

**CHOLLA POWER PLANT  
CLOSURE PLAN §257.102(b)  
BOTTOM ASH POND  
Amendment 2 (November 23, 2020)**

**Closure Plan Contents §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.*

<b>Prepared for Arizona Public Service by AECOM Technical Services, Inc. (AECOM)</b>	
<b>CLOSURE PLAN AMENDMENT HISTORY</b>	
Initial	August 30, 2016
Amendment 1	October 2, 2020 - Updated regulatory framework information and dates
Amendment 2	November 23, 2020 – Deleted reference to closure of Sedimentation Pond being performed concurrently with closure of Bottom Ash Pond.
<b>SITE INFORMATION</b>	
Site Name / Address	Cholla Power Plant / 4801 I-40 Frontage Road, Joseph City, AZ 86032
Owner Name / Address	Arizona Public Service / 400 North 5 <sup>th</sup> Street, Phoenix, AZ 85004
CCR Unit	Bottom Ash Pond
Location	34° 57' 18" N, 110° 17' 19" W
Reason for Initiating Closure	Permanent cessation of a coal-fired boiler(s) by a date certain
Final Cover Type	Evapotranspiration Cover
Closure Method	Closure by leaving CCR in place
<b>CLOSURE PLAN DESCRIPTION</b>	
(b)(1)(i) – A narrative description of how the CCR unit will be closed in accordance with this section.	The Bottom Ash Pond (BAP) is an existing Coal Combustion Residual (CCR) impoundment constructed for the storage of bottom ash generated by the Cholla Power Plant. The BAP was placed into service after the Bottom Ash Dam was completed in 1978. The Bottom Ash Dam was built to impound the hydraulically deposited bottom ash. The BAP is regulated by the United

States Environmental Protection Agency per 40 CFR parts 257 and 261. The BAP embankment dam is regulated by the Arizona Department of Water Resources (ADWR) Dam Safety Program (ADWR Dam #09.27).

The BAP will be dewatered to facilitate construction of a final cover system for leaving the CCR in place. The final cover will be constructed over a graded and prepared CCR subgrade. The Bottom Ash Pond decant areas will be filled with hydraulically deposited bottom ash to provide grading from south or southwest to northeast. The bottom ash top slopes will be re-graded to provide the slope to promote storm water drainage off the closed pond. The storm water runoff will be discharged off the closed configuration of the BAP to a new detention basin. The detention basin will outfall to Tanner Wash.

Closure operations will consist of:

- 1) Dewatering,
- 2) Re-grading CCR to create acceptable grades for closure,
- 3) Installing the final cover system, and
- 4) Constructing the perimeter drainage channels.

In accordance with §257.102(b)(3), this Amendment 1 revises information in the initial written closure plan regarding dates and regulatory framework information. This amended written closure plan will be amended to provide additional details after the final engineering design for the grading and cover system is completed. The current version of the closure plan reflects the information and planning available at the time of issuance.

<p>(b)(1)(ii) – If closure of the CCR 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.</p>	<p>Not applicable. The Bottom Ash Pond will be closed by leaving CCR in place and designed in accordance with §257.102(d).</p>
<p>(b)(1)(iii) – If closure of the CCR 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.</p>	<p>Applicable. The Bottom Ash Pond will be closed by leaving CCR in place and closure will be designed in accordance with §257.102(d).</p> <p>The area is in a semi-arid to arid climate with precipitation on the order of 6 inches per year and evaporation losses (pan evaporation rate) on the order of 50 inches per year. Therefore, this environment is appropriate for using a water-balance soil cover system that relies on the net water losing climate to reduce infiltration into the subgrade of the cover.</p> <p>The final cover system will be installed in direct contact with a sloped subgrade of CCR or other fill to achieve final subgrade elevations designed for positive storm water drainage. The alternative final cover (“evapotranspiration cap”) system, designed in accordance with requirements of §257.102(d)(3)(ii), will consist of the following (from bottom to top):</p> <ol style="list-style-type: none"> <li>1) a minimum of 18 inches of compacted earthen material with a discharge (flux) through the cover material equivalent to a cover system with a single geomembrane;</li> <li>2) Six inches of soil capable of sustaining native plant growth and resisting erosion (erosion layer); and</li> <li>3) Seeded with native vegetation.</li> </ol> <p>CCR material will be re-graded and earthen fill material placed, as required, to bring the grades to the design slopes. Earthen material for the infiltration layer will be placed, graded, and compacted to meet the specified thickness and</p>

