

Response to Comments
Draft Handling Permit for Coal Combustion Residuals (CCR)
Plant Hammond AP-3

In accordance with the Georgia Environmental Protection Division (EPD) public participation policy, the draft Closure/Post-Closure Care Permit for Georgia Power's Plant Hammond Inactive CCR Surface Impoundment AP-3 was posted on EPD's website on July 12, 2021. This initiated the comment period, which remained open until September 10, 2021 (60 days). EPD received a total of approximately 1,970 comments, which included 39 verbal comments in the public meeting, 1 via US mail, and 1,930 via email. Two new permit conditions have been added in response to public comments: Conditions #6 and #7, requiring groundwater model updates every 5 years and maintenance of TreeWells®, respectively. A summation of the comments is provided below along with EPD's responses.

1. Comments Concerning Coal Ash

- Coal ash is toxic waste and therefore should not be eligible for closure in place
- Coal ash contains heavy metals
- People in Rome and communities around Rome, including areas of Alabama down river of Plant Hammond, that rely on wells will be exposed to heavy metals which can lead to cancer
- Releases from CCR units cause cancer and many illnesses in humans as well as damage to the environment and animal habitats

EPD Response:

Coal Combustion Residuals or CCR is federally regulated under RCRA Subtitle D, which addresses non-hazardous solid waste; hazardous waste is regulated under Subtitle C of RCRA. CCR is defined in the US EPA and State of Georgia CCR regulations as a solid waste that includes fly ash, bottom ash, boiler slag, and flue gas desulfurization materials generated from the burning of coal for the purposes of generating electricity by electric utilities and independent power producers. As such, CCR is defined by federal and state rules to be a solid waste and is not defined or managed as hazardous waste or toxic waste.

The final cover system for the Georgia Power's Plant Hammond Inactive CCR Surface Impoundment AP-3 is designed to meet the performance criteria of Georgia's CCR Rules, which also incorporate federal CCR regulations by reference. Proper grading and construction of the cover system on the surface impoundment reduces infiltration of surface water to the maximum extent feasible.

The groundwater monitoring network is designed to detect potential releases and migration of CCR constituents, including metals. If CCR constituents are detected above relevant regulatory thresholds, the CCR rules provide for corrective actions to be implemented in accordance with the Georgia Rules for Solid Waste Management section 391-3-4.10(6).

2. Comments Concerning Location Restrictions, Including Karst Geology and Distance to Aquifer

- Hammond AP-3 is located in an area of active or mature karst geology and is at high risk for release of CCR and contaminants
- Voids beneath the site are hydraulically connected and are evidence of mature karst geology making Hammond AP-3 high risk for failure and release of contaminants
- Boring logs, as recent as 2017, show many large voids that could result in sinkholes like the one that caused the massive CCR waste loss from AP-3
- Hammond AP-3 does not meet the location restrictions in the regulations
 - AP-3 is located in unstable karst terrain and Draft Permit fails to address unstable areas beneath the 25-acre impoundment
 - AP-3 violates the aquifer location restriction because it fails to provide five feet of separation between the CCR waste and the aquifer

EPD Response:

According to the Hydrogeologic Assessment Report, degradation of the limestone bedrock underlying AP-3 is expected to take hundreds of thousands of years. One of the steps Georgia Power has taken to reduce the risk of limestone degradation at AP-3 is by storing coal ash in a dry state since 1982. No known karst related displacements have occurred since storing dry ash began. Additional action taken by Georgia Power includes the installation of a low permeability final cover system in 2018. Actions taken to date effectively reduce downward water pressure and infiltration, reduce limestone degradation risk, and reduce the potential for adverse effects on the structural components of AP-3 related to karst features.

