COLSTRIP POWER PLANT

Prepared for

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COLSTRIP WASTEWATER FACILITY CLOSURE PLAN UNITS 1&2 STAGE I&II EVAPORATION POND SITE

Per Requirements of AOC Article IX

Colstrip Steam Electric Station
Colstrip, Montana

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ABBREVIATIONS AND ACRONYMS

AOC	Administrative Order on Consent
CCR	Coal Combustion Residuals
cm/sec	Centimeters per second
COI	Constituent of Interest
CSES	Colstrip Steam Electric Station
EHP	Effluent Holding Pond
GCL	Geosynthetic Clay Liner
HDPE	High Density Polyethylene
MDEQ	Montana Department of Environmental Quality
RPP	Reinforced Polypropylene
SOEP	Stage I Evaporation Pond
STEP	Stage II Evaporation Pond
USEPA	U.S. Environmental Protection Agency
USGS	United States Geologic Survey

1. INTRODUCTION

1.1 Purpose

This Facility Closure Plan (Plan) has been prepared by Geosyntec Consultants, Inc. (Geosyntec) on behalf of Talen Montana, LLC (Talen) pursuant to Article IX of the "Administrative Order on Consent Regarding Impacts Related to Wastewater Facilities Comprising the Closed-Loop System at Colstrip Steam Electric Station, Colstrip Montana" (AOC) [MDEQ 2012]. The AOC was entered between Talen, the successor of PPL Montana, LLC, and the Montana Department of Environmental Quality (MDEQ or the Department) in August 2012.

The AOC for Colstrip Steam Electric Station (CSES or the Station) applies to three areas:

i. Areas at and downgradient of Units 1&2 Stage I and Stage II evaporation ponds northwest of the main plant site (SOEP/STEP Site);

ii. Areas at and downgradient of the main plant site (Plant Site); and

iii. Areas at and downgradient of Units 3&4 effluent holding ponds southeast of the main plant site (EHP Site).

Article IX of the AOC requires a Facility Closure Plan be developed for each of the three areas (or sites). Figure 1 depicts the locations of the three sites. All wastewater facilities identified in Attachment A of the AOC will be addressed in one of the three plans. Table 1 replicates the facilities listed in Attachment A of the AOC and notes which plan addresses each facility. This Facility Closure Plan is for the SOEP/STEP Site. The Plant Site and the EHP Site will be addressed in separate facility closure plans.

1.2 Scope

This Plan specifically addresses the AOC Article IX requirements for the SOEP/STEP Site including: (1) provisions for control, minimization, or elimination, to the extent necessary to protect human health and the environment, of post-closure escape of Constituents of Interest (COIs) to the environment; (2) proposed actions to inform and obtain input from the community consistent with AOC Article V – Public Participation; and (3) cost estimates for closure and post-closure care. Closure of all CCR units will occur in compliance with the criteria for closure set forth in 40 CFR 257.102.

The requirements of the written closure plan (Appendix A) and post-closure plan (Appendix B) for existing impoundments prepared by Geosyntec [2016a, 2016b], serve as the baseline for this Plan for the SOEP/STEP Site.

It is noted that detailed design plans for each impoundment will be developed and submitted to MDEQ prior to initiating closure of the respective impoundment.

1.3 Plan Updates

This Plan will be updated either every five years or when a major change or modification is made to the facility, per the requirement of AOC Article IX.E.

2. BACKGROUND

2.1 Facility Location

The CSES is a coal-fired steam electric generating facility partially owned and operated by Talen. The Station is located near the City of Colstrip, which lies within Rosebud County in south central Montana, approximately 90 miles east of Billings, Montana. An aerial location map of the CSES is shown in Figure 1. Figure 2 presents the location of the SOEP/STEP Site on United States Geologic Survey (USGS) 7 ½ minute topographic quadrangle maps [USGS 2014].

2.2 SOEP/STEP Site Description

The SOEP/STEP Site contains several impoundments (or ponds) used for disposal of flyash scrubber slurry from Units 1 and 2. The SOEP/STEP impoundments can also be used to store captured groundwater and stormwater runoff for reuse. The SOEP/STEP Site is located approximately 2 miles northwest of the Plant Site. The impoundments within the STEP Site are identified on Figure 3. The SOEP is located southwest of STEP A Cell, as shown on Figure 2. Table 2 summarizes the historic and current process wastewater impoundments at the SOEP/STEP Site. Details of the construction history of the individual impoundments can be found in the "Colstrip Steam Electric Station History of Construction" prepared by Geosyntec [Geosyntec 2016c].

When CSES Units 1 and 2 were constructed in 1975, the SOEP was constructed to manage CCR wastes and wastewater associated with plant processes. The STEP was constructed later in 1992 directly down drainage from the SOEP and started receiving slurry in 1994. Through the 3-mile scrubber pipeline, scrubber slurry generated from Units 1 and 2 is transported hydraulically to the STEP, and decant water is pumped back to the plant for reuse or evaporation. The scrubber slurry is currently received at the paste plant building at the STEP Site, where approximately 90 percent of the available free water in the flyash scrubber slurry is removed prior to disposal in ponds. Decant water is routed to the STEP New Clearwell (B Cell) and then returned to the scrubbers for reuse [Hydrometrics 2016].

2.3 CCR Rule

Since 2014, Talen has undertaken a significant effort to implement operational changes to the means and methods for managing water and waste at CSES. These actions are largely due to the promulgation of the United States Environmental Protection Agency's (USEPA's) Final Rule for regulation of CCR under Subtitle D of the Resource Conservation and Recovery Act (RCRA), hereafter referred to as "the CCR Rule" or "the Rule" [USEPA 2015], and the requirements of the AOC. These operational changes also reflect the shutdown of Units 1 and 2 no later than 1 July 2022, the Units 3 and 4 bottom ash dewatering system in service no later than 31 December 2018, and non-liquid disposal of CCR at the EHP by 1 July 2022. The CCR Rule requirements for closure and post-closure are summarized in Tables 3 and 4, respectively and the Written Closure Plan and Written Post-Closure Plan that were prepared to comply with the CCR Rule are included as Appendices A and B, respectively.

3. HEALTH AND ENVIRONMENTAL PROTECTION

3.1 SOEP/STEP Site Closure Plan

To provide for control, minimization, or elimination, to the extent necessary to protect human health and the environment, of post-closure impact of COIs to the environment, this Plan identifies the closure process for each of the wastewater facilities at the SOEP/STEP Site including each impoundment regulated by the CCR Rule (previously prepared [2016b, 2016c]). Many factors, including the current use of the impoundment and potential future uses of the space above the closed impoundment (e.g., for a new impoundment or stormwater storage), were considered when developing the closure plan and post-closure plan for each impoundment. The CCR Rule and AOC do not differentiate between closure requirements for impoundments storing wastewater or solids. Impoundments not regulated by the CCR Rule will be similarly closed by: (i) application of a final cap system; (ii) removal of water prior to use as stormwater containment structures; or (iii) decommissioning, liner removal, and re-grading the impoundment area prior to reclamation with vegetation. Prior to closure activities, surface water will be removed from the impoundments through evaporation or re-use in the plant operations.

Some pore water will typically remain in lower levels of the impounded ash and will be capped along with the CCR. Dewatering impounded ash, if necessary, will be conducted as part of the approved remedy and is not included in this Plan. In the event that the approved remedy includes dewatering the ash in an impoundment, this work will be performed in a manner that will not impact the integrity of the closure design. The water that is removed from the ash will be evaporated or returned to the plants for re-use. For impoundments that are closed after the plants are no longer operational, water removed from the impoundments may be evaporated through the forced evaporation system or treated and discharged under a discharge permit, as required. The CSES is expected to remain a zero-discharge facility at least until plant closure.

Additionally, pipelines will be drained and closed in place, and the associated drain pond will be decommissioned, removed, and the disturbed area will be reclaimed with vegetation. CCR removed from the pipelines will be disposed in the final disposal impoundment at the STEP Site, which is anticipated to be D Cell.

3.1.1 SOEP/STEP Wastewater Facility Closure

Closure plans for the individual impoundments within the SOEP/STEP Site, the pipelines and the drain pit along the pipeline are described below. Table 2 summarizes these plans.