	<p>permeability. The final cover surface will be seeded and vegetated.</p> <p>Figures 1 through 3 show the general grading concept for the closure of the BAP. The final cover will have minimum as-constructed top slopes of 0.5 to 1.0 percent. The proposed grading will allow water to flow from the top slope into a drainage collection channel that will collect and convey the runoff directly to a newly constructed detention/retention basin that will outfall to Tanner Wash. The outside slopes of the existing dam will not be re-graded as there is already erosion protection in place and previous geotechnical analyses have shown the existing slopes to be stable.</p>
<p>(b)(1)(iii) – How the final cover system will achieve the performance standards in §257.102(d).</p> <p><b>Five Performance Standards:</b></p>	
<p>1. (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.</p>	<p>The infiltration (flux) through the final cover will be demonstrated to be equivalent to or less than flux through the unlined native soil comprising the bottom of the BAP. The demonstration of the alternative final cover system will be completed during final engineering design for the grading and cover system and issued in an amended closure plan.</p>
<p>2. (d)(1)(ii) – Preclude the probability of future impoundment of water, sediment, or slurry.</p>	<p>The final cover will have a minimum as-constructed top slope of 0.5 to 1.0 percent to preclude the probability of ponding. The overall drainage pattern of the final cover will slope toward the northeast corner of the BAP to coordinate drainage with the adjacent Bottom Ash Monofill. The design for the final cover system will consider the magnitude of the expected settlement of the wastes and the potential and locations of possible differential settlement. The post-closure plan includes maintenance measures to correct local grading deficiencies.</p>

<p><b>3.</b> (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.</p>	<p>The downstream slopes of the embankment dam will remain at 2H:1V and not be re-graded for the final closed configuration of the BAP. The final engineering design for the grading and cover system will include geotechnical analyses to demonstrate that the final outer slopes and cover will satisfy the stability requirements to prevent sloughing or mass movement.</p>
<p><b>4.</b> (d)(1)(iv) – Minimize the need for further maintenance of the CCR unit.</p>	<p>The final cover will be seeded with native vegetation to minimize erosion maintenance. Drainage channels will have appropriate erosion protection measures to minimize erosion maintenance.</p>
<p><b>5.</b> (d)(1)(v) – Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.</p>	<p>Closure is expected to occur in coordination with the schedule for cessation of coal-fired electricity generation at the Cholla Power Plant. Coal-fired electricity generation is scheduled to cease in 2025. APS is seeking a time extension to initiate closure in accordance with the separate “Site-specific alternative deadlines to initiate closure of CCR surface impoundments” provisions of §257.103(f)(2). The BAP is scheduled to close no later than October 17, 2028.</p> <p>The BAP closure will include sufficient dewatering and ash material stabilization for construction of the final grading and cover. These activities will be performed concurrently with the cessation of coal-fired electricity generation at the Cholla Power Plant in 2025 and the closure of the Fly Ash Pond and Bottom Ash Monofill. Dewatering and stabilization may take approximately 1 to 2 years and construction of the grading and final cover with appurtenant drainage features may take an additional 1 to 2 years.</p>
<p>(d)(2)(i) – Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.</p>	<p>The existing CCR will be dewatered to remove incidental free liquids and to provide a stable base for the construction of the final cover system. The form and extent of required dewatering has not yet been identified.</p>