According to the Hydrogeologic Report, observation of rock cores during drilling and review of boring and geophysical logs from the site indicate the presence of discontinuous solution features and solution-enhanced joints and fractures, but do not suggest the presence of large, laterally continuous karst features such as caverns or sinkholes. The surface geophysical and borehole geophysical investigations conducted in 2017 indicate that aside from the few solution openings in the borings that are on the order of a few inches up to almost a foot, the limestone bedrock within these borings is solid with numerous bedding plane fracture or partings on the scale of only millimeters or less. The geophysical logs also indicate the presence of clay in the voids. This data combined with the lack of drastic or sudden changes in groundwater levels indicates that the voids are not hydraulically interconnected and acting as preferential pathways for groundwater flow.

Existing CCR surface impoundments that do not meet location restrictions for minimum separation to uppermost aquifer, are required to cease placing CCR and initiate closure. [ref. 40 CFR 257.60(c)(4), 40 CFR 257.101(b)(1), 40 CFR 257.102]

While a CCR unit not meeting location restrictions must be closed, it may be closed by either method allowed by 40 CFR 257.102, specifically: 1) closure in place with an engineered final cover system, or 2) closure by removal of the CCR. The rule does not dictate which closure method must be used for units failing any one or multiple location restrictions.

Due to the inability to meet location restriction described above, Hammond AP-3 ceased receiving CCR and non-CCR waste streams, and Georgia Power elected to close the unit in place with an engineered final cover system.

3. Comments related to the Groundwater Monitoring Network

- Hammond AP-3's groundwater monitoring system violates state and federal regulations
 - The groundwater monitoring network does not have enough monitoring wells
 - The groundwater monitoring wells are poorly located
 - The groundwater monitoring system does not meet the 1991 EPD manual or state or federal CCR requirements

EPD Response:

Hammond AP-3's groundwater monitoring system meets both federal and state regulatory requirements and has been designed with groundwater monitoring wells throughout the property that will represent the quality of groundwater passing the waste boundary of the CCR unit.

The 1991 Manual for Groundwater Monitoring and EPA Region 4 Science and Ecosystem Support Division (SESD) (now known as Laboratory Services and Applied Science Division LSASD) guidance and procedures were relied upon when evaluating the groundwater monitoring system at Hammond AP-3. The groundwater monitoring system for Hammond AP-3 was certified by a qualified groundwater scientist and subsequently approved by EPD to be in accordance with the guidance and procedures stated above.

4. Comments Concerning Groundwater and Contamination of Groundwater

- CCR units inevitably leak contaminants into groundwater and water supplies
- Monitoring will only detect groundwater contamination after the fact
- Groundwater monitoring should be conducted more often than semi-annually
- Groundwater beneath Hammond AP-3 is already contaminated
- Contaminated groundwater beneath Hammond AP-3 will continue to migrate further from the unit unless the CCR is removed
- Compliance with groundwater monitoring requirements does not render compliance with closure standards themselves unnecessary. They are 2 separate requirements that need to be met separately.
- 2019 Groundwater monitoring detected Appendix IV constituents including barium, chromium, cobalt, fluoride, lead, lithium, molybdenum and radium 226/228
- The groundwater monitoring should detect contamination before it leaves the AP-3 boundary to enable corrective measures in a timely fashion

EPD Response:

Even though Appendix IV constituents are detected in groundwater, Hammond AP-3 is in compliance with groundwater protection standards in accordance with Ga Comp. Rules and Regs. R. (Rule) 391-3-4.10. Semi-annual monitoring is required by Rule 391-3-4.10(6)(c) and is as frequent as the Federal Rule. According to the Advanced Engineering Methods Feasibility

Report dated September 2020, with the current engineered final cover installed (Scenario 1A), it takes approximately 52 years for a particle to cross AP-3's permit boundary. As a result, semi-annual monitoring is sufficient to detect any issues in a timely manner and allow for appropriate corrective action.

Hammond AP-3's groundwater monitoring system meets both federal and state regulatory requirements and has been designed with groundwater monitoring wells throughout the property that will accurately represent the quality of groundwater passing the waste boundary of the CCR unit before it reaches the property boundary. The groundwater monitoring system is designed to detect monitored constituents in the uppermost aquifer. Following permit issuance, if contamination above applicable regulatory thresholds is detected at any point at or beyond the waste boundary, corrective action will be initiated. Corrective action may include a variety of remedies to address that contamination, up to and including removal of the waste.

