ArcGIS 10.8
3. Phase H Lateral Expansion has been filled to the level of northern and eastern roadway.

N

0 150 300 600 900 1,200 1,500

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Figure 2: Current Progress
Residual Waste Landfill
Gavin Power LLC
Cheshire, Ohio

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Pond 6
Pond 5
Pond 3
Pond 2
Pond 1
Future Pond 4
Residual Waste Landfill
Stack-Out Pad
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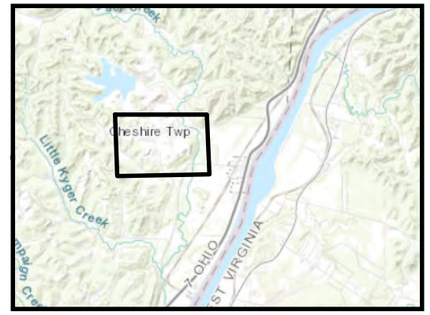

Legend

[#] Photograph Location

NOTES:
1. Locations are approximate
2. Aerial Imagery: Esri World Imagery
   Reproduced under license in ArcGIS 10.8

N

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Feet

Figure 3: Visual Inspection Map
Residual Waste Landfill
Gavin Power LLC
Cheshire, Ohio

ERM

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APPENDIX A ANNUAL INSPECTION PHOTOGRAPHS

Residual Waste Landfill

(Photographs taken during 2021 CCR Inspection on 10/06/21)

Photograph #1 Main haul road constructed of bottom ash. Minor area of FGD slope grading in lower right of image. Picture taken from summit of landfill. (looking southeast)	
Photograph #2 Main haul road constructed of bottom ash heading up the north eastern side of the landfill (looking south)	
Photograph #3 Main haul road constructed of bottom ash near east side of landfill (looking south)	

Photograph #4 Northeastern gravel access road and vegetated slope (looking north)	
Photograph #5 Western vegetated slope and temporary sediment basin from landfill construction activities (looking east)	
Photograph #6 Southwest gravel access road and roadside channel with rock check dams. (Looking north)	

Photograph #7 Rock check dams on eastern slopes. (looking north)	
Photograph #8 View of southwest slopes. (looking north)	
Photograph #9 View of southern slope. (looking southeast)	

Photograph #10 View of interim summit of landfill with intermediate soil cover and vegetation growing. (looking north).	
Photograph #11 View of Phase H. Intermediate soil covered and vegetated northern slope. (looking northwest)	
Photograph #12 View of Phase H. Intermediate slope covered and vegetated eastern slope (looking east)	

Photograph #13 View of Phase H, vegetated eastern slope, and intermediate soil cover (looking north)	
Photograph #14 Eastern slope near summit elevation. (looking west)	
Photograph #15 Phase H and I RWL operations (looking south)	

Photograph #16 Haul trucks and dozers continuing Phase H and I RWL operations (looking north)	
Photograph #17 Erosion gully into FGD material on Western slopes. (looking east)	
Photograph #18 Erosion gully into FGD material on Southeastern slopes (looking west)	

Photograph #19 View of interim summit with multiple stockpiles and chimney drain. FGD stockpile to the right of picture. Soil stockpile to the left of picture. (looking south)	
Photograph #20 Western vegetated slope of summit and RWL grading during landfill construction activities. (looking east)	
Photograph #21 RWL overview. Construction chimney drain, leachate gravel, geonet, and filter fabric visible prior to placement of protection layer. (looking south)	

Photograph #22 Newly constructed Pond No. 6 clarifying pond (looking north)	
Photograph #23 Newly constructed Pond No. 6 primary pond (looking northeast)	

Pond No. 1

Photograph #24 View of inlet pipes for vertical flow wetland treatment adjacent to Pond No. 1 (looking west).	
Photograph #25 View of Pond No. 1 vertical flow wetland (looking east).	

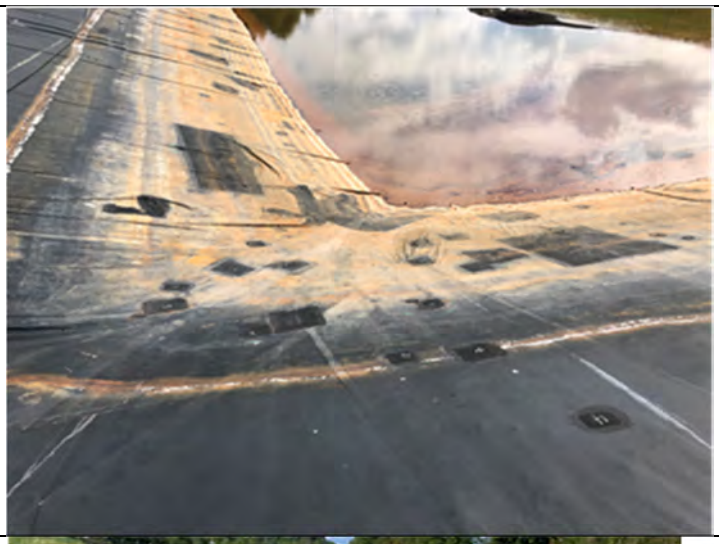
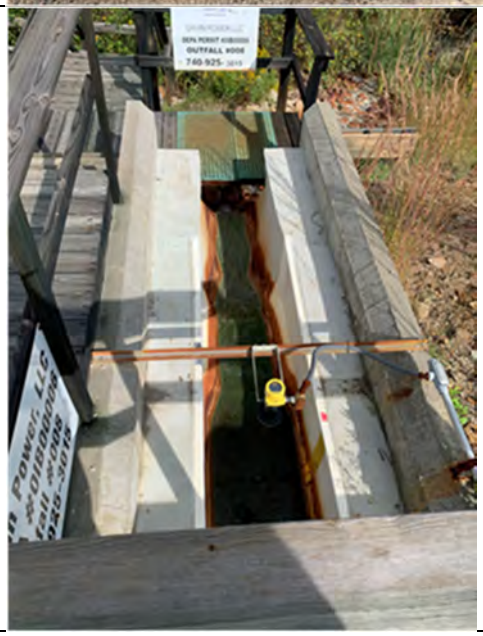
Photograph #26 View of inlet structures for Pond No. 1 vertical flow wetland.	
Photograph #27 Outlet for vertical flow wetland at Pond No. 1 (looking southeast)	
Photograph #28 Flow measurement flume at outlet for Pond No. 1 vertical flow wetlands (looking south)	

