CLOSURE PLAN ASH LANDFILL AREA SPRINGERVILLE GENERATING STATION SPRINGERVILLE, ARIZONA

Prepared for

Tucson Electric Power Company

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Closure Plan Ash Landfill Area Springerville Generating Station Springerville, Arizona

I certify that the material and data in this Closure Plan were prepared under the supervision and direction of the undersigned and meets all the requirements of 40 CFR§257.102.

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1 INTRODUCTION

AMTECH Associates L.L.C. (AMTECH) has prepared this closure plan for the Ash Landfill area associated with Springerville Generating Station (SGS) operated by Tucson Electric Power Company (TEP). This plan was prepared to comply with closure plan requirements as per the U.S. Environmental Protection Agency's Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfill and Surface Impoundments, 40 CFR part 257 Subpart D. These standards are applicable to the facility's Ash Landfill as an "Existing CCR landfill" as defined in 40 CFR§257.53.

As part of the closure plan, AMTECH has outlined the procedures to be taken in order to close the Ash Landfill as stipulated for existing CCR landfills in accordance with 40 CFR§257.102. In accordance with §257.102(b)(2)(iii), this plan will be placed in the SGS's facility operating record pursuant to the requirement stipulated in §257.105(i)(4).

1.1 Regulatory Requirements

As per 40 CFR part §257.102(b), a written closure plan must be prepared for a CCR unit 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. Information specified to be included in the closure plan by this section is further described in Section 2 of this document.

1.1.1 Site Description and Location

The SGS is a four-unit, pulverized coal-fired, steam electric generating facility, operated by TEP, which began operations in 1985 and consists of a combined net generating output of approximately 1600-megawatts.

SGS is located approximately 15 miles northeast of Springerville, in Apache County, Arizona. The power plant area of SGS is located in Sections 27, 28, 33, and 34, of Township 11 North, Range 30 East of the Salt and Gila River Baseline and Meridian. The SGS site occupies 14,355 acres, which includes the power plant area, ash landfill area and the east and west well fields.

The Ash Landfill, located southwest of the power plant area, is primarily used for the disposal of fly and bottom ash, products of the coal-fired units at the plant. A delineated portion of the Ash Landfill is used for the disposal of other items in lesser quantities, i.e. reactivator sludge, construction debris and power plant outage refuse, sump sludges, demineralizer resins, PCS, cooling tower sludge, lime, soda ash, sewage pond sludge, evaporation pond solids,



miscellaneous pond clean-outs, cooling tower treated lumber, and other inert and non-hazardous materials. TEP is authorized to dispose of these materials in the Ash Landfill under its Aquifer Protection Permit (APP) No. P-101448. The Arizona Department of Environmental Quality (ADEQ) is the regulating authority for the APP Program.

1.2 Other Information

The ADEQ issued APP permit No. P-101448 for the SGS (last modified on June 15, 2016), which authorizes the operation and closure of existing discharging facilities, including the Ash Landfill.

ADEQ requires closure of the Ash Landfill as soon as a portion of it achieves its final configuration. TEP will perform closure in phases per the APP permit.

As provided in 257.102(b)(3), TEP will amend this closure plan as needed based on site-specific and local regulatory mandates; the modified plan will replace this closure plan to satisfy the requirements of the CCR Rules.



2 CLOSURE PLAN

This plan will describe the steps necessary to close the CCR unit at any point consistent with recognized and generally accepted good engineering practices and must include at a minimum, the requirements pursuant to 40 CFR part §257.102(b). A brief outline of the closure plan is provided below:

- Narrative description of the closure activities. 40 CFR part §257.102(b)(1)(i);
- 40 CFR part §257.102(b)(1)(ii) is not applicable to this facility as CCR will not be removed from the Ash Landfill.
- As closure of the CCR unit will be accomplished by leaving CCR in place, the final cover, using a low permeability infiltration layer and erosion layer, will be placed in order to meet the performance standards as specified by the CCR rules. 40 CFR part §257.102(b)(1)(iii);
- An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit will be documented as part of the closure activities. 40 CFR part §257.102(b)(1)(iv);
- An estimate of the largest areas of the CCR unit ever requiring a final cover at any time during the CCR unit's active life. 40 CFR part §257.102(b)(1)(v);
- A schedule for completing all activities necessary to satisfy the closure criteria. 40 CFR Part §257.102(b)(1)(vi).

2.1 Narrative Description 40 CFR part §257.102(b)(1)(i)

The following closure procedures shall be performed for the closure of the Ash Landfill facility. The conceptual closure configuration of the Ash Landfill is provided in **Appendix A**.

2.1.1 Pre-Closure Procedures

Perform Pre-Closure Activities: The following activities are being performed on an on-going basis to prepare the site for final closure and construction of the final cover:

• Construct adequate access roads to and around the facility.



- Evaluate and document slope stability of the ash fill and final soil cover system interface on an on-going basis as the ash filled areas attain final closure elevations.
- Compact the ash material to minimize settlement of in-place materials.
- Fine-grade, uniformly, the top surface of the top deck of the ash fill when final elevations have been achieved to prevent run-off
- Fine grade, uniformly, the slope benches of the ash fill when final elevations have been achieved to prevent run-off.
- Construct the side-slopes of the landfill in a manner that will minimize the potential for erosion of the final soil cover system and to ensure erosion will be less than 2 tons per acre, per year.
- Fine grade, uniformly, the side-slopes of the ash fill to 1.45 horizontal to 1 vertical (1.45:1V) when final elevations have been achieved.
- Keep and maintain current records of closure and/or maintenance activities.
- Ensure that drainage features have been constructed in accordance with the Initial Run-On/Run-Off Control System Plan.
- Amend this closure plan when there is a change in operation of the Ash Landfill that would substantially affect the current plan.