Although neither federal nor state regulations make the issuance of a permit for a CCR surface impoundment contingent on non-detection of regulated constituents above applicable levels, past and future groundwater monitoring data has been and will continue to be evaluated by EPD throughout the permitting and post closure care period. Any necessary remedies will be implemented in accordance with the Rules and permit to return the affected area to compliance.

The groundwater results are available on the Georgia EPD Online System (GEOS), accessible to the public through the public inquiry portal, and on the Georgia Power CCR Compliance website.

5. Comments Concerning Lateral Flow of Groundwater through CCR

- Groundwater is flowing through CCR at Hammond AP-3, a situation prohibited by the regulations
- CCR is in contact with groundwater/below groundwater at Hammond AP-3, and this is not allowed by the regulations

Comments included arguments that the proposed AP-3 closure plan does not meet the first two closure performance standards when leaving CCR in place [40 CFR 257.102(d)], specifically:

- i. Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere; and
- ii. Preclude the probability of future impoundment of water, sediment, or slurry.

EPD Response:

Commenters argue that infiltration cannot be minimized if the CCR is in contact with groundwater. "Infiltration" is a technical term defined in the fields of hydrology and earth science and based on these technical definitions, the Georgia EPD Solid Waste Management Program has consistently defined "infiltration" as "vertical percolation of precipitation into the ground." As described in the Manual for Erosion and Sediment Control in Georgia, GSWCC 2016 edition, infiltration is the gradual downward flow of water from the surface through the

soil to the water table. Sample definitions of infiltration and associated references include the following:

- “Infiltration is commonly defined as the process of water entry at the land surface into a soil from a source such as rainfall, irrigation, or snowmelt.”

Hydrology Handbook (2013), American Society of Civil Engineers (ASCE), Second Edition, ISBN (print): 978-0-7844-0138-5. (Chapter 3, page 75)

<https://ascelibrary.org/doi/10.1061/9780784401385.ch03>

- Infiltration is “the downward entry of water into a soil (or sediment).”

A Field Method for Measurement of Infiltration, Geological Survey Water-Supply Paper 1544-F, First Printing 1963, Second Printing 1991. (Page F-1 and page F-2, Figure 1, hydrologic cycle)

<https://pubs.usgs.gov/wsp/1544f/report.pdf>

- “Infiltration is defined as the initial process of water movement into the vadose zone through the soil surface.”

U.S. EPA (1998) *Estimation of Infiltration Rate in the Vadose Zone: Application of Selected Mathematical Models*, Volume II, EPA/600/R-97/128b.

<https://nepis.epa.gov/Exe/ZyPDF.cgi/30003L4K.PDF?Dockey=30003L4K.PDF>

“Infiltration” does not include the lateral flow of groundwater; rather, “infiltration” is best characterized as the slow movement of water by gravity or other forces into the soil. Lateral flow within soil is defined by other terms such as “groundwater flow”¹ or “seepage”². Hammond AP-3’s cover system minimizes vertical movement of precipitation from the ground surface into the CCR, thereby minimizing infiltration.

Commenters argue that closure in place at AP-3 does not preclude the future impoundment of water, sediment, or slurry. In the context of the CCR regulations, “impoundment of water, sediment, or slurry” refers to surface media, that is surface water, sediment (transported by surface water), or slurry (particles suspended in water/liquid to convey the particles by gravity flow). Units that are closed in place by construction of a cover system designed to promote runoff and collection of precipitation thereby minimizing infiltration do preclude future impoundment of water, sediment, or slurry.

6. Comments Concerning Elimination of Free Liquids

- Closure in place at AP-3 fails/failed to eliminate free liquids within the waste based on confirmed groundwater contamination downgradient from AP-3

¹ Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, *Closure of Hazardous Waste Surface Impoundments*, SW-873, by Wyss, Willard, and Evans (Acurex Corporation) and Schmitt, Sherman, Bruehl, and Greco (Metcalf and Eddy, Inc.), U.S. Environmental Protection Agency, 1982, Figure 3-1, page 25.

