FOUR CORNERS POWER PLANT
CLOSURE PLAN §257.102(b)
DRY FLY ASH DISPOSAL AREA (DFADA)
Revision 1 (July 8, 2020)

Revision Statement

The Revision 1 Closure Plan (dated July 8, 2020) is an amendment to the Initial Closure Plan (dated October 17, 2016). The Revision 1 Closure Plan has been prepared to include the planned DFADA Cell 4, which is scheduled to be put into service and receive CCR materials in December 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.

SITE INFORMATION	
Site Name / Address	Four Corners Power Plant / 691 CR-6100, Fruitland, NM 85416
Owner Name / Address	Arizona Public Service / 400 North 5th Street, Phoenix, AZ 85004
CCR Unit	Dry Fly Ash Disposal Area (DFADA)
Location	36° 40’ 43.27” N, 108° 30’ 12.2” W
Reason for Initiating Closure	Known Final Receipt of Waste
Final Cover Type	Evapotranspiration Cover
Closure Method	Closure by leaving CCR in place
CLOSURE PLAN DESCRIPTION	
(b)(1)(i) – A narrative description of how the CCR unit will be closed in accordance with this section.	The DFADA is an existing coal combustion residual (CCR) lined landfill facility located to the southwest of the Four Corners Power Plant. The DFADA currently consists of four contiguous cells – Cell 1 (constructed in 2007), Cell 2 (constructed in 2012), Cell 3 (constructed in 2014), and Cell 4 (constructed in 2020). Lateral Expansion Cells 5, 6, and 7 are planned as the DFADA expands to the west to accommodate additional CCR during the life of the Four Corners Power Plant (FCPP). The DFADA, the Lined Ash Impoundment (LAI), and the Lined Decant Water Pond (LDWP) are adjacent to one another and will share selected

	closure-related features, including perimeter drainage channels and the type of cover system. The major closure construction activities will be: 1) Re-grading CCR to create acceptable grades for closure, 2) Installing the final cover system, and 3) Constructing the perimeter drainage channels. The final cover for the DFADA will be constructed over a graded and prepared subgrade. The subgrade and final cover will be sloped to promote drainage across the surface of the landfill. A system of perimeter drainage channels will provide storm water diversion around the perimeter of the DFADA. Storm water runoff will discharge from the DFADA via sheet flow into a drainage channel. The channel will discharge to a storm water detention basin. In accordance with §257.102(b)(3), this written closure plan will be amended to provide additional details after the final engineering design for the grading and cover system is completed. This written closure plan reflects the information and planning available at the time of issuance.
(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.	Not Applicable. The DFADA will be closed by leaving CCR in place and the cover will be designed in accordance with §257.102(d).
(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	Applicable. The DFADA will be closed by leaving CCR in place and the cover will be designed in accordance with §257.102(d). The DFADA is in a semi-arid to arid climate with precipitation on the order of 10 inches per year and evaporation losses (pan evaporation rate) on the order of 60 inches per year. Therefore, this

the performance standards specified in paragraph (d) of this section.	environment is appropriate for using a water-balance soil cover system that relies on the net water losing climate to minimize infiltration into the subgrade of the cover. The final cover system will be installed in direct contact with a sloped subgrade of CCR or other fill to achieve final subgrade elevations. The alternative ("evapotranspiration cap") final cover system, designed in accordance with requirements of §257.102(d)(3)(ii), will consist of the following (from bottom to top): 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; 2) Six inches of soil capable of sustaining native plant growth and resisting erosion (erosion layer); and 3) Seeded with native vegetation. The existing CCR will be re-graded and earthen or CCR material fill will be placed, as required, to bring the grades to the design slopes. Earthen material for the infiltration layer and erosion layer will be placed, graded, and compacted to meet the specified thickness, density, and permeability. After the erosion layer is placed, the final cover surface will be seeded with native vegetation. Figures 1 shows the general grading concept for the closure of the DFADA. The final cover will have minimum as-constructed slopes of 0.5 percent, for the top slopes and channels, and will be graded to convey storm water via sheet flow to a storm water drainage channel. The closed configuration of the DFADA will consist of outer slopes re-graded to 4:1 Horizontal:Vertical (H:V), or flatter where applicable, to improve long-term

