ENGINEERING REPORT FOR INACTIVE CCR LANDFILL

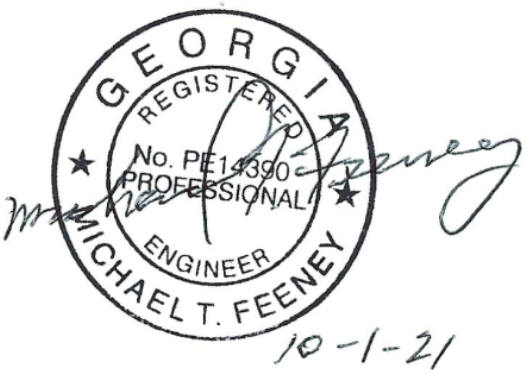
FORMER PLANT ARKWRIGHT – AP1 LANDFILL

MACON-BIBB COUNTY, GEORGIA

FOR

Georgia Power

October 2021



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1. BACKGROUND AND OBJECTIVE

AP1 Landfill was issued a Closure Certificate by the Environmental Protection Division (EPD) on July 30, 2010. Although this CCR unit has officially been closed, Georgia Power plans to remove the CCR waste from this CCR unit. After removal of CCR, the area will be regraded and revegetated. This engineering report has been included in the permit application to provide supporting documentation for the updated Closure Plan.

2. LOCATION RESTRICTION DEMONSTRATION

In accordance with the requirements of Georgia Solid Waste Management Rule 391-3-4-.10(9), an Inactive CCR Landfill permit application must include the location restriction demonstration requirements in 40 CFR 257.64 for unstable areas. No unstable areas were identified during the feasibility study for AP1 Landfill or in the preparation of this permit application. Local geologic/geomorphologic features and human-made surface features were studied and additional information for the onsite conditions can be found in the Limited Hydrogeological Study. Since the CCR waste is to be removed, long-term stability and differential settling conditions were not evaluated. Any sub-surface human-made features that may be found during excavation of CCR will be evaluated by a professional engineer and changes will be made to the Closure Plan, if necessary. A certification from a Georgia-Registered Professional Engineer is included in Appendix A.

3. STORMWATER MANAGEMENT DURING EXCAVATION

The run-on and run-off control plan for AP1 Landfill, which is included in the Closure Plan of this permit application, was prepared to comply with Solid Waste Management Rule 391-3-4-.10. The below documentation has been provided to demonstrate how the run-on and run-off controls were evaluated based on the current conceptual design for CCR removal. The run-on and run-off control systems will be further evaluated during development of construction drawings and will be modified based on field conditions, if needed.

3.1 General Description of Stormwater Management System

Stormwater control during CCR removal from the AP1 Landfill has two goals:

1) Prevent the release of stormwater run-off generated from the CCR excavation area, and
2) Minimize the quantity of this stormwater by controlling run-on from the portions of the site outside of the limits of CCR.

During CCR removal, a combination of containment berms, ditches, equalization basin storage, and pumping and piping (to be selected by the contactor as the work proceeds) will be utilized to collect and manage stormwater and contact water. Equalization basins will be used to store run-off originating from within the CCR excavation area and will be sized to accommodate the run-off (within the CCR excavation area) generated by the 100-year, 24-hour design storm event.

Overbank flooding of the Ocmulgee River and Beaverdam Creek will not be entirely controlled once the CCR excavation proceeds below the 100-year flood plain elevation.

3.2 Design Criteria

Stormwater flows used for the system design were calculated using either the Rational Method or the Soil Conservation Service (SCS) Technical Release 55 (TR-55) procedures. The Rational and TR-55 Methods use land use data representative of the percent of a drainage area that is impervious, runoff coefficient and curve number, respectively, along with soil characteristics to predict the expected runoff from the drainage area. Rainfall distribution and precipitation values were taken from the Georgia Stormwater Management Manual and included references to National Oceanic and Atmospheric Administration data.

Berms and ditches will be necessary to divert the peak discharge from a 100-year, 24-hour storm around the CCR excavation area to an adequately sized outfall so that this surface water does not run-on to the active CCR excavation. The equalization basins have been evaluated for the 100-year runoff generated from within the CCR excavation. The calculation, presented in Appendix B, assumes that the basins are empty at the beginning of the storm event and that the CCR excavation area has reached its maximum size.