² Bureau of Reclamation, U.S. Department of the Interior, “Chapter 5: Protective Filters.” *Design Standards No. 13 Embankment Dams*, prepared by Mark Pabst, U.S. Department of the Interior, 2011, page 5-161.

EPD Response:

In the context of the federal and state CCR regulations, “free liquids” refer to liquids that readily separate from the solid portion of a waste under ambient temperature and pressure. Prior to installing the final cover system, the owner/operator is required to eliminate free liquids by removing liquid waste and stabilizing the remaining waste for the purpose of supporting the final cover system.

At Hammond AP-3, CCR was placed by dry-stacking placement methods beginning in 1982, i.e., placement of CCR into the surface impoundment without wet sluicing. Due to dry-stacking, AP-3 contains no free liquids.

7. Comments Related to Closure

- The Draft Permit approves closure methods that violate applicable closure performance standards imposed on owners/operators by Georgia’s CCR Rule. (Violates State and Federal Performance Standards for Closure of CCR Units)
- The Draft Permit improperly approves a waste permit application that is missing mandatory explanations concerning how the proposed closure methods comply with the Closure Performance Standards
- Georgia Power failed to show that its closure plan will eliminate or minimize the release of CCR waste into the groundwater
- Closure in place should not be allowed for an unlined impoundment
- Closure by removal is the only reasonable/effective/moral closure method
- Closure has already taken place; the proposed permit is being considered after the fact
- Closure in place will set a precedence for closure in place of many other CCR units
- Closure in place should not be allowed due to the proximity to the Coosa River
- Closure in place will inevitably result in release of CCR constituents to the environment/ drinking water/groundwater near Cabin Creek
- EPD should require GP to place its CCR in a lined disposal facility before someone gets sick and proves that their illness is due to CCR resulting in lawsuits for criminal negligence with very expensive litigation
- If the EPD doesn't take a stance to protect our beautiful environment (that also provides vital economic resources that need to be used sustainably), Georgia will only continue to drive out the bright young minds that can make it even better.
- Communities in Floyd, Monroe, Cobb, Coweta, and Heard Counties deserve the same long-term protection from coal ash contamination as communities in South Carolina, North Carolina, and Virginia where regulators are requiring utilities to excavate all of their coal ash and dispose in fully lined facilities.
- The coal ash will eventually have to be cleaned up. It may take a Supreme Court decision, but the CCR will eventually have to be relocated to a lined disposal facility.
- Closure of CCR units in place is a bad idea as climate change is bringing more flooding and more intense storms which can breach the ash pond dikes.

EPD Response:

Hammond AP-3 ceased receiving Coal Combustion Residuals or CCR during the early 1990's, prior to the effective date of both the Federal and State CCR rules. It is considered an "Inactive Surface Impoundment" as defined in the Georgia Rule because it stopped receiving CCR prior to October 19, 2015, but still contained both CCR and liquids on or after October 19, 2015. Therefore, it is subject to the relevant standards for inactive surface impoundments per the Georgia CCR Rule. Even though a final cover system meeting the regulatory requirements was constructed over Hammond AP-3 in 2018, the closure and post-closure care requirements are established by the permit, and the permittee will have to ensure that all permit conditions are met and will be required to make any future necessary changes to Hammond AP-3 to do so.

Any new surface impoundments must be designed and constructed with a composite liner system meeting the requirements of the relevant standard. A new surface impoundment is one that first receives CCR or commences construction after October 19, 2015. Since Hammond AP-3 is not a new surface impoundment, it is not required to have a bottom liner system.

The Georgia Rules for Solid Waste Management at 391-3-4-.10 "Coal Combustion Residuals" were developed to meet or exceed the minimum criteria in the U.S. Environmental Protection Agency's federal rule. Federal CCR rules in 40 CFR 257.102 allow for two methods of closure of CCR surface impoundments that do not meet the location restrictions specified in the rules, such as Hammond AP-3: 1) closure in place with an engineered final cover system, or 2) closure by removal of the CCR. The rule does not dictate which closure method must be used. Georgia Power has chosen to close the inactive Hammond AP-3 by closure in place with an engineered final cover system.