SOEP

The impoundment system at the SOEP/STEP Site began operating in 1975 [Hydrometrics 2016]. The SOEP, also referred to as Stage One Evaporation Pond in the AOC Attachment A, received scrubber slurry from the Plant Site Units 1&2 A/B Ponds between 1975 and 1997. The SOEP was constructed with the approximately 70-foot high Stage I Main Dam and a partial liner consisting of natural clay. The Stage I Main Dam was constructed with chimney drains, a blanket drain, and a toe drain. Water from those drains was routed to a sump that returned seepage water to the SOEP [Hydrometrics 2016]. Being full in 1997, the SOEP was closed with an MDEQ approved soil cap. The reclamation program for this impoundment was completed in 2002 with an engineered evapotranspiration cover to reduce infiltration.

STEP

The STEP was constructed in 1992 directly down drainage (east) from the SOEP (Figure 3) and started receiving slurry in 1994. The STEP was constructed via the Stage II Main Dam that is approximately 88 feet high. The Stage II Main Dam was constructed with a central core grout curtain that extends horizontally along the entire length of the dam, and vertically through the alluvium where it is keyed into the underlying siltstone. The Stage II Main Dam was constructed with chimney drains and toe drains that are routed to a sump that conveys seepage water to E Cell [Hydrometrics, 2016]. The STEP currently consists of five impoundments, including A Cell, B Cell (New Clearwell), D Cell, E Cell, and Old Clearwell. STEP C Cell was designed to be north of E Cell, but will not be constructed.

<u>STEP A Cell</u>

STEP A Cell is full and no longer receives scrubber slurry, captured groundwater or process water. A Cell was constructed in 1992 and was lined with 60-100 -mil HDPE geomembrane over the compacted liner subgrade. The footprint of A Cell is 42.1 acres. In 2020, A Cell is planned to be closed by capping CCR in place. A Type IV final alternative cover system shown in Figure 4 will be constructed over the entire area of the cell. A geocomposite drainage layer and/or a geotextile cushion may be added to the cover system during the design phase if deemed necessary. The criteria for

evaluating whether a geocomposite drainage layer and/or a geotextile cushion will be needed are provided in Section 3.1.2 of this Plan.

STEP B Cell

STEP B Cell (16.8 acres) was designed to store clearwater from the paste process and serve as pond return water for the scrubbers. To provide for future double-lined clearwell operation and additional volume to store process water, B Cell was constructed using a double-liner system with a liquid collection system placed in between and under the liners in 2006. In 2011, after the paste plant was in operation, B Cell was converted to the STEP New Clearwell where the decant water was returned to the scrubbers for re-use. When there is no longer the need for decant water reuse, B Cell will be dewatered by using it at the Units 3&4 scrubbers, by forced evaporation at the 3&4 EHP, or through a treatment system; the geomembrane liner will then be cleaned, and then used for stormwater management at the SOEP/STEP Site. Seepage analysis was performed to evaluate the infiltration through B Cell during the post-closure period. The pond is assumed to be dewatered and left dry when closed. The city of Billings, Montana was selected for weather data inputs, including evapotranspiration, precipitation, temperature and solar radiation data. Using these data inputs, the 30-year average annual percolation through B Cell is approximately 7.9×10^{-4} gallons per minute over the entire area of the impoundment (assuming some flaws in the geomembrane liner). The stormwater stored in the pond will evaporate quickly under the site conditions and the estimated average water head in the pond is 0.016 inches. The seepage analysis is included as Appendix C.

STEP D Cell

In 2011, STEP D Cell (25.7 acres) was constructed to provide additional volume for paste disposal and water as needed. D Cell was constructed using a RPP double-liner system with a liquid collection system placed in between and under the liners. D Cell has not received CCR material, but if it does prior to Units 1&2 shutdown, D Cell is planned to be closed in accordance with the requirements of the CCR Rule by capping CCR in place in 2023. A Type IV final alternative cover system shown in Figure 4 will be constructed over the entire area of the cell. A geocomposite drainage layer and/or a geotextile cushion may be added to the cover system during the design phase if deemed necessary. The criteria for evaluating whether a geocomposite drainage layer and/or a geotextile cushion will be needed are provided in Section 3.1.2 of this Plan.

STEP E Cell

STEP E Cell (46.8 acres) was constructed in 1992 and was lined with 100-mil HDPE geomembrane over the compacted liner subgrade. E Cell is currently the only STEP cell receiving paste from the paste plant. E Cell also receives water from the STEP Main Dam Sump. In 2022, E Cell is planned to be closed in accordance with the requirements of the CCR Rule by capping CCR in place. A Type IV final alternative cover system shown in Figure 4 will be constructed over the

entire area of the cell. A geocomposite drainage layer and/or a geotextile cushion may be added to the cover system during the design phase if deemed necessary. The criteria for evaluating whether a geocomposite drainage layer and/or a geotextile cushion will be needed are provided in Section 3.1.2 of this Plan.

STEP Old Clearwell

STEP Old Clearwell (10.9 acres), commissioned in 1992, was lined with 100-mil HDPE geomembrane over the compacted liner subgrade. The unit stores water and scrubber slurry. The Old Clearwell is planned to be filled with paste before its closure in 2022. Old Clearwell will be closed in accordance with the requirements of the CCR Rule by capping CCR in place. A Type IV final alternative cover system shown in Figure 4 will be constructed over the entire area of the cell. A geocomposite drainage layer and/or a geotextile cushion may be added to the cover system during the design phase if deemed necessary. The criteria for evaluating whether a geocomposite drainage layer and/or a geotextile cushion will be needed are provided in Section 3.1.2 of this Plan.

Units 1&2 Scrubber Pipeline and North 1AD Drain Pond

A three-mile pipeline was constructed to transport scrubber slurry from the scrubbers to the SOEP/STEP Site and return decant water to the scrubbers in 1975. The pipeline was originally lined-steel, and was changed out to two HDPE pipelines in 2001, one for scrubber slurry and one for return decant water. Along the pipelines, North 1AD Drain Pond is geosynthetic lined and periodically used to facilitate draining the pipelines during maintenance (see Appendix D for available plans). The pipelines and the drain pit will be decommissioned once the SOEP/STEP Site is no longer in service. CCR material and water in the pipelines and the drain pit will be drained and transported to the final disposal ponds at the STEP Site. The pipelines will be closed in place. The geosynthetic liner in the drain pit will be removed and disposed in the disposal ponds at the STEP Site after removing the water. The drain pit will then be pushed in with soils to achieve the natural-appearing grade that blends the area into the surrounding landscape. The disturbed area will be reclaimed with vegetation. After the liner is removed, soil samples will be collected from below the pond liner to determine if any soils that could act as sources of COIs to groundwater should be removed before the pond is reclaimed.

3.1.2 Description of Final Cover System

As discussed above, STEP A Cell, D Cell, E Cell and Old Clearwell closures will be designed in accordance with the requirements of the CCR Rule §257.102(d)(3)(ii) for an alternative final cover system (see Figure 4). A low-permeability final cover will be used to close all CCR Rule-regulated impoundments to control and reduce, to the extent feasible, post-closure infiltration of stormwater into the waste. The infiltration layer of the alternative final cover system will achieve an equivalent reduction in infiltration as the prescriptive final cover system such that the permeability of the final

cover system is less than or equal to the permeability of the bottom liner or natural subsoils present (or 1×10^{-5} cm/sec, whichever is less). The design of the final cover system will include an erosion layer that provides equivalent protection from wind or water erosion as an erosion layer that contains a minimum of six inches of earthen material capable of sustaining native plant growth.

The final cover will be constructed of earthen and geosynthetic components that are sufficiently flexible to accommodate expected local differential settlements and subsidence. The design of the final cover system, lateral drainage layer, liquids collection system, and stormwater collection system are such that there will be no further impounding of water, sediment, or slurry in the closed impoundment.

Quality control and quality assurance measures will be implemented at the time of final cover system construction to document that the final cover was constructed as designed to achieve and maintain slope stability and integrity throughout the closure and post-closure periods. The specific closure design varies depending on the future use of the unit. For more details of the final cover system design for each pond, please see the written closure plan for existing impoundments [Geosyntec 2016a].

The future use of each pond will be considered when designing the final alternative cover system for construction at each pond. Figure 4 is a general schematic showing the components that may be included in the final cover system. Engineering criteria will be used to determine if a geocomposite drainage layer and/or geotextile cushion are needed for each pond. A geocomposite drainage layer will be used if the cap drainage model (e.g., HELP model) and cap veneer stability analysis shows that liquid buildup above the cap geomembrane is sufficient to lead to veneer instability of the cap. Use of a geotextile will depend on the grain size distribution and angularity of the prepared subgrade material (CCR, primarily bottom ash) and the infiltration layer (clean fill). Analyses to evaluate the potential need for a geocomposite or geotextile will be performed as part of the detailed design process prior to impoundment closure.