3.3 Run-On Prevention

Berms and ditches constructed for CCR removal will be utilized to control run-on from flowing into the excavation area. Details of the expected berms and ditches are described below. Calculations and drainage area maps are included in Appendix B.

a) Prior to CCR excavation, the area at the northwest corner of the site shall be graded to drain to a temporary storm drain installed below the existing site access driveway. This will act as run-on control for the area between the excavation and the existing railroad. Detailed calculations are presented in Appendix B of this report. This storm drain will be designed to manage the 100-year, 24-hour design storm.

b) Areas to the east of the site are adjacent to the Ocmulgee River and will not drain into the excavation.

c) The remaining perimeter of the site lies to the west and is adjacent to the existing Norfolk-Southern railroad. This area currently drains to a ditch located along the edge of the railroad right of way. This ditch will continue to convey the non-contact CCR run-off from west of the site to an outfall into Beaverdam Creek, just downstream of the existing railroad bridge.

3.4 Stormwater Within Excavation

CCR contact stormwater run-off for the AP1 Landfill will be managed via two equalization basins that will be constructed and maintained during removal of the CCR. The equalization basins will be completely contained within the excavation area and will provide a minimum volume equal to the 100-year runoff generated by the contributing disturbed drainage area. The volume will increase as the work progresses and the basins will be managed to provide a sufficient volume based on the area draining into the excavation, excluding flood events described in Section 3.1.

As excavation progresses, the site shall be graded such that run-off from disturbed CCR excavation areas drains to the equalization basins or is pumped to these basins from other low points created in the excavation.

The two equalization basins will provide an adequate storage volume for the 100-year run-off from the controlled excavation area, assuming that the maximum CCR removal area is disturbed when the 100-year storm event occurs. This is considered a conservative approach. A summary of the hydrologic parameters and the required and available storage volumes for the two equalization basins is provided below in Table 1. Supporting calculations are presented in Appendix B.

TABLE 1. EQUALIZATION BASINS FOR AP1 LANDFILL

	North Equalization Basin	South Equalization Basin
Disturbed Area	11.7 acres	13.3 acres
Equivalent Curve Number	87	87
Curve Number for Equalization Basin	98 over 0.7 acres	98 over 1.2 acres
Curve Number for Disturbed CCR Area (This uses the highest CN, associated with soil type exposed below CCR when excavation is nearly complete.)	86 over 11.0 acres	86 over 12.1 acres
Required Storage Volume	285,500 ft^3	324,500 ft^3
Available Storage Volume	370,100 ft^3	468,100 ft^3
Conclusion	Basin is adequately sized	Basin is adequately sized

The collected water will be pumped from the equalization basins to onsite storage tanks, or removed by tanker truck, and transported to a permitted wastewater facility for treatment to maintain sufficient available volume. The combination of storage tanks and tanker truck removal will be determined by contractor based on the rate of progression of CCR excavation.

4. FLOOD PROTECTION

Potential measures to protect removal activities from an overbank flooding event have been evaluated during the permitting design phase. Further evaluations and selection of appropriate measures will be conducted during the detailed design phase and included in contract documents for award to the selected contractor. The following features have been evaluated:

4.1 Excavation Sequencing

The excavation will proceed in the following general sequence:

a) The first stage of excavation will consist of the removal of CCR from elevations above the 100-year flood elevation (approximately 325 ft-msl).

b) For the second stage, CCR from the interior portion of the AP1 Landfill will be removed while maintaining the outer soil/CCR berm up to the 100-year flood elevation level. No soil or vegetation will be removed from the outer berm during this stage. As a result, the outer soil/CCR berm will protect the interior excavation areas from flooding and protect the river from sediment and CCR exposed in the interior excavation. When interior excavation has been completed, the third stage of excavation will begin.

c) The third stage will be the removal, in segments, of the outer soil/CCR berm. The length of each berm segment will be kept short to allow for quick removal and to minimize the area of soil and CCR potentially exposed to flooding during removal. Beginning at the north end of the site, a length of the outer soil/CCR berm will be identified for removal. An interim soil berm will be built across the interior excavation at a point south of the planned slope removal to provide protection of the southern portion of the interior excavation from flooding. Soil, CCR, and vegetation on the outer slope north of the interim soil berm will then be removed by "dragging" these materials inward to previously excavated areas for transport and disposal. Vegetation will not be stripped from the outer slope surface prior to this removal. When the first segment of the outer soil/CCR berm has been removed, then a second segment of slope will be selected, and the process repeated. The interim berm built across the interior excavation will be periodically relocated as the slope removal proceeds southward. This process will continue until all CCR has been removed from the AP1 Landfill.

