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

Prepared by

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Project Number ME1343H

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Geosyntec consultants

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Geosyntec consultants

ABBREVIATIONS AND ACRONYMS

AOC	Administrative Order on Consent
CCR	Coal Combustion Residuals
COI	Constituent of Interest
CSES	Colstrip Steam Electric Station
EHP	Effluent Holding Pond
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. Closure of all CCR units will occur in compliance with the criteria for closure set forth in 40 CFR 257.102.

It is noted that detailed design plans will be developed and submitted to MDEQ prior to initiating closure of any 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.

This Plan was amended in April 2022 under the terms of Article VI.A. of the October 2021 settlement agreement with MDEQ (Settlement Agreement) to conform to Alternative 10, which is MDEQ's currently selected remedy for the SOEP/STEP Site and which includes removal of ash from the SOEP/STEP during the closure process (i.e., closure-by-removal). This Plan may be subject to further revision depending on the outcome of the Request to Amend Remedy Selection process described in the Settlement Agreement.

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 2016].

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. Some, but not all, of the impoundments within the SOEP/STEP are subject to regulation under the federal CCR Rule (those units that are subject to the federal CCR Rule are referred to as CCR Rule impoundments in this Plan). These operational changes also reflect the January 2020 shutdown of Units 1 and 2.

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-by-removal process for the SOEP/STEP Site. Prior to closure-by-removal activities, surface water and, to the extent practical, pore water will be removed from the impoundments through active dewatering efforts, evaporation, or re-use in the plant operations.

Dewatering impounded ash will be performed in order to safely excavate ash for closure-by-removal activities. The water that is removed from the ash will be evaporated or returned to the plants for re-use. If dewatering occurs 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 a new CCR landfill to be constructed specifically to accept ash excavated from the SOEP/STEP Site.

3.1.1 SOEP/STEP Wastewater Facility

The SOEP/STEP Site will be closed by removal of CCR from the CCR units. The individual impoundments within the SOEP/STEP Site, the pipelines, and the drain pit along the pipeline are described below.

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 historically conveyed collected water to E Cell [Hydrometrics 2016], but currently conveys that same water to B Cell. 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.

STEP A Cell

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.

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.

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.

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 has received both scrubber slurry and paste from the paste plant. E Cell also historically received water from the STEP Main Dam Sump.

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 historically stored water and scrubber slurry, but currently only contains scrubber slurry.

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 A for available plans). The pipelines and the drain pit will remain in service throughout the implementation of the groundwater remedy during which time they will be used to transport groundwater capture from the SOEP/STEP Site to the Groundwater Capture Treatment System located at the Plant Site. When groundwater cleanup criteria are met, the groundwater capture system will be shut down, and the pipelines and drain pit will be decommissioned. CCR material in the pipelines and the drain pit will be drained and transported to a new CCR landfill. The pipelines will be closed in place. The geosynthetic liner in the drain pit will be removed and disposed in the landfill 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 Closure-by-Removal

Under Alternative 10, the SOEP/STEP Site will be closed by removal of CCR from the CCR units. Closure-by-removal includes dewatering CCR, excavating CCR and impacted materials from the SOEP/STEP Site, moisture conditioning and hauling these materials to a new CCR landfill, and restoring the SOEP/STEP Site upon completion of excavation activities.

Dewatering

Saturated CCR will require dewatering to effectively excavate and transport it to the landfill. Ash dewatering activities in STEP A and E Cells were conditionally approved by MDEQ in 2020 and were initiated in 2021. The ash dewatering wells installed in STEP A and E Cells were terminated approximately ten feet above the approximate liner elevation to protect the liner systems.

Additional dewatering will be required to remove the bottom approximately ten feet of ash in STEP A Cell, E Cell, and Old Clearwell prior to placement in the landfill. Dewatering will also be required to remove the bottom approximately 20 feet of ash in SOEP prior to placement in the

landfill. This may be accomplished using drainage ditches, sumps, or other methods. More detailed dewatering plans will be developed during the design phase for closure-by-removal.

