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## MEMORANDUM

October 2016  
File No. 129063-002

SUBJECT:        Conceptual Closure Plan  
                  CCR Temporary Stockpile Area  
                  AES Puerto Rico  
                  Coal-Fired Power Plant  
                  Guayama, Puerto Rico

AES Puerto Rico (AES-PR) operates a 454 MW coal-fired power plant located in Guayama, Puerto Rico. The plant produces approximately 17% of the island's electricity. In the course of producing electricity, the Plant also produces coal combustion residuals (CCR), which have been used beneficially in applications on the island. In particular, AES-PR uses CCR to produce AGREMAX<sup>TM</sup>, a manufactured aggregate which has been used as landfill daily cover, roads, and other applications. AES-PR has also disposed of unused AGREMAX<sup>TM</sup> in a Subtitle D landfill, when authorized.

Prior to use or other off-site disposition, AES-PR's inventory of AGREMAX<sup>TM</sup> has been stored in the Temporary Stockpile Area (Stockpile Area), a six-acre area located behind the generating station at the Plant site. AES-PR has used the Stockpile Area to store its aggregate product since beginning operations in 2002. Within the Stockpile Area, AES-PR has segregated its remaining inventory of AGREMAX<sup>TM</sup> produced before October 19, 2015. Since that date, AES-PR has continued to produce AGREMAX<sup>TM</sup>, but has stored new inventory in a separate stockpile within the Stockpile Area that is segregated from the pre-October 19, 2015 inventory. At present, AES-PR will continue to store its new inventory of AGREMAX<sup>TM</sup> produced by the Plant in the Stockpile Area before use or disposal.

For purposes of this planning effort, AES-PR has assumed the Stockpile Area is a CCR unit.<sup>1</sup> This written Closure Plan (Plan) therefore addresses the requirements of §257.102 *Criteria for conducting the closure or retrofit of CCR units*, specifically section §257.102(b) for written closure plans, of the US Environmental Protection Agency's (EPA's) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR Part 257 (CCR Rule) effective 19 October 2015.

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<sup>1</sup> It is AES-PR's view that the temporary storage of its inventory of manufactured aggregate is not a CCR landfill and therefore is not a CCR unit subject to the CCR Rule, 40 C.F.R. Part 257. Nonetheless, as a protective measure, AES-PR taken steps to satisfy CCR Rule requirements applicable to CCR landfills, such as this Closure Plan. By undertaking these measures, AES-PR does not admit its facility is a CCR landfill covered by the CCR Rule and expressly preserves all rights and defenses.

The information required for the Plan is presented in the following sections in accordance with §257.102(b) of the CCR Rule.

This Plan describes the Stockpile Area, closure elements, a general schedule for closure, and steps required to amend the Plan in the future, if necessary. AES-PR will determine in the future whether the Stockpile Area will be closed by leaving CCR in place and installing a final cover system or through closure by removal of CCR in accordance with the allowable closure methods in the CCR Rule. As such, this initial Plan includes provision for both closure methods. AES-PR will amend this Plan in the future once those decisions are made.

*§257.102(b)(1): The owner or operator of a CCR unit must prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include, at a minimum, the information specified in paragraphs (b) (1) (i) through (vi) of this section.*

Closure may be necessary at any point during the active life of the Stockpile Area. Currently, AES-PR plans to operate the Plant through the year 2027 and begin closure of the Stockpile Area thereafter. Regardless of when the Stockpile Area is closed, the following steps will be necessary for closure of the unit identified for both closure methods:

#### Closure-in-place

1. Obtain written Professional Engineer (PE) certification that design of the cover system meets the requirements of the Final CCR Rule.
2. No later than the date closure is initiated, prepare a notification of intent to close a CCR unit and place notification in the facility operating record. The notification of intent to close must include the PE certification from Step 1.
3. Commence closure no later than 30-days after known final receipt of CCR.
4. Complete installation of final cover system within 6-months of commencing closure activities.
5. Obtain PE certification verifying closure has been completed in accordance with this Plan.
6. Within 30-days of completion of closure of the CCR unit, prepare a notification of closure of a CCR unit and place notification in the facility operating record. The notification of closure must include the PE certification from Step 5.
7. Following closure of the CCR unit, record a notation on the deed to the property or some other instrument normally examined during title search.
8. Within 30-days of recording a notation on the deed to the property, prepare a notification stating that the notation has been recorded and place the notification in the facility operating record.

#### Closure by Removal

1. Finalize detailed construction plans for closure.
2. Obtain written Professional Engineer (PE) certification that design of the excavation and final grading plans meet the requirements of the Final CCR Rule.