	stability and limit erosion. A system of perimeter drainage channels will provide storm water diversion for run-on flows arriving from the east around the DFADA. A separate system of drainage channels will provide runoff collection and conveyance for the flow from the top of the DFADA to the new detention basin.
(b)(1)(iii) – How the final cover system will achieve the performance standards in §257.102(d). **Five Performance Standards:**	
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.	The infiltration (flux) through the alternative final soil cover will be demonstrated to be equivalent to a single geomembrane liner/infiltration layer cover system. 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.
2. (d)(1)(ii) – Preclude the probability of future impoundment of water, sediment, or slurry.	The final cover will have a minimum as-constructed top slope of 0.5 percent to preclude the probability of ponding. The final cover will generally slope from south to north and future settlement of CCR is expected to be minimal and will tend to be uniform over the DFADA area, which will not result in ponded water on top of the DFADA. The post-closure plan includes maintenance measures to correct local grading deficiencies.
3. (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 outer slopes of the final closed configuration of the DFADA will be re-graded to 4H:1V, or flatter where applicable. 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.
4. (d)(1)(iv) – Minimize the need for further maintenance of the CCR unit.	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.

5. (d)(1)(v) – Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.	Closure is expected to occur after the final receipt of CCR materials in the DFADA. The closure of the DFADA will be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.
(d)(2)(i) – Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.	The DFADA cells are filled in a manner so as to minimize the opportunity to impound free liquid resulting from precipitation. Water or FGD sludge is blended with CCR solids before placement to facilitate compaction and solidification of placed CCR wastes. The base of the landfill consists of a leachate drainage layer to collect and discharge leachate to a retention pond. Therefore, dewatering is not expected to be necessary to close the DFADA.
(d)(2)(ii) – Remaining wastes must be stabilized sufficiently to support the final cover system.	The existing CCR will be re-graded to provide a stable base for the construction of the final cover system.
(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. (d)(3)(i) – The design of the final cover system must be included in the written closure plan.	The 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 clayey and silty soils present at the site to promote 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 DFADA. The rocky on-site soils or an off-site aggregate source will be used to provide an erosion layer to protect the infiltration layer. When the engineering design for the final cover system is completed, it will be issued in an amended closure plan.
EITHER (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 1 x 10^{-5} cm/sec, whichever is less.	The bottom liner systems for Cells 1 through 4 all have slightly different compositions. The bottom liner system for Cell 1 consists of the following (from top to bottom):

(d)(3)(i)(B) – The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer than contains a minimum of 18 inches of earthen material. OR (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).	1) a drainage layer (consisting of freely-draining bottom ash drain material); 2) a single 60-mil HDPE geomembrane; and 3) a scarified and compacted subgrade of clayey soil and weathered shale. The bottom liner system for Cell 2 consists of the following (from top to bottom): 1) a drainage layer consisting of a geocomposite drain material (geonet drain between two layers of non-woven geotextile); 2) a single 60-mil HDPE geomembrane; 3) a geosynthetic clay liner (GCL); and 4) a prepared, compacted subgrade of clayey soil and weathered shale. The bottom liner system for Cells 3 and 4 consists of the following (from top to bottom): 1) a drainage layer consisting of freely-draining bottom ash; 2) a single 60-mil HDPE geomembrane; 3) a geosynthetic clay liner (GCL); and 4) a prepared, compacted subgrade of clayey soil and weathered shale. The infiltration (flux) through the alternative final soil cover will be demonstrated to be equivalent to that through a single geomembrane and GCL liner system/infiltration layer cover system. This demonstration will be completed during final engineering design for the alternative final cover system.
EITHER (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. OR	The final cover will include either of the following: 1) 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