Final Alternative Cover System

STEP A, D and E Cells, as well as Old Clearwell, will be closed with a Type IV final alternative cover design that includes (from top to bottom):

- 6-inch thick erosion layer capable of sustaining native plant growth;
- 12-inch thick layer of earthen material serving as an infiltration layer;
- geocomposite drainage layer (where needed);
- 40-mil textured HDPE geomembrane; and
- 8-oz non-woven geotextile cushion (where needed).

The geotextile cushion, when used, will be installed above a prepared subgrade of CCR material. A typical HDPE geomembrane specification is included as Appendix E.

As designed, the final alternative cover system will provide sufficient lateral drainage of liquids off the cap, which will reduce the head on the geomembrane and thus, the infiltration through the final cover. The geomembrane infiltration layer will be overlain by an 18-inch protective cover soil layer, which will protect the geomembrane infiltration layer and provide vegetative support to limit erosion of the final cover. The drainage layer will be graded at a sufficient slope to allow free flow of liquid through the geocomposite (above the geomembrane cap). Liquids collected within the drainage layer will be conveyed off the cover and collected in stormwater management features such as channels, culverts, and storage ponds. The liquids stored in these ponds will be evaporated or re-used in the plant. After plant closure, this stormwater is expected to be discharged under a discharge permit if needed or evaporated through the forced evaporation system.

As discussed in Section 3.1.1, STEP B Cell was double-RPP lined and an underdrain collection system was installed between and under the liners in 2008. Moreover, after the cells are no longer in service, STEP B Cell will be left empty and used for stormwater storage. Appendix C considers the infiltration through the aforementioned double-liner system after the cell closure used for stormwater storage. As can be seen, the stormwater stored in the pond will be evaporated quickly under the site conditions and little water will remain in the ponds. The pond is assumed to be dewatered and left dry when closed.

3.1.3 Performance Standard

The CCR impoundments covered by this Plan will be closed in a manner to control and minimize, to the extent feasible, post-closure infiltration of liquid into the waste per §257.102(d)(1)(i) by incorporating a low-permeability final cover that meets the requirements of §257.102(d)(3)(ii)(A) through (C). This performance standard does not apply to STEP B Cell.

§257.102(d)(3)(ii)(A) – Reduction in Infiltration

The infiltration layer of the alternate final cover must achieve an equivalent reduction in infiltration as the infiltration layer specified in §257.102(d)(3)(i)(A), which requires that the permeability of the final cover system be less than or equal to the permeability of the bottom liner or natural subsoils present (or 1×10^{-5} cm/sec, whichever is less), and §257.102(d)(3)(i) (B), which requires the use of an infiltration layer that contains a minimum of 18 inches of earthen material. Compliance with this requirement is discussed below for the cover system.

A Type IV final alternative cover system will be used for all impoundments at STEP. For the lined impoundments, none of the liner systems incorporate the use of a composite liner system. Therefore, use of a single geomembrane in the cap will be sufficient for the cover system permeability to be less than or equal to that of any of the CSES liner systems. Thus, the Type IV final alternative cover system meets the performance standard under §257.102(d)(3)(i)(A).

The low permeability of the final cover is aided through the use of a geocomposite drainage layer (as needed) and an 18-inch thick layer of earthen material. The Final Cover Drainage Layer Analysis performed by Geosyntec (Appendix A.1 of CCR Rule Written Closure Plan) shows that the drainage layer is sufficient to allow liquids to flow freely through the geocomposite and off the cap, which will prevent buildup of liquid head on the geomembrane, thereby minimizing infiltration.

§257.102(d)(3)(ii)(B) – Erosion Protection

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 §257.102(d)(3)(i)(C), that is an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

The final alternative cover system includes an erosion layer that meets the prescriptive requirements of §257.102(d)(3)(i)(C) and, therefore, the Final Alternative Cover System meets this performance standard.

§257.102(d)(3)(ii)(C) – Integrity of the Final Cover

For the Final Alternative Cover System, the final cover will be constructed of earthen and geosynthetic components that are sufficiently flexible to accommodate expected local differential settlements and subsidence, as demonstrated by the Final Cover Settlement Analysis performed by Geosyntec (Appendix A.2 of CCR Rule Written Closure Plan). The design of the final cover system and lateral drainage layer and dewatering system are such that there will be no further impounding of water, sediment, or slurry in the closed impoundment, as required by §257.102(d)(1)(ii). The calculations in Appendix A.2 also demonstrate that the final cover system grades will not be reversed and the lateral drainage layer and dewatering system will continue to perform as designed even after settlement of the underlying waste under the maximum overburden loading from the overfill impoundment, stormwater pond, or final cover system has occurred. The final cover design thus meets the performance standard in §257.102(d)(3)(ii)(C).

At the time of final cover system construction, quality control and quality assurance measures will be implemented such that the final cover will be constructed as designed and the cover system will maintain major slope stability and integrity throughout the closure and post-closure periods, as required under §257.102(d)(1)(iii). The stability of the final cover system under design conditions is demonstrated by the Veneer Slope Stability Analysis performed by Geosyntec (Appendix A.3 of CCR Rule Written Closure Plan). The final cover design thus meets this performance standard.

3.2 Post-Closure Care

Post-closure care activities considered in this Plan include: (i) maintenance of final cover systems as needed to maintain integrity and effectiveness and to addresses settlement and erosion; (ii)

operation and management of final cover liquid collection systems; and (iii) operation and management of underdrain collection systems. Groundwater activities, such as operation and maintenance of groundwater monitoring and groundwater capture systems, will be addressed by the Remedy Evaluation under the AOC.

3.2.1 Property Uses During Post-Closure Period

Currently cattle graze on the SOEP site at the recommendation of Talen's reclamation consultant, KC Harvey Environmental, LLC (2017), to facilitate good vegetative cover. The executive summary states, in part, the following:

> "At all study sites, grazing management may improve species richness by opening the canopy for desired species to establish. Grazing to a 50% utilization level can provide an intermediate disturbance that maintains species richness and promotes soil health through nutrient cycling resulting from decay or plant residues. Boron levels in vegetation do not pose a health risk to grazing animals based on levels measured during 2017 monitoring. Continuation of low intensity grazing by livestock is recommended at the sites after observing the plant production condition in spring 2017. In addition, early spring or late fall grazing could be considered in the future for management of annual grasses."

This practice may continue after facility closure in addition to stormwater storage at the SOEP/STEP Site. Disturbance to the integrity of the closure/containment system is not anticipated. To provide for control, minimization, or elimination, to the extent necessary to protect human health and the environment, of post-closure escape of COIs, an appropriate institutional control may be imposed on the real property, without conveying the property or creating a dominant and servient estate. Section 257.102(i) of the CCR Rule outlines the requirements for deed notations to be placed on the property that contains a closed surface impoundment that is regulated by the CCR Rule, which include notification of the presence of a CCR unit and that the use of the property is restricted. If identified in the AOC Remedy Evaluation Report, similar procedures could be followed for surface impoundments not regulated by the CCR Rule.

3.2.2 Final Cover System Maintenance

Construction of the final cover as described above uses passive management systems to the extent possible to reduce the need for long-term maintenance of cells after closure. If the closed unit is not used for storage of stormwater, the final cover will be vegetated with native, non-woody vegetation requiring little maintenance such as mowing.

Following the closure of the CCR surface impoundments where no stormwater storage is planned (i.e., A, D, E Cells, and Old Clearwell), erosion and sediment control measures will be maintained until vegetated surfaces of the final cover system are fully stabilized. After vegetation is fully

established, routine site inspections will be performed as part of post-closure care to monitor the condition of the access roads, stormwater channels, and final cover, and evaluate if repair maintenance is needed.

When identified during routine site inspections, eroded, non-vegetated, or otherwise damaged areas of the final cover will be repaired by the addition of soil, regrading, and revegetation, as necessary. Inspections of all closed impoundments will be performed at least on an annual basis throughout the 30-year post-closure period for the CCR impoundments. At the end of the 30-year post-closure care period, the cover systems will be evaluated to verify that they have met the requirements and determine if any additional activities are needed.