3. No later than the date closure is initiated, prepare a notification of intent to close a CCR unit and place notification in the facility operating record. The notification of intent to close must include the PE certification from Step 2.
4. Commence closure no later than 30-days after known final receipt CCR.
5. Complete closure within six months of commencing closure activities.
6. Obtain PE certification verifying closure has been completed in accordance with this Plan.
7. Within 30-days of completion of closure of the CCR unit, prepare a notification of closure of a CCR unit and place notification in the facility operating record. The notification of closure must include the PE certification from Step 6

§257.102(b) (1) (i): *A narrative description of how the CCR unit will be closed in accordance with this section*

Closure-in-place

The final cover system will be designed and constructed to meet the USEPA's CCR Rule requirements of §257.102(i)(A-D). The proposed final cover system will consist of a minimum 18-inch thick soil infiltration layer that will minimize the infiltration of liquids through the CCR unit. The infiltration layer will have a permeability less than or equal to any natural subsoils present, or no greater than  $1 \times 10^{-5}$  cm/s, whichever is less. An equivalent alternative may also be chosen in the future. Erosion of the final cover system will be minimized by the placement of a minimum 6-inch thick soil erosion layer, capable of supporting native plant growth. It is anticipated that soils for the final cover system will be imported from adjacent borrow areas proximate to the Stockpile Area.

The final cover system will be placed and graded to elevations necessary to prevent future impoundment of stormwater on the final cover system. Grading of the in-place CCR may be necessary prior to placement of cover system soils to ensure positive drainage and manage surface water run-off. Additional fill may also be necessary to meet design subgrade elevations. Surface water run-off and run-on will be managed to minimize the need for future maintenance of the cover system. The final cover system design grades will be analyzed and designed to provide appropriate safety factors against slope failure, sloughing or movement of the final cover system. Final cover grades will also be designed to accommodate settling and subsidence of the Stockpile to minimize disruption of the integrity and function of the final cover system.

Closure by Removal

After final receipt of CCR is achieved, the CCR materials will be removed from the Stockpile Area and areas that have been affected by releases from the unit, if any, will be decontaminated. AES-PR presently intends to add a geocomposite liner throughout the footprint of the Stockpile Area. Upon completion of CCR removal, any geocomposite liner will also be removed. Additionally, the sump pump and associated pump system elements in the southwest corner of the Stockpile Area and gabion walls along the eastern and southern perimeter (above grade) will be removed. The unit may also potentially be retrofitted for other use. Finally, groundwater monitoring concentrations will be evaluated to determine if the established groundwater protection standards are met pursuant to §257.95(h).

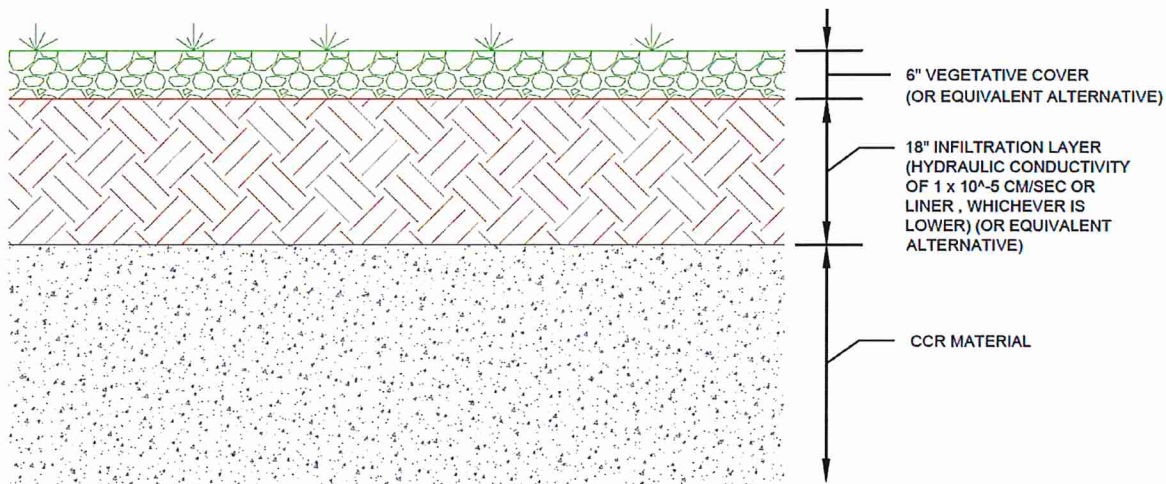
§257.102(b)(1)(ii): If closure of the unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) of this section.