2.2 Closure Procedures 40 CFR part §257.102(b)(1)(ii)

Within 90 days following closure notification to the ADEQ, TEP will submit a closure plan with the criteria outlined above. In addition, the following actions will be undertaken:

- Work with a third-party professional engineer registered in the state of Arizona to develop closure documents for the final cover system and its appurtenances;
- Evaluate final landfill configuration (shape and pre-closure elevations) and design final closure elevations, final grading plan, and stormwater drainage system (if needed);
- Develop Construction Drawings and Technical Specifications that lay out the work to be performed for closure;
- Develop a construction quality assurance (QA) / construction quality control (QC) plan that specifies all construction performance standards and testing frequencies;
- Prepare construction bid package necessary for general contractors to bid on closure construction;



- Construct the final cover system in accordance with the Construction Drawings and Technical Specifications, including geotechnical testing; and
- Submit a construction certification report from a third-party professional engineer registered in the state of Arizona that certifies that closure was conducted in accordance with the ADEQ-approved closure plan and provides documentation of all testing, construction activities, and certified as-built drawings.

2.3 Final Cover Installation 40 CFR part §257.102(d)(3)

As CCR will be left in place, a final cover system must be installed. The final cover will consist of an infiltration (i.e., soil barrier) layer and erosion layer and will be placed following fine grading of the final ash fill surfaces. Past geotechnical investigations demonstrate that on-site soils are capable of achieving and exceeding the following minimum performance standards, which are pursuant both to APP and CCR regulatory requirements:

- Place a minimum 18 inches of infiltration layer with permeability less than or equal to 1×10^{-5} cm/sec in accordance with Sections 257.102 (d)(3)(i)(A) to (B); and
- Place a minimum six inches of erosion materials capable of sustaining natural vegetative growth as required by Section 257.102 (d)(3)(i)(C), either through natural vegetation or through hydroseed application.

As the Ash Landfill benches are completed to their 5-foot to 10-foot maximum height and 1.45H:1V side-slopes configuration, a settlement and slope stability analysis will be performed to demonstrate minimal subsidence and settlement as required by Section 257.102 (d)(3)(i)(D).

2.3.1 Alternative Final Cover Installation

An alternative final cover may be proposed in accordance with Section 257.102 (d)(3)(ii).

2.4 Estimate of CCR Amount 40 CFR part §257.102(b)(1)(iv)

The Ash Landfill has been in operation since 1985. Approximately 27.94 million tons of CCR have been buried at the facility to date. Based on the existing footprint of the Ash Landfill area, the remaining capacity of the landfill has been estimated to 35.78 million cubic yards. Using this capacity and approximate unit weight of ash of 48 lbs/cu-ft., the Ash Landfill will accept approximately 22.08 million tons of additional CCR until it attains final capacity for a total of approximately 50 million tons of CCR.

2.5 Estimate of Final Cover Area 40 CFR part §257.102 (b)(1)(v)

The active area for the Ash Landfill will need final cover pursuant to CCR rules. The cover for this closure area will meet the minimum requirements as cited above for prescriptive or alternative final covers.



2.6 Final Closure Schedule 40 CFR part §257.102 (b)(1)(vi)

According to TEP's records, approximately 1.1 million tons of ash was deposited in 2015. Assuming this volume and the final balance capacity of 22.08 million tons, the remaining life of the Ash Landfill within the existing footprint is approximately 20 years. TEP will continue to maintain current records/inventory of the amount of CCR deposited in the Ash Landfill in order to implement closure objectives in multiple phases.

2.7 Recordkeeping, Notification, and Posting §257.105-107

In accordance with §257.105 (a), files will be maintained (relevant to the closure plan) as required by this section in its facility operating record.

In accordance with §257.105 (b), these records will be maintained for a minimum of five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or study. In accordance with §257.105 (i), the following documents will be placed in the facility's operating record, (as pertinent to the operation of this facility) those items specified in §257.105 (i)(1) through §257.105 (i)(11).

- Notification of intent of closure. §257.105 (i)(1).
- Annual progress reports of closure implementation. §257.105 (i)(2).
- Notification of closure completion. §257.105 (i)(3).
- Written closure plan and any subsequent amendments. §257.105 (i)(4).
- Any written demonstrations for a time extension for initiating closure. 257.105 (i)(5).
- Any written demonstrations for a time extension for completing closure. §257.105 (i)(6).
- Notification of intent to close a CCR unit. §257.105 (i)(7).
- Notification of completion of closure of a CCR unit. §257.105 (i)(8).
- Notification of recording a notation on a deed. §257.105 (i)(9).
- Notification of intent to comply with alternative closure requirements. §257.105 (i)(10).
- Annual progress reports under the alternative closure requirements (if necessary). §257.105 (i)(11).

TEP will provide notification of the availability of the Closure Plan to the relevant State Director and/or Tribal authority before the close of business on the day the notification is required to be completed. §257.106.

TEP will place the Closure Plan on TEP's CCR Web site in accordance with §257.107.

APPENDIX A

DRAWING 1

ASH DISPOSAL LANDFILL CONCEPTUAL CLOSURE CONFIGURATION