During detailed design of impoundment closure, a run-on and run-off control and stormwater management system will be developed. The run-on and run-off control system will be designed and constructed to limit erosion and other damage to the final cover. The run-on and run-off control system will also be designed and constructed to maintain its effectiveness following closure of the surface impoundment. The specific details of the run-on and run-off control system will be developed during the detailed design for the closure of each impoundment. In general, these systems may consist of, but are not limited to, swales, benches, berms, and downchutes.

The drainage systems will be operated and monitored as needed to remove liquids from above the cover system. If routine inspections and/or monitoring, or performance of the drainage system, indicate that the drainage system is not operating as designed, maintenance will be performed to correct the deficiency. The need for operation of the underdrain collection systems beyond the 30-year post-closure care period will be evaluated as part of the post-closure activities and monitoring for each impoundment.

As discussed in Section 3.1, the CSES will remain a zero-discharge facility at least until plant closure.

3.2.3 Underdrain Collection System Maintenance

As discussed above, STEP B and D Cells were constructed with underdrain collection systems placed between and under the double-liner system. The underdrain collection systems for the B and D Cells consist of: (i) one underdrain collection system situated between the primary and secondary liners (between liner collection), and (ii) a second underdrain collection system situated beneath the secondary liner (under liner). The double liner and underdrain collection systems consist of the following components (from top to bottom) [Hydrometrics, 2016]:

- 45-mil RPP primary geomembrane liner;
- 350-mil geocomposite drainage layer consisting of a geonet between two geosynthetic cushions (between liner or primary collection system);
- 36-mil RPP secondary geomembrane liner;

- geosynthetic cushion layer; and
- compacted native clay soil (under liner or secondary collection system).

Liquids collected in the underdrain collection systems will be conveyed to a sump fitted with riser pipes in which a pump will be operated to remove liquids to the decant water pond for use by the plant. Following Units 1&2 shutdown, these liquids will be evaporated through the forced evaporation system, or treated and used at Units 3&4 or discharged under a discharge permit. The liquid collection between the geosynthetic liners will reduce the liquid head on the bottom liner and limit seepage from the overlying cells. The liquid collection installed below the geosynthetic liners will be operated to capture any liquid seeping through both liners.

The underdrain collection systems will be operated and maintained throughout the post-closure period capturing liquid from the waste placed in the impoundments as needed. If monitoring or performance of the LCRS indicates that the system is not operating as designed, maintenance will be performed to correct the deficiency.

As discussed in Section 3.1, the CSES will remain a zero discharge facility at least until plant closure.

4. PROPOSED ACTIONS FOR PUBLIC PARTICIPATION

Per Article IX.C of the AOC, this Plan "shall include proposed actions to inform and obtain input from the community consistent with Article V." The proposed actions that Talen will conduct for public participations and that the Department shall perform as part of its action on this submission are in accordance with Article V.F of the AOC (Amendment entered effective 1 March 2017). The following bullet points are a summary of those requirements:

- Talen will submit this Plan to the Department per the requirements of the AOC;
- The Department shall post this Plan on its website upon receipt of this report. If the Department disapproves the plan, it shall also post its written disapproval;
- The Department shall post any revised plans submitted by Talen addressing concerns identified by the Department in its disapproval;
- The Department shall post a preliminary approval or preliminary conditional approval of the plan or revised plan on its website and a notice to the public of a 60-day period within which to comment on the report;
- Upon receipt of a written request within 10 days of posting by 10 or more persons or by a group having 10 or more members, the Department will conduct a public meeting on the plan;
- If a request for a public meeting has been received, the Department will set a public meeting and publish a public notice of the meeting on its website and in the local newspaper and the Billings Gazette;

- The public meeting must be held at least 10 days prior to the close of the public comment period. The Department shall conduct the public meeting;
- The Department will respond to substantive public comment as part of its final action on the submission; and
- The Department shall conduct a public meeting annually to inform the public of progress made by the Department and Talen under the AOC and to accept any input the public may have on implementation of the AOC.

5. COST ESTIMATE FOR CLOSURE AND POST-CLOSURE CARE

Cost estimates are based on recent cost experience at CSES for similar construction work and Geosyntec's experience with similar projects. To estimate costs for future development activities, costs for typical construction activities anticipated to be performed at the Station were developed (e.g., capping, liner system) and these costs were then normalized on a per unit basis (e.g., acre, foot, square foot). This per unit cost was then used to estimate construction costs for each of the anticipated impoundment construction activities based on the size of the existing or proposed impoundment and the type of construction activity being performed. Costs for closure and post-closure care activities are presented in 2018 dollars.

Table 5 presents the cost estimate for closure and post-closure care of wastewater facilities at the SOEP/STEP Site. It is notable that the future construction costs are heavily dependent on a few construction components (primarily geosynthetics but also, for some units, excavation), for which the costs are reasonably well known, and on several ancillary construction items (e.g., liquid or cover drainage systems), which are affected by specific design details and, therefore, are less certain. More detailed cost estimates will be developed during the design phase for each construction activity.

6. REFERENCES

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USGS (2014). "Colstrip SE Quadrangle Montana-Rosebud Co. 7.5-Minute Series." United States Geological Survey. Accessed 17 March 2016. http://store.usgs.gov/b2c_usgs/usgs/maplocator/(ctype=areadetails&xcm=r3standardpitrex_prd&carea=%24root&layout=6_1_61_48&uiarea=2)/.do

TABLES

Table 1. AOC Attachment A Facilities with Plan Reference

Wastewater Facility [1]	Facility Closure Plan
Units 1&2 A/B Flyash Pond	Plant Site
Clearwell	
A Pond	
B Pond	
1&2 Scrubber Pipeline	SOEP/STEP Site
Units 1&2 Wash Tray Pond	Plant Site (currently Units 1&2 Bottom Ash Clearwell)
Units 1&2 Bottom Ash Pond w/ Clearwell	Plant Site
Units 1&2 Brine Waste Disposal Ponds	(previously closed per MDEQ approval)
D1-D3 ponds	
D4 pond	
Units 1&2 Cooling Tower Blowdown (Pond C)	Plant Site
Pond C North	
Pond C South	
Units 1&2 Groundwater Capture Storage Pond	Plant Site
Units 1&2 Stage I Evaporation Pond	(previously closed per MDEQ approval)
Units 1&2 Stage II Evaporation Pond	SOEP/STEP Site
Cells A-E	
Cell B	
Old Clearwell	
Cell D	
Units 3&4 Auxiliary Scrubber Drain Pond	(concrete structure being addressed as part of plant demolition work)
Units 3&4 North Plant Area Drain	Plant Site
Units 3&4 Wash Tray Pond (Storm Water Pond – 1)	Plant Site
Units 3&4 Scrubber Drain Collection (Storm Water Pond - 2)	Plant Site
Units 3&4 Bottom Ash Pond w/ Clearwell	Plant Site
Brine Concentrator Solids Disposal Area	Plant Site
Units 3&4 Effluent Holding Pond w/ Clearwell (EHP)	EHP Site
Units 3&4 Scrubber-EHP Pipeline	EHP Site
Units 1-4 Sediment Retention Pond	Plant Site

Table 1. AOC Attachment A Facilities with Plan Reference (cont.)

Wastewater Facility (1)	Facility Closure Plan
Units 1-4 North Plant Sediment Retention Pond	Plant Site
Units 1-4 Surge Pond (Castle Rock Lake)	(Fresh water supply pond, not a wastewater facility)
Unit 4 Cooling Tower Canal	(concrete structure being addressed as part of plant demolition work)
Drain Pit #3 (2)	EHP Site
Drain Pit #5 (2)	EHP Site
Drain 1AD Drain Pond (2)	SOEP/STEP Site

Notes: (1) Wastewater facilities from AOC Attachment A unless otherwise specified.

(2) Drain pits along the pipelines were not listed in AOC Attachment A.

Table 2. Description of Wastewater Facility Construction and Service History at the SOEP/STEP Site

Wastewater Facility	CCR Rule Regulated	Surface Area (acre) (1)	Years in Service	Contents Stored	Construction Upgrades/Operational Changes
STEP A Cell	No	42.1	1992-2015	CCR water and solids, currently just contains CCR solids only	HDPE lined, close by capping the unit in 2020.
STEP B Cell	No	16.8	2006-2011	Decant water	Lined in 2008 using double-liners with 45-mil RPP and liquid collection systems installed in between and under the liners.
			2011-2022	Decant water	Changed to the New Clearwell receiving decant water from the paste plant.
			After 2022	Stormwater	To store stormwater as post-closure stormwater management pond.
STEP C Cell	N/A	17.0	Not Applicable	Not Applicable	Permitted, but will not be constructed.
STEP D Cell	Yes	25.7	2011-present	Decant water	Double-lined RPP with liquid collection systems installed in between and under the liners. Close by capping the unit in 2023.
			Future if needed	CCR water and solids	May be used for paste storage if needed prior to plant shutdown.