§257.102(c): An owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit. CCR removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and the groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to §257.95(h) for constituents listed in appendix IV to this part.

Removal of CCR materials will be completed by excavation and the CCR will either be beneficially used or disposed of in a Subtitle D landfill. Once the unit commences closure, groundwater concentrations will be evaluated by comparing to the determined protection standards and either the unit will meet those standards and be certified as closed or in the event that the statistically significant increases above the protection standards exist, managed in accordance with the requirements of the CCR Rule to meet the protection standards.

§257.102(b)(1)(iii): If closure of the unit will be accomplished by leaving CCR in place, **a description of the final cover system**, designed in accordance with paragraph (d) of this section, and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section.

A typical section of the final cover is presented below.



§257.102(b)(1)(iii): If closure of the unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with paragraph (d) of this section, and **the methods and procedures to be used to install the final cover**. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section.

The following general installation methods and procedures are expected to be used to construct the final cover system:

#### Subgrade Preparation

Prior to installation of the infiltration layer, any existing vegetation will be removed and the surface smoothed to provide a suitable working base for cover system installation. Fill soil may be required to bridge soft materials, shape the subgrade, fill in low areas or repair erosion as necessary. Any soft subgrade areas will be under-cut and recompact as necessary to provide a firm, unyielding foundation for placement and compaction of the infiltration layer. The subgrade shall be maintained in a smooth, uniform, and drained condition prior to placement of the infiltration layer.

The subgrade will be surveyed to establish elevations of the surface prior to placement of the infiltration layer.

#### Infiltration Layer

Soil materials for the infiltration layer will be obtained from an adjacent on-site or off-site source, delivered using haul trucks, spread with a dozer, and compacted with soil compaction equipment. Soil will be sufficiently compacted to achieve compaction and permeability requirements. The final surface of the infiltration layer will be maintained in a smooth, uniform drainage condition.

Upon completion, the infiltration layer will be surveyed to establish elevations and verify a minimum thickness of 18-inches is provided.

#### Erosion Layer

Soil materials for the erosion layer will be obtained from an adjacent on-site or off-site source, delivered using haul trucks, and spread with a dozer. The erosion layer does not require compaction control; however, it should be stable for construction traffic. The erosion layer top surface will remain rough to promote the establishment of native vegetation. Stabilization and seeding of the erosion layer shall begin immediately after placement (weather permitting).

Upon completion, the erosion layer will be surveyed to establish elevations and verify a minimum thickness of 6-inches is provided.

Temporary or permanent erosion control materials (mulches, fabrics, rock check dams, soil tackifier) may be used to minimize erosion and aid in establishment of vegetation. Hard armor such as cobbles or rip rap may be used in areas where establishment of vegetation may be difficult or impractical.

#### Stormwater Run-off Controls

Appropriate drainage channel design and/or existing or proposed sediment/stormwater management ponds may be used to manage runoff.

***§257.102(b)(1)(iii): If closure of the unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with paragraph (d) of this section, and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section.***



§257.102(d)(1): *The owner or operator of a CCR unit must ensure that, at a minimum, the CCR unit is closed in a manner that will:*

§257.102(d)(1)(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;*

The proposed final cover system will have a permeability less than or equal to any natural subsoils present, or no greater than  $1 \times 10^{-5}$  cm/s, whichever is less, which will minimize infiltration of liquids into the waste and generation of leachate. The final cover system will minimize releases of CCR and CCR contaminated run-off by completely covering the in-place CCR preventing exposure to erosive conditions. The final cover system will minimize the potential for CCR fugitive dust by covering the in-place CCR preventing exposure to wind, mechanical equipment and/or vehicle traffic.

§257.102(d)(1)(ii): *Preclude the probability of future impoundment of water, sediment, or slurry;*

The final cover will be graded to promote positive drainage and prevent the impoundment of water, sediment, or slurry.

§257.102(d)(1)(iii): *Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period;*

The final cover system design grades will be analyzed and designed to provide appropriate slope stability and be designed to guard against slope failure, sloughing or movement of the final cover system. Stormwater controls will be designed to collect and discharge stormwater from the Stockpile Area in a controlled fashion to prevent inundation and minimize potential for erosion.

§257.102(d)(1)(iv): *Minimize the need for further maintenance of the CCR unit; and*

Erosion of the final cover system will be minimized by design of stormwater controls such as ditches, swales, and diversions and by establishment of native vegetation on the erosion layer minimizing the need for future maintenance. The design grades of the final cover system will be sufficient to accommodate settling and subsidence without disrupting the integrity of the final cover system. Accounting for potential settlement and subsidence the final cover system will minimize the need for future maintenance.