(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.	2) a minimum of 6 inches of rock armor erosion protection to meet the requirements of §257.102(d)(3)(ii)(B).
(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.	The final 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. The relatively freely-draining nature of the fly and bottom ash minimizes the likelihood of prolonged drainage or consolidation of wastes. The majority of settlement is likely to be immediate as additional waste is placed. The properties and method of placement/compaction of materials placed in the DFADA are expected to minimize the potential for long-term settlement. The final cover will have minimum as-constructed slopes of 0.5 percent 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, non-brittle manner to accommodate differential settlement that may occur.
INVENTORY AND AREA ESTIMATES	
(b)(1)(iv) – An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.	5,295 acre-feet (total for Cells 1, 2, 3, and 4)
(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.	135 acres (total for Cells 1, 2, 3, and 4)
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 cell 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).	
The milestone 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	by October 17, 2016
Final Design and Final Closure Plan	Within 30 days of the final receipt of CCR materials

Certification Statement 40 CFR § 257.102(b)(4) – Revision 1 Closure Plan for a CCR Landfill

CCR Unit: Arizona Public Service; Four Corners Power Plant; Dry Fly Ash Disposal Area

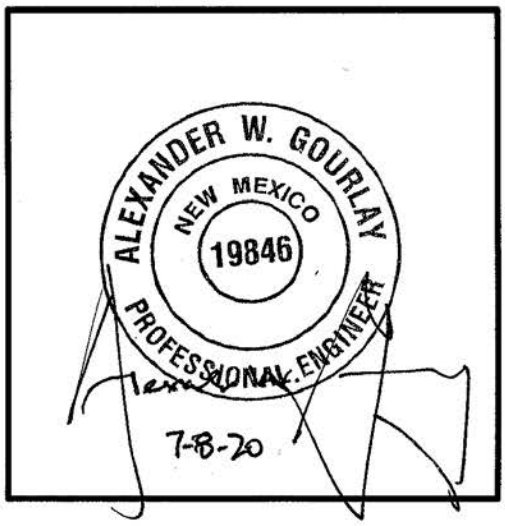
I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the Revision 1 closure plan dated July 8, 2020 meets the requirements of 40 CFR § 257.102.

Alexander W. Gourlay

Printed Name

July 8, 2020

Date



Certification Statement 40 CFR § 257.102(d)(3)(iii) – Design of the Final Cover System for Closure of a CCR Landfill

CCR Unit: Arizona Public Service; Four Corners Power Plant; Dry Fly Ash Disposal Area

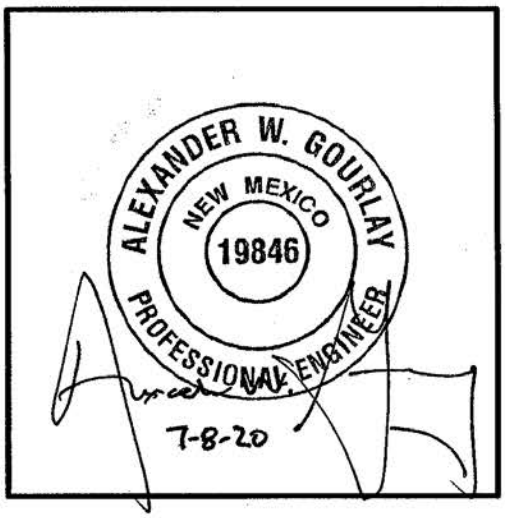
I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the design of the final cover system as included in the design statement dated July 8, 2020 meets the requirements of 40 CFR § 257.102.