Table 2. Description of Wastewater Facility Construction and Service History at the SOEP/STEP Site (cont.)

Wastewater Facility	CCR Rule Regulated	Surface Area (acre) (1)	Years in Service	Contents Stored	Construction Upgrades/Operational Changes
STEP E Cell	Yes	46.8	1992-2022	CCR water and solids	HDPE-Lined, close by capping the unit in 2022.
STEP Old Clearwell	Yes	10.9	1992-2022	CCR water and solids	HDPE Lined; close by capping the unit in 2022.
SOEP	No	114	1975-1997	CCR water and solids	Closed per MDEQ approved evapotranspiration soil cap with reclamation program completed in 2002.
Units 1&2 Scrubber Pipeline and North 1AD Drain Pond (2)	No	Not Applicable	1975-2022	Scrubber slurry transported from the scrubbers to the SOEP/STEP Site and decant water returned to the scrubbers	The 3-mile pipeline was originally lined-steel, changed out to HDPE in 2001. North 1AD Drain Pond along the pipeline supports maintenance of the pipeline as needed. To be decommissioned and removed in 2023.

Notes: (1) This is the footprint of the cell.
(2) The Units 1&2 scrubber pipeline and North 1AD Drain Pond along the pipeline are an accessory to the SOEP/STEP Site and are considered in the Report.

Table 3. CCR Rule Requirements for Closure of Surface Impoundments

Rule Section	Rule Requirement	Location Where Addressed in CCR Rule Written Closure Plan (Appendix A)
§257.102(b)(1)(i)	Narrative description of how unit will be closed with CCR in place	Section 3.1
§257.102(b)(1)(iii)	Description of final cover system design	Section 3.2.1
	Discussion of how final cover system will meet performance standard of §257.102(d)(1)	Section 3.1, 3.2.2, and 3.2.4
	Discussion of drainage and stabilization requirements of §257.102(d)(2)	Section 3.2.3
	Description of methods and procedures used to install the final cover system	Section 3.2.4
§257.102(b)(1)(iv)	Estimate of the maximum on-site CCR inventory	Section 3.3
§257.102(b)(1)(v)	Estimate of the largest area of the CCR unit requiring closure	Section 3.4
§257.102(b)(1)(vi)	Closure schedule	Section 3.5
§257.102(g) and §257.102(h)	Closure notifications	CERTIFICATION STATEMENT and Section 3.6
§257.102(i)	Notification of deed notations	Section 3.6
§257.102(j)	Recordkeeping requirements	Section 3.6

Table 4. CCR Rule Requirements for Post-Closure of Surface Impoundments

Rule Section	Rule Requirement	Location Where Addressed in CCR Rule Written Closure Plan (Appendix B)
§257.104(d)(1)(i)	Description and frequency of monitoring and maintenance activities required by §257.104(b)	Section 3.1
§257.104(d)(1)(ii)	Post-closure period contact information	Section 3.2
§257.104(d)(1)(iii)	Property uses during post-closure period	Section 3.3
§257.104(d)(2)	Deadline to prepare the initial written post-closure plan	CERTIFICATION STATEMENT
§257.104(d)(4)	Written certification from a qualified professional engineer that the initial/amended written post-closure plan meets the requirements of §257.104(d)	CERTIFICATION STATEMENT
§257.104(e)	Notification of completion of post-closure care period	Section 3.4
§257.104(f)	Recordkeeping and notification requirements	Section 3.4

Table 5. Cost Estimates for Wastewater Facility Closure and Post-Closure Care at the SOEP/STEP Site

Wastewater Facility	Facility Area, ac	Design and Construction Costs (1)				Closure (2, 3)	Post-Closure Care (3, 4, 5)	Subtotal
		Activity	Year Planned	Item Cost	NPV Item Cost (2, 3)			
STEP A Cell	42.4	Design STEP A Cell closure	2019	$300,000	$291,262	$8,398,000	$738,000	$9,136,000
		Close STEP A Cell	2020	$8,600,000	$8,106,325			
STEP B Cell	16.8	Prepare STEP B Cell for use as post-closure stormwater management pond	2023	$500,000	$431,304	$431,000	$0	$431,000
STEP D Cell	25.9	Design STEP D Cell closure	2022	$300,000	$266,546	$4,838,000	$451,000	$5,289,000
		Close STEP D Cell	2023	$5,300,000	$4,571,827			
STEP E Cell	46.8	Design STEP E Cell closure	2021	$300,000	$274,542	$8,715,000	$815,000	$9,530,000
		Close STEP E Cell	2022	$9,500,000	$8,440,627			
STEP Old Clearwell	11	Design STEP Old Clearwell closure	2021	$300,000	$274,542	$2,318,000	$192,000	$2,510,000
		Close STEP Old Clearwell	2022	$2,300,000	$2,043,520			
Units 1&2 Scrubber Pipeline and drain pits along the pipeline	0.35	Decommissioning in 2023	2023	$100,000	$86,261	$86,000	$0	$86,000
							SOEP/STEP SITE TOTAL	**$26,982,000**

Notes: (1) Construction cost is obtained from the per acre cost estimated in Table 6 and the facility's area. Note that construction quality assurance (CQA) is assumed to be five (5) percent of the total construction cost and is included here.

(2) NPV = net present value. A discount rate of three (3) percent was used, as agreed upon between MDEQ and Talen.

(3) Costs for closure and post-closure care activities are presented in 2018 dollars.

(4) A post-closure care period of 30 years is considered after the SOEP/STEP Site is closed after plant shutdown. Under the CCR Rule, the owner or operator of a CCR unit should conduct post-closure care for 30 years.

(5) Post-Closure Care includes maintenance of final cover as needed to maintain integrity and effectiveness and addresses settlement and erosion, operation and management of underdrain collection system. Operation and maintenance of groundwater monitoring system and groundwater capture system will be addressed by the remediation report under the AOC.

Table 6. Typical Construction Costs

Construction Type [1]	Item	Units	Quantity	Unit Price	Total Price	Price per Acre	Unit Price Notes
Type IV Cover System (assume 50 acres)	Mobilization/Demobilization	LS	1	$455,472	$455,472		Five percent of other construction items (per PPL)
	Surveying	AC	50	$4,000.00	$200,000		Estimated price of $4,000 per acre for surveying for geosynthetic liner/cap construction
	Attic Fill (to 3% slopes) - on-site source/CCRs	CY	900,000	$5.00	$4,500,000		Cost based on the actual cost of onsite projects, rounded to nearest dollar, plus $1/cy for compaction
	Geomembrane (40-mil HDPE)	SF	2,178,000	$0.49	$1,067,220		Cost estimated based on other onsite projects
	Cap Drainage System	LS	1	$500,000.00	$500,000		Estimate
	Cap Soil (two feet) - on-site source	CY	161,333	$4.00	$645,333		Borrow soil cost rounded to nearest dollar from other onsite projects
	Permanent Stabilization	AC	50	$7,500.00	$375,000		Assumes amending top six inches of soil ($5k) and applying seed and mulch ($2.5k)
	Miscellaneous (25% of construction costs)	LS	--	--	$1,821,888		Assumed to be 25 percent of unit price items
					$9,564,914	**$191,298**	
Type II Cover System (assume 50 acres)	Mobilization/Demobilization	LS	1	$220,000.00	$220,000		Cost estimated based on other onsite projects
	Surveying	AC	50	$2,970.00	$148,500		Cost estimated based on other onsite projects
	Subgrade Fill	CY	80,667	$3.24	$261,360		Cost estimated based on other onsite projects, assumes an average of one foot of fill over the entire cell
	Subgrade Preparation	SF	2,178,000	$0.05	$103,278		Cost estimated based on other onsite projects, assumes that subgrade is ready and only requires fine grading
	GCL	SF	2,178,000	$1.24	$2,700,720		Cost estimated based on other onsite projects
	Geomembrane (60-mil HDPE)	SF	2,178,000	$0.47	$1,023,660		Cost estimated based on other onsite projects
	Geotextile	SF	2,178,000	$0.19	$413,820		Cost estimated based on other onsite projects
	Liner Protective Cover (1.5 feet bottom ash)	CY	121,000	$7.40	$895,400		Cost estimated based on other onsite projects, including screening and placement
	Leachate Collection and Removal System	LS	1	$699,596.70	$699,597		Cost estimated based on other onsite projects
	Miscellaneous (25% of construction costs)	LS	--	--	$1,561,584		Examples include: access ramps, connection to paste plant. Assumed to be 25 percent of unit price items
					$8,027,919	**$160,558**	

Table 6. Typical Construction Costs (cont.)