§257.102(d)(1)(v): *Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.*

Closure will be completed in the shortest amount of time consistent with generally accepted good engineering practices and industry standard construction methods but needs to incorporate sufficient time for development of detailed engineering design drawings and specifications, prequalification and availability of cover/construction materials, accommodation of adverse weather conditions, etc.

\$257.102(b)(1)(iv): An estimate of the maximum inventory ever on-site over the active life of the CCR unit.

The approximated maximum volume of CCR that could be stored in the Stockpile Area over the remaining active life is approximately 500,000 tons based on current estimates.

*\$257.102(b)(1)(v)*: Estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit's active life.

The largest area of the unit that could require a final cover is approximately 6.2 acres.

§257.102(b)(1)(vi): A schedule for completing all activities necessary to satisfy the closure criteria in this sections, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure. When preparing the written closure plan, if the owner or operator of a CCR unit estimates that the time required to complete closure will exceed the timeframes specified in paragraph (f) (1) of this section, the written closure plan must include the site-specific information, factors and considerations that would support any time extension sought under paragraph (f)(2) of this section.

An estimated schedule for completing the activities necessary to satisfy the closure in place criteria of the CCR Rule is provided below. The schedule lists the sequential steps that need to be taken to close the unit.

### Closure in Place Schedule

[illegible]

An estimated schedule for completing the activities necessary to satisfy the closure by removal criteria of the CCR Rule is provided below. The schedule lists the sequential steps that need to be taken to close the unit.

#### Closure by Removal Schedule

Item #	Task Item	Completion Time Frame (months)													
		-6	-5	-4	-3	-2	-1		1	2	3	4	5	6	7
1	Prepare Construction Plans/Specs														
2	PE Design Certification														
3	Notice of Intent to Close														
4	Obtain Applicable Agency Permits/Approvals														
5	Cease placing CCR														
6	Commence Closure														
7	Excavate CCR														
8	Regrading/Final Grading														
9	PE Closure Certification														
10	Notice of Closure														

AES-PR will need to initiate some activities prior to commencing closure. As indicated on each of the schedules, AES-PR will need to take action on Steps 1-4 as early as 6 months prior to the anticipated final placement of CCR at the Stockpile Area. The schedule as shown above should be considered a preferred timing path and that the order and ability to perform the upfront work prior to AES-PR ceasing placing CCR at the Stockpile Area is subject to circumstances at the time of closure and will be altered accordingly.

Per §257.102(e)(3) closure of the unit has commenced when AES-PR has ceased placing CCR at the Stockpile Area and completes any of the following actions or activities: (i) Taken any steps necessary to implement the written closure plan; (ii) Submitted a completed application for any required state or agency permit or permit modification; or (iii) Taken any steps necessary to comply with state or other agency standards that are a prerequisite, or are otherwise applicable, to initiating or completing the closure of the CCR unit.

AES-PR presently intends to operate the plant through 2027. Closure activities for the CCR unit are estimated to be completed in 2028. Closure activities for the CCR unit will occur in accordance with the allowable timeframes when either the unit ceases receiving CCRs, reaches capacity, or is triggered for closure. AES-PR will complete closure in the allowable timeframes including any closure time extensions in accordance with §257.102(f).

§257.102(b)(3)(i): *The owner or operator may amend the initial or any subsequent written closure plan developed pursuant to paragraph (b) (1) of this section at any time.*

AES-PR will assess and amend the Plan whenever there is a change in operation of the CCR unit that would substantially affect the closure plan or when unanticipated events necessitate a revision of the plan either before or after closure activities have commenced.



The Plan will be amended at least 60 days prior to a planned change in the operation of the facility or the CCR unit that necessitates a revision of the plan, or no later than 60 days after an unanticipated event requires the need to revise the Plan. If the Plan needs to be revised after closure activities have commenced, the Plan will be revised no later than 30 days following the triggering event.

The amended closure plan will be placed in the facility operating record as required by the CCR Rule.

A record of amendments to the plan will be tracked below. The latest version of the closure plan will be noted on the front cover of the plan.

Version	Date	Description of Changes Made
1	October 2016	Initial Issuance

§257.102(b)(4): The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of this section.

### Professional Engineer Certification

I certify that this written Closure Plan for AES Puerto Rico's CCR Temporary Stockpile Area at the Coal-Fired Power Plant meets the USEPA's Final CCR Rule requirements of §257.102(b).

Signed:   
Certifying Engineer

Print Name: Pedro E. Labayen  
Puerto Rico License No.: 24451

Professional Engineer's Seal