Alexander W. Gourlay

Printed Name

July 8, 2020

Date



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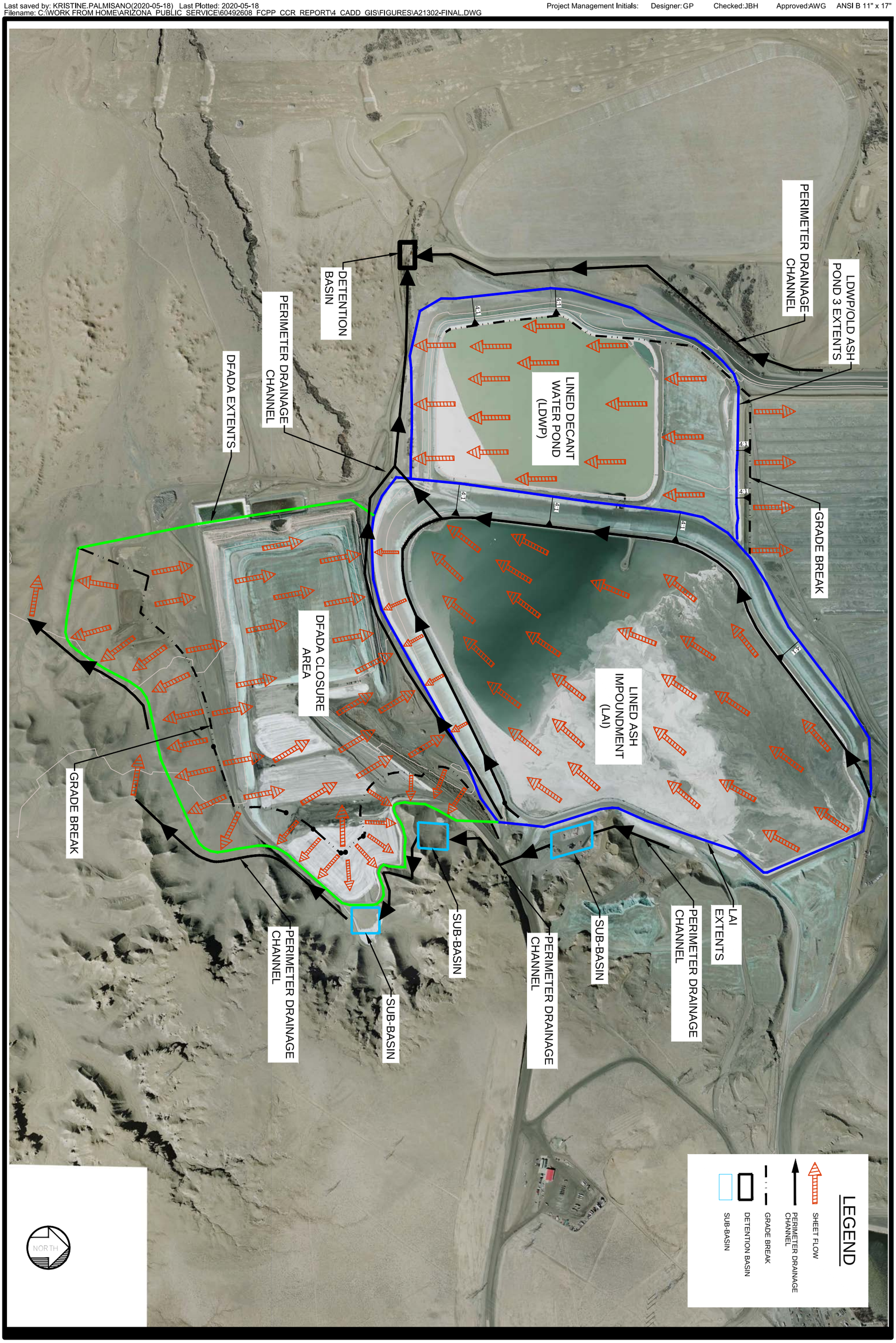

Cholla Power Plant
Arizona Public Service
Four Corners Power Plant,Fruitland, NM
60492608 Date: 2020-05-14

Four Corners DFADA Closure
Plan View

AECOM

Figure: 1