Construction Type [1]	Item	Units	Quantity	Unit Price	Total Price	Price per Acre	Unit Price Notes
Type III Cover System (EHP New Clearwell only, 22.5 acres)	Mobilization/Demobilization	LS	1	$390,158.51	$390,159		Five percent of other construction items (per PPL)
	Surveying	AC	22.5	$4,000.00	$90,000		Estimated price of $4,000 per acre for surveying for geosynthetic liner/cap construction
	Excavation	CY	500,000	$4.00	$2,000,000		Cost estimated based on other onsite projects, rounded to nearest dollar
	Subgrade Preparation	SF	980,100	$0.05	$46,475		Cost estimated based on other onsite projects, assumes that subgrade is ready and only requires fine grading
	GCL	SF	980,100	$1.24	$1,215,324		Cost estimated based on other onsite projects
	Geomembrane (60-mil HDPE)	SF	980,100	$0.47	$460,647		Cost estimated based on other onsite projects
	Geocomposite	SF	980,100	$1.11	$1,087,911		Cost estimated based on other onsite projects, plus 5% per year increase and plus 10% locale cost
	Geomembrane (60-mil HDPE)	SF	980,100	$0.47	$460,647		Cost estimated based on other onsite projects
	Secondary Liquids Collection System	LS	1	$381,532.00	$381,532		Cost estimated based on other onsite projects
	Water Piping	LS	1	$500,000.00	$500,000		Estimate
	Miscellaneous (25% of construction costs)	LS	--	--	$1,560,634		Assumed to be 25 percent of unit price items
					$8,193,329	**$364,148**	
Impoundments Lined with Clay to Be Pushed In (Assume 5 acres)	Mobilization/Demobilization	LS	1	$17,290.00	$17,290		Five percent of other construction items (per PPL)
	Erosion Control Matting	SY	24,000	$2.10	$50,400		Estimated price based on recent similar projects
	Subgrade Preparation	SF	217,500	$0.20	$43,500		Assumes that subgrade is ready and only requires fine grading
	Cap Soil (0.5 feet) - on-site source	CY	4,000	$4.00	$16,000		Borrow soil cost rounded to nearest dollar from other onsite projects
	Permanent Stabilization	AC	5.0	$7,500.00	$37,500		Assumes amending top six inches of soil ($5k) and applying seed and mulch ($2.5k)
	Waste (CCR) excavation and relocation	CY	800	$8.00	$6,400		Unit price from recent similar projects, assume 0.1 ft thick CCR settling in the pond
	Clay liner excavation and relocation	CY	24,000	$8.00	$192,000		Unit price from recent similar projects, assume 3 ft thick clay liner
	Miscellaneous (15% of construction costs)	LS	-	-	$51,870		Assumed to be 15 percent of unit price items
					$414,960	**$82,992**	

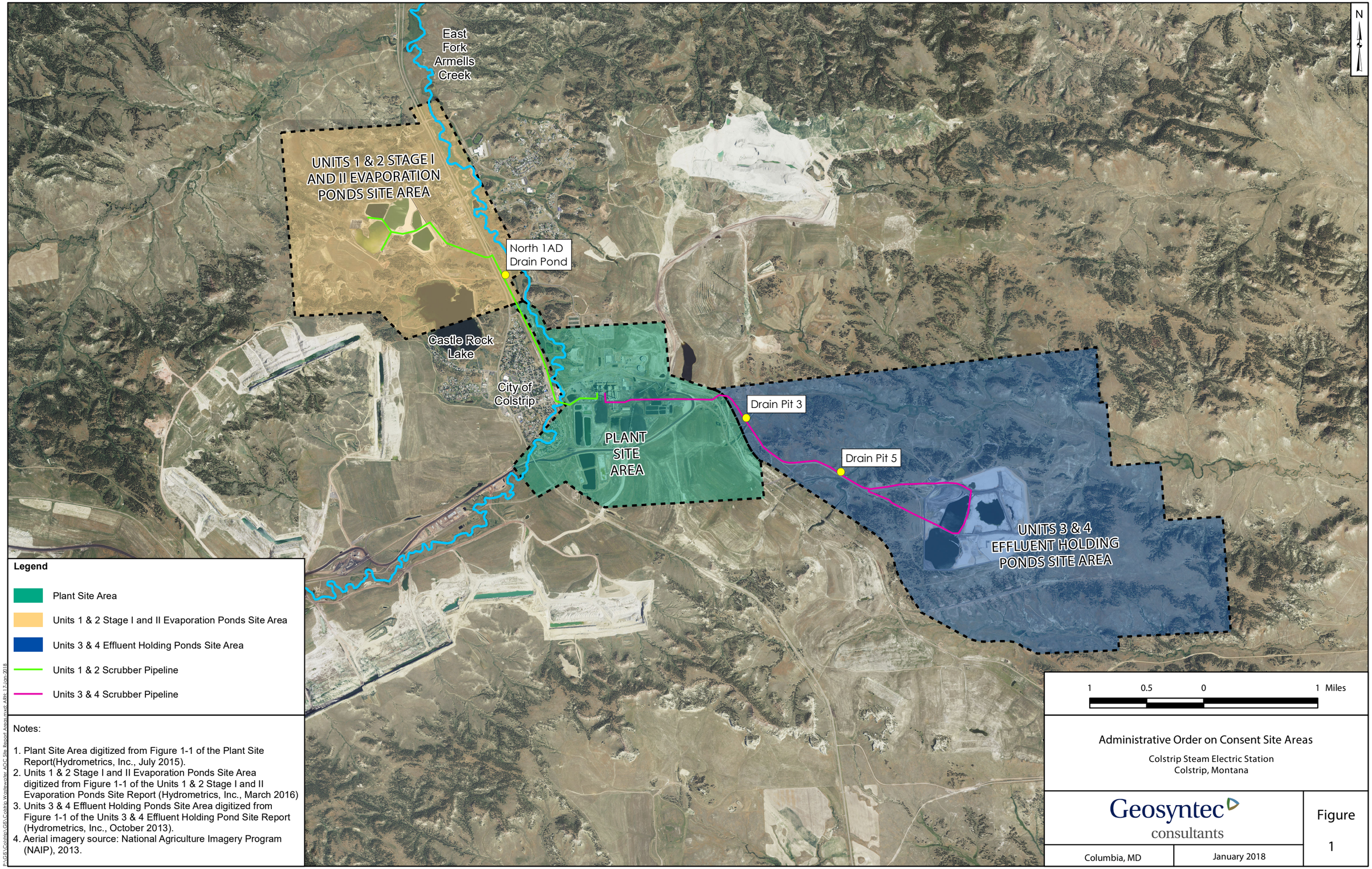
Table 6. Typical Construction Costs (cont.)