<p>(d)(2)(ii) – Remaining wastes must be stabilized sufficiently to support the final cover system.</p>	<p>The existing CCR will be dewatered and re-graded to provide a stable base for the construction of the final cover. The materials within the BAP are generally bottom ash and therefore assumed to provide a stable liner subgrade surface with limited compactive effort.</p>
<p>(d)(3) – A final cover system must be installed to minimize infiltration and erosion, and at minimum, meets the requirements of (d)(3)(i) of this section, or the requirements of the alternative final cover system specified in paragraph (d)(3)(ii) of this section.</p> <p>(d)(3)(i) – The design of the final cover system must be included in the written closure plan.</p>	<p>The alternative final cover system will meet the requirements of §257.102(d)(3)(ii). The requirements of §257.102(d)(3)(ii) will be achieved using the clayey and silty soils present at the site to construct an infiltration layer that promotes runoff and evapotranspiration. The infiltration layer will be a minimum of 18 inches thick and will be constructed to reduce infiltration or flux into the BAP. On-site soils or an off-site aggregate source will be used to provide an erosion layer to protect the infiltration layer.</p> <p>The engineering design for the final cover system will be issued in an amended closure plan when the final cover system is completed.</p>
<p>EITHER</p> <p>(d)(3)(i)(A) – The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than <math>1 \times 10^{-5}</math> cm/sec, whichever is less.</p> <p>(d)(3)(i)(B) – The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.</p> <p>OR</p> <p>(d)(3)(ii)(A) – The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (d)(3)(i)(A) and (B).</p>	<p>The alternative final cover system will meet the requirements of §257.102(d)(3)(ii). The permeability of the final cover will be demonstrated prior to closure.</p>

<p>EITHER</p> <p>(d)(3)(i)(C) – The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.</p> <p>OR</p> <p>(d)(3)(ii)(B) – The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (d)(3)(i)(C) of this section.</p>	<p>The final cover will include either:</p> <ul style="list-style-type: none"> <li>a) a minimum of 6 inches of a soil erosion layer that is capable of sustaining native plant growth (erosion layer) that will be seeded and vegetated to meet the requirements of §257.102(d)(3)(i)(C); or</li> <li>b) a minimum of 6 inches of rock armor erosion protection to meet the requirements of §257.102(d)(3)(ii)(B).</li> </ul>
<p>(d)(3)(i)(D), (d)(3)(ii)(C) – The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.</p>	<p>The engineering design for the final cover system will consider the magnitude of the expected settlement of the wastes and the potential and locations of possible differential settlement.</p> <p>The relatively freely draining properties of bottom ash minimize the likelihood of delayed drainage or consolidation of wastes. The majority of settlement is likely to be immediate and not evident as additional waste is placed.</p> <p>The final cover will have as-constructed slopes graded to drain to accommodate potential future differential settlement and subsidence. The final cover will incorporate an 18-inch thick, loosely-compacted evapotranspiration layer that will behave in a flexible manner so as to minimize the risk of disrupting the continuity of the cap due to settlement.</p>
<p><b>INVENTORY AND AREA ESTIMATES</b></p>	
<p>(b)(1)(iv) – An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.</p>	<p>3,710,000 cubic yards</p>
<p>(b)(1)(v) – An 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.</p>	<p>80 acres</p>

**CLOSURE SCHEDULE**

(b)(1)(vi) – A schedule for completing all activities necessary to satisfy the closure criteria in this section, 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/milestones that will be taken to close the CCR unit, and the estimated timeframes to complete each step or phase of CCR unit closure. If closure timeframe is anticipated to exceed the timeframes specified in paragraph §257.102(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 §257.102(f)(2).

APS is seeking a time extension to initiate closure in accordance with the separate “Site-specific alternative deadlines to initiate closure of CCR surface impoundments” provisions of §257.103(f)(2). The milestones and the associated timeframes are initial estimates. Some of the activities associated with the milestones will overlap. Amendments to the milestones and timeframes will be made as more information becomes available.

Initial Written Closure Plan Completed	August 2016
Closure Plan Amendment 1	October 2020
Closure Plan Amendment 2	November 2020
Permits and Approvals from Agencies	October 2024 (estimated)
Date of Final Receipt of CCR	April 2025
Closure Activities Initiated	April 2023
Complete Dewatering	December 2026 (estimated)
Complete CCR Stabilization	December 2026 (estimated)
Installation of Final Cover	Prior to October 17, 2028
Estimated Completion of Closure Activities	Prior to October 17, 2028

**Certification Statement 40 CFR § 257.102(b)(4) – Amended Written Closure Plan for a CCR Surface Impoundment**

**CCR Unit: Arizona Public Service; Cholla Power Plant; Bottom Ash Pond**

I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of Arizona, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the amended written closure plan dated November 23, 2020 meets the requirements of 40 CFR § 257.102.

Alexander W. Gourlay, P.E.

*Printed Name*

November 23, 2020

*Date*