Photograph #29 View of Pond No. 1 (looking north).	
Photograph #30 View of vegetated sediment patch in Pond No. 1 (looking west)	
Photograph #31 View of sediment, vegetation, and patched repair on Pond No. 1 West embankment. (looking east)	

Photograph #32 Pond No. 1 South embankment with vegetation and gravel. (looking east)	
Photograph #33 Multiple tears in West embankment of Pond No. 1 with vegetation growing through. (looking south)	

Pond No. 2

Photograph #34 Concrete settling basin adjacent to Pond No. 2. (looking east)	
Photograph #35 Pond No. 2 clarifying pond. Vegetation on Eastern embankment (looking east)	
Photograph #36 Pond No. 2 primary pond overview (looking south)	

Photograph #37 Pond No. 2 primary pond patch repairs on Northeast corner (looking south)	
Photograph #38 Vertical flow wetlands for Pond No. 2. (looking north)	
Photograph #39 Flow measurement flume at outlet for Pond No. 2 vertical flow wetlands (looking east)	

Pond Nos. 3 & 5

Photograph #40 Sediment and vegetation within Primary Pond No. 3 across uppermost end (looking south)	
Photograph #41 Sediment, vegetation, and landfill leachate system with chemical treatment system in the background at Primary Pond No. 3 (looking southeast)	
Photograph #42 Vegetation growing through holes within the liner of Primary Pond No. 3 and previously patched repairs (looking east)	

Photograph #43 Vegetation growing through the holes within the liner of Clarifying Pond No. 3. (looking east)	
Photograph #44 Vegetation and gravel along slopes of Clarifying Pond No. 3. (looking northwest)	
Photograph #45 Pond No. 5 North & West embankment. (looking northwest)	

Photograph #46 Pond No. 5 North & West embankment (looking northwest)	
Photograph #47 Outlet for vertical flow wetland at Pond Nos. 3 and 5. (looking west).	
Photograph #48 Maintenance occurring at vertical wetlands for Pond Nos. 3 and 5. (looking north).	

Photograph #49	
View of inflow channel to Pond 5 with multiple small liner tears. (looking west).	

Stack Out Pad Operations

Photograph #50 View of FGD stack out pad operations (looking south).	
Photograph #51 View of FGD stack out pad operations (looking east).	

APPENDIX B SUMMARY OF QUALITATIVE INSPECTION TERMS

SUMMARY OF QUALITATIVE VISUAL INSPECTION TERMS

The terms described below are used to describe the overall condition and/or appearance of an observed embankment, structure, activity, or item. These terms are intended to give an overall qualitative judgment of the particular item. Please note, some of the terms described below were not used in this year's inspection, but are included as a comparative reference.

Satisfactory: A condition or activity that meets what would be minimally anticipated or expected from a stability, maintenance, or design viewpoint.

Poor: A condition or activity that does not meet what would be minimally anticipated or expected from a stability, maintenance, or design viewport. If a rating of "poor" is assigned, then corrective action is required in as timely a manner as possible.

Minor: A reference to an item or activity where the current maintenance condition is below what is normally desired, but does not cause concern from a stability of safety viewpoint. Generally, these conditions would be identified and could be remedied through the normal maintenance process.

Significant: A reference to an item or activity which would impact the stability or daily operating conditions of the CCR unit. Generally, significant features develop over time and would likely be a result of maintenance not occurring when minor deficiencies were first noted. If left unchecked, such conditions could eventually be a concern for the stability and safety of the CCR unit.

Excessive: A reference to an item or activity that is much worse than what is normal or desired and is of immediate concern to the stability or safety of the CCR unit. Such a condition may also impact the ability of the inspector to properly evaluate the particular item or area.

APPENDIX C PROFESSIONAL ENGINEER CERTIFICATION

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I or an agent under my review has prepared this Annual Inspection Report for the Residual Waste Landfill, and am familiar with the provisions of the final rule to regulate the disposal of coal combustion residuals (CCR). I attest that this report has been prepared in accordance with good engineering practices and meets the intent of 40 CFR 257.84. To the best of my knowledge, the information contained in this Report is true, complete, and accurate.

_____

James A. Hemme, P.E.

Date: 7 January 2022

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