Construction Type (1)	Item	Units	Quantity	Unit Price	Total Price	Price per Acre	Unit Price Notes
Impoundments Lined with Geosynthetic to Be Pushed In (Assume 0.25 acre)	Mobilization/Demobilization	LS	1	$15,000.00	$15,000		Estimate for small construction jobs
	Erosion Control Matting	SY	2,000	$2.20	$4,400		Estimated price based on recent similar projects
	Subgrade Preparation	SF	17,500	$0.20	$3,500		Assumes that subgrade is ready and only requires fine grading
	Cap Soil (0.5 feet) - on-site source	CY	350	$4.00	$1,400		Borrow soil cost rounded to nearest dollar from other onsite projects
	Permanent Stabilization	AC	0.40	$7,500.00	$3,000		Assumes amending top six inches of soil ($5k) and applying seed and mulch ($2.5k), additional disturbed area of 0.15 acre
	Waste (CCR) excavation and relocation	CY	450	$8.00	$3,600		Unit price from recent similar projects, assume average 1 ft thick CCR settling in the pond
	Clay liner/soil excavation and relocation	CY	1,250	$8.00	$10,000		Unit price from recent similar projects, assume 3 ft thick layer
	Removal and Disposal of Existing Liner	AC	0.25	$9,800.00	$2,450		Unit price from recent similar projects
	Miscellaneous (30% of construction costs)	LS	-	-	$8,505		Assumed to be 30 percent of unit price items
					$51,855	**$207,420**	
Impoundments Lined with Geosynthetic to Be Pushed In (Assume 10 acres)	Mobilization/Demobilization	LS	1	$25,000.00	25,000		Estimate for small construction jobs
	Erosion Control Matting	SY	25,000	$2.20	$55,000		Estimated price based on recent similar projects
	Subgrade Preparation	SF	17,500	$0.20	$3,500		Assumes that subgrade is ready and only requires fine grading
	Cap Soil (0.5 feet) - on-site source	CY	14,600	$4.00	$58,400		Borrow soil cost rounded to nearest dollar from other onsite projects
	Permanent Stabilization	AC	10.15	$7,500.00	$76,125		Assumes amending top six inches of soil ($5k) and applying seed and mulch ($2.5k), additional disturbed area of 0.15 acre
	Waste (CCR) excavation and relocation	CY	16,500	$8.00	$132,000		Unit price from recent similar projects, assume average 1 ft thick CCR settling in the pond
	Clay liner/soil excavation and relocation	CY	24,500	$8.00	$196,000		Unit price from recent similar projects, assume 3 ft thick layer
	Removal and Disposal of Existing Liner	AC	10.00	$9,800.00	$98,000		Unit price from recent similar projects
	Miscellaneous (30% of construction costs)	LS	-	-	$185,708		Assumed to be 30 percent of unit price items
					$829,733	**$82,973**	
Pipeline Removal only (Assume 3 miles)	Removal and disposal of 3-mile pipelines	LS	-	-	**$15,100**	**$15,100**	Assumes being part of drain pond/pit removal construction, Mobilization/Demobilization not double-counted
Post-closure Care (2)	Post-closure Care (per acre)	AC	1	$1,000.00	**$1,000**	**$1,000**	Estimate

Notes: (1) For construction activities, construction quality assurance (CQA) is assumed to be five percent of the total construction cost, which is included in the total closure cost in Table 5.

(2) Based on actual cost on other similar facility, Post-closure Care is assumed to be $1,000 per acre of closed impoundment, including maintenance of final cover as needed.

FIGURES



Legend

- Plant Site Area
- Units 1 & 2 Stage I and II Evaporation Ponds Site Area
- Units 3 & 4 Effluent Holding Ponds Site Area
- Units 1 & 2 Scrubber Pipeline
- Units 3 & 4 Scrubber Pipeline

Notes:

1. Plant Site Area digitized from Figure 1-1 of the Plant Site Report(Hydrometrics, Inc., July 2015).
2. Units 1 & 2 Stage I and II Evaporation Ponds Site Area digitized from Figure 1-1 of the Units 1 & 2 Stage I and II Evaporation Ponds Site Report (Hydrometrics, Inc., March 2016)
3. Units 3 & 4 Effluent Holding Ponds Site Area digitized from Figure 1-1 of the Units 3 & 4 Effluent Holding Pond Site Report (Hydrometrics, Inc., October 2013).
4. Aerial imagery source: National Agriculture Imagery Program (NAIP), 2013.

P:\GIS\Colstrip\GIS\Colstrip Wastewater AOC Site Report Areas.mxd; ARH; 17-Jan-2018

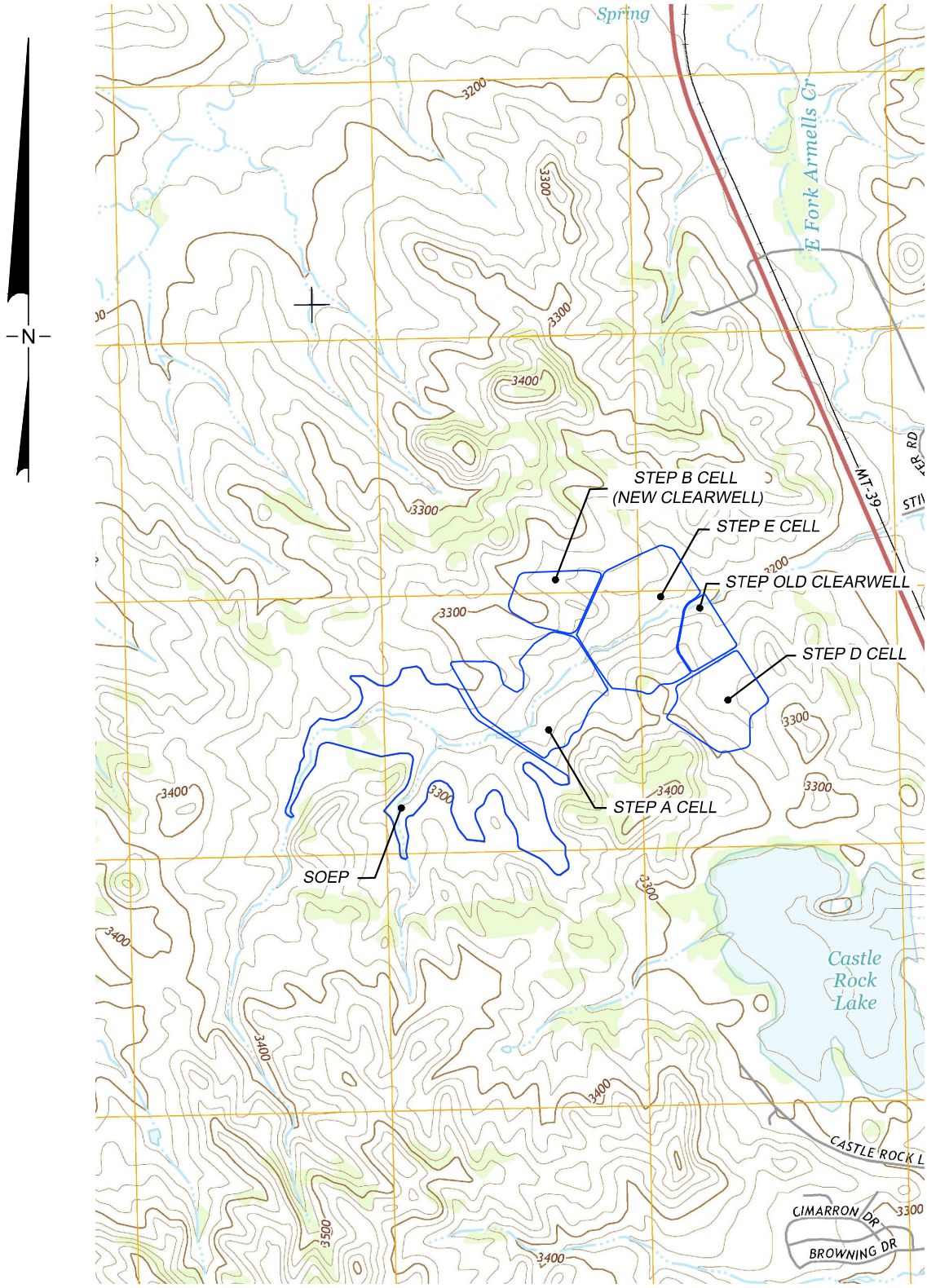
Administrative Order on Consent Site Areas