4.2 Vegetation Maintenance

Existing vegetation on the outer slopes of the outer soil/CCR berm will be maintained for as long as possible, up until the actual moment of excavation and removal. Equipment will not operate on these outer slopes or otherwise disturb the vegetation or soil surface.

4.3 Interim Berms

As briefly described in Section 4.1, interim berms will be periodically constructed across the interior excavation. These berms will protect previously excavated interior areas from flooding when removal of the outer soil/CCR berm is occurring north of the interim berm.

4.4 Temporary Structural Elements

Temporary structural elements will be utilized as appropriate to reduce the potential for CCR to be eroded from the outer soil/CCR berm segments during their removal as described in Section 4.1. Temporary structural elements may consist of, but are not limited to, the following:

a) Prefabricated articulated concrete blocks which could be deployed over exposed CCR if sufficiently high-water levels are predicted;

b) HESCO wall, or other similar structure; and

c) Sheet pile wall.

4.5 Erosion Control Measures

Erosion control measures will be utilized to protect the integrity of the outer soil/CCR berm from erosion by floodwaters or intense rains so that the berm can continue to provide flood protection to the interior portion of the excavation. Erosion control measures may consist of, but not be limited to, the following:

a) Soil stockpiles close to slope excavation areas so that exposed CCR can be covered quickly if sufficiently high-water levels are predicted;

b) Erosion control matting deployed on disturbed areas;

c) Geotextiles or temporary geomembranes (rain tarps) deployed on disturbed areas;

d) Temporary seeding or sodding of disturbed areas;

e) Double row silt fence installed at the toe of the outer slope to trap sediment before entering the river or creek;

f) Additional rows of silt fence installed above the toe of the outer slope but downhill from disturbed areas;

g) Hay bales, likely utilized in conjunction with silt fences;

h) Small soil berms constructed at or near the toe of the outer slope to trap sediment; and

i) Intensive monitoring and maintenance of silt fence, hay bales, and small soil berms so that trapped sediment is promptly removed, and the full sediment retention capacity of the fence/bale/berm is available.

4.6 Polymer Emulsions

Polymer emulsions may be applied to disturbed areas to reduce erosion.

4.7 Construction Schedule Adjustment

During construction, the forecast for local weather will be closely monitored. If heavy local rains are predicted, construction activities may be paused or modified to reduce the potential for erosion. Temporary measures described in Sections 4.3 through 4.6 may also be deployed.

Predicted Ocmulgee River water levels will be closely monitored during construction. United States Geological Survey (USGS) monitoring stations are located both upstream and downstream of the project site, and water levels at the project can be predicted by interpolating from predictions at these USGS stations. If predicted water levels will rise as high as exposed CCR excavation areas, then construction will be paused and one or more of the temporary measures described in Sections 4.3 through 4.6 may be deployed. Additionally, Georgia Power personnel will maintain close communications with dam operations personnel at Lake Juliette so that flow releases from the lake may be reduced during periods of high-water levels.

5. SUMMARY

AP1 Landfill was closed under the previous Solid Waste Management Rules. Georgia Power plans to remove the CCR waste from this CCR unit in accordance with the updated Closure Plan. Evaluations have not revealed the presence of any unstable areas within the permit boundary. A combination of measures, as described in Section 4, will be used to prevent stormwater run-on from adjacent areas from entering the CCR excavation. Stormwater run-off will be stored in equalization basins within the excavation area until pumped to onsite storage tanks or removed by tanker truck. Overbank flooding of the Ocmulgee River and Beaverdam Creek are not entirely controlled once the CCR excavation proceeds below the 100-year flood plain elevation. Further evaluations and selection of appropriate flood protection measures will be conducted during the detailed design phase and included in contract documents for award to the selected contractor.