If the owner or operator of the inactive surface impoundment elects to close the unit by leaving the CCR in place, the regulations require the owner or operator to ensure, at a minimum, that the final cover system is designed in a manner that will (1) control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere, (2) preclude the probability of future impoundment of water, sediment, or slurry, (3) include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system, and (4) minimize the need for further maintenance of the CCR unit.

Prior to installing the final cover system, the regulations require the owner/operator to eliminate free liquids by removing liquid wastes and stabilizing the remaining wastes and waste residues to support the final cover system.

The performance standards for closure at Hammond AP-3 are met by: 1) a cover system that minimizes vertical movement of precipitation from the ground surface into CCR, thereby minimizing infiltration, 2) a cover system designed to promote runoff and collection of precipitation that prevents future impoundment of surface water, sediment, or slurry, 3) the placement of dry ash, grading of the closed surface impoundment, control of drainage, a low permeability engineered cover system, evaluation of the long-term stability and settling of the closed surface impoundment, and 4) implementing measures to meet performance standards 1 through 3 which minimizes the need for further maintenance.

The groundwater monitoring system and required reporting is designed to detect any migration of contaminants before there are offsite impacts on human health or the environment. If contaminants are present above regulatory thresholds, corrective action will be taken. Corrective action may include a variety of remedies up to and including removal of the waste.

8. Comments Concerning Costs of Closure

- It will cost less to relocate the CCR to a proper facility now rather than later when pollution has spread to water sources and caused greater damage.

EPD Response:

The CCR Rules do not include cost as a factor in determining compliance with closure criteria. As noted previously, closure in place is one of the two regulatory options allowed under the federal and state CCR regulations.

9. Comments Concerning Additional Measures That Should Be Imposed for Closure in Place

- Underdrains, impermeable cutoff walls, lowering the local water table, and leachate collection and treatment should be considered to prevent leaching of contaminants to groundwater at AP-3.

EPD Response:

Design measures such as underdrains, impermeable cutoff walls, and leachate collection and treatment systems are not required by the federal or state CCR Rules for inactive CCR surface impoundments. However, the permittee has provided additional measures to lower the water table including the use of Treewells® for uptake of groundwater. In addition, the dewatering of nearby Hammond AP-1 will result in significant further reductions of the groundwater level in the vicinity of Hammond AP-3.

EPD added two additional permit conditions, Conditions #6 and #7, in response to concerns raised during the public comment period. Conditions #6 and #7 are described below.

Permit Condition #6 requires the groundwater model to be updated to verify the validity of statements concerning saturated ash reductions resulting from the dewatering of Hammond AP-1 and the TreeWells®, the Advanced Engineering Methods (AEM). Permit Condition #6 requires that the groundwater model update shall be done every 5 years after permit issuance.

Permit Condition #7, includes requirements related to TreeWells®, the AEM to be installed by the Permittee:

- a) Advanced Engineering Methods (AEM) must be implemented through installation of a minimum of 254 TreeWells® within 12 months of permit issuance.
- b) The Permittee must maintain a minimum of 170 TreeWells® with healthy trees as determined through annual tree health assessments by an arborist certified by the International Society of Arboriculture and licensed to perform work in Georgia.
- c) Harvested, felled, or dead trees must be properly disposed of in accordance with the Rules for Solid Waste Management, Chapter 391-3-4.

- d) The Permittee must evaluate and report effectiveness of AEM every five (5) years after the permit issuance for the duration of the post-closure care period.

10. Comments Related to Post Closure Care

- The post-closure care period should be longer than 30 years.

EPD Response:

The post-closure period for inactive surface impoundments such as Hammond AP-3 is a minimum of 30 years from permit issuance. The post-closure care period may be extended beyond 30 years if non-compliance of groundwater protection standards and/or other issues are identified. As the owner/operator of the facility, Georgia Power is the responsible party. EPD will provide regulatory oversight throughout the post closure period to ensure permit compliance.