Colstrip Steam Electric Station
Colstrip, Montana

Geosyntec consultants

Columbia, MD | January 2018

Figure 1



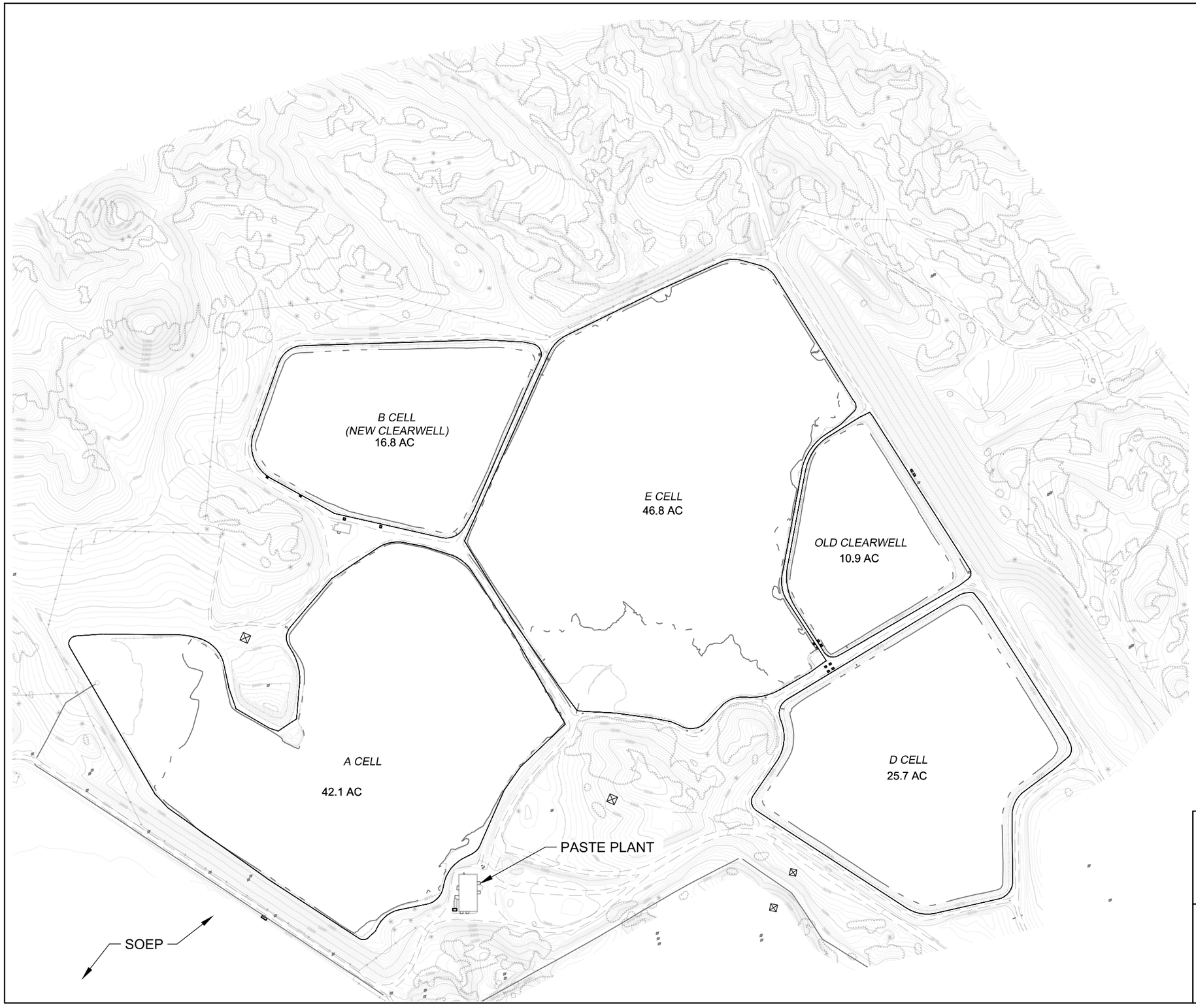
SOURCE: USGS MAP (7.5, MINUTE SERIES, ROSEBUD COUNTY, 2014)

0 1,000'
SCALE IN FEET

USGS 7 ½ Minute Topographic Quadrangle Map of the SOEP/STEP Site

Geosyntec consultants
COLUMBIA, MARYLAND

DATE:	JULY 2017
PROJECT NO.	ME1431
DOCUMENT NO.	MD17151
FILE NO.	F001–003
FIGURE NO.	2



N

LEGEND

- EXISTING GRADE CONTOUR (FEET-MSL)
- EXISTING ROAD / DRIVE
- EXISTING STRUCTURE
- EXISTING TREELINE
- EXISTING WATERLINE

NOTE:
EXISTING CONDITIONS FROM AN AERIAL SURVEY BY AERIAL DESIGN DATA OF NORTH HUNTINGTON, PENNSYLVANIA FROM FLYOVER CONDUCTED ON 8 DECEMBER 2014.

0 400'
SCALE IN FEET

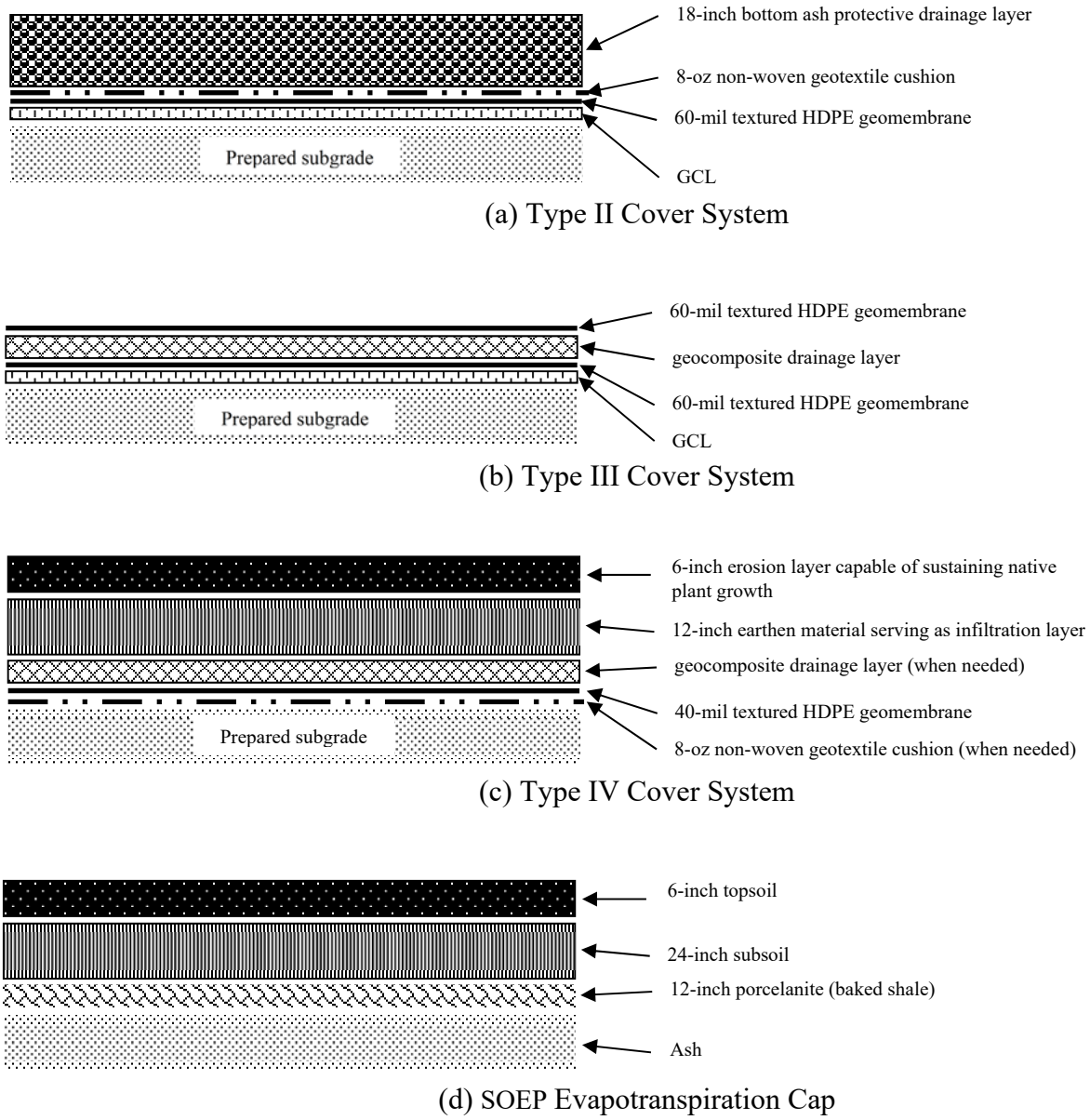
Process Pond Layout at the SOEP/STEP Site

COLSTRIP STEAM ELECTRIC STATION
COLSTRIP, MONTANA

Geosyntec consultants
COLUMBIA, MARYLAND

DATE:	JULY 2017
PROJECT NO.	ME1431
DOCUMENT NO.	MD17152
FILE NO.	1199f152
FIGURE NO.	3

Figure 4. Final Alternative Cover Systems and Evapotranspiration Cap.



Wastewater Facility	Cover System	Wastewater Facility	Cover System
SOEP	ET	STEP E Cell	Type IV
STEP A Cell	Type IV	STEP Old Clearwell	Type IV
STEP B Cell	N/A(1)	North 1 AD Drain Pond	N/A(2)
STEP D Cell	Type IV	--	--

N/A(1) – Not applicable, not subject to CCR Rule. Pond will eventually be used to manage stormwater.
N/A(2) – Not applicable, not subject to CCR Rule. Liner will be removed, and pond area will be regraded and reclaimed with vegetation.