Excavation

CCR will be excavated from the SOEP/STEP Site and relocated to a new CCR landfill. As excavation progresses at the SOEP/STEP Site, temporary slopes will be cut into the in-place ash as various areas reach different excavation depths. Temporary excavation slopes will be evaluated for stability during the design phase for closure-by-removal. Various slope and dewatering scenarios may be found that are acceptable for safe and efficient excavation. A robust surveillance and instrumentation monitoring program may be implemented as a part of closure-by-removal activities if it is deemed necessary during the design phase.

Erosion and sediment (E&S) control activities will include installation, maintenance, and removal of vegetative and structural E&S control measures. The required E&S control measures will be installed prior to earth-disturbing activities, and these measures will be inspected periodically and after runoff-producing rainfall events. E&S controls may include temporary and permanent vegetative stabilization, silt fence, erosion control blanket, stabilized construction entrances, and tire washes. More detailed E&S control plans will be developed during the design phase for closure-by-removal. Fugitive dust generated during excavation and transportation will also be controlled, primarily through the conditioning and wetting of CCR and haul roads, respectively.

Quality control and quality assurance measures will be implemented at the time of closure-by-removal to verify and certify that closure-by-removal has been completed. Closure-by-removal will be verified by documenting visual observations (e.g., photographic evidence). Soil samples will also be collected to determine if additional soils that could act as sources of COIs to groundwater should be removed.

Moisture Conditioning and Hauling

Prior to transportation, the excavated ash will be moisture conditioned (i.e., additional drying or wetting) to facilitate handling, transportation, and compaction of the ash and control of fugitive dust emissions. Haul roads will be constructed and maintained to safely and efficiently transport CCR and impacted materials from the SOEP/STEP Site to the landfill.

Additionally, impacted debris generated as part of closure-by-removal activities should also be transported to the new CCR landfill for disposal. Impacted debris may include materials from existing liner systems, underdrains, or other impacted features of the SOEP/STEP Site.

Restoration

The SOEP/STEP Site will be restored following the removal of CCR. The area will be regraded to promote positive drainage of stormwater through the original floodplain. Areas of bare soils will be

stabilized with seeding, mulching, and dust control measures. Native vegetation will be used to stabilize the area to minimize the establishment of invasive species.

The dams and internal divider dikes will be breached after closure-by-removal is complete. The dams and dikes will be breached using conventional mechanical excavation methods by either: (i) constructing properly sized and stabilized channels through the dams and dikes or (ii) completely removing the dams and dikes. If breached instead of completely removed, the breach should be located at the lowest floodplain elevation, where the original stream channel was located. This will reduce the likelihood of a shallow pool of impounded water remaining after the breach is complete. Soils obtained from breaching dams and divider dikes that are not impacted by CCR may be used for restoration grading.

3.1.3 Performance Standard

The CCR Rule impoundments covered by this Plan will be closed by removing and decontaminating all areas affected by releases from those CCR units. Under the Federal CCR Rule, CCR removal and decontamination of a CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to §257.95(h) for constituents listed in Appendix IV to the CCR Rule.

Additionally, ongoing groundwater monitoring activities at the SOEP/STEP Site are conducted according to the Water Resources Monitoring Plan [Talen 2020]. Groundwater monitoring activities for the SOEP/STEP Site presented in the Water Resources Monitoring Plan will continue during closure activities to demonstrate compliance with the CCR Rule.

3.2 Post-Closure Care

Pursuant to §257.104(a)(2), a CCR unit that will be closed by removing CCR as provided by §257.102(c) is not subject to post-closure care criteria of the CCR Rule. There are no post-closure care requirements in the AOC.

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;
- Upon receipt of this Plan, the Department shall post the Plan on its website. If the Department disapproves the Plan, the Department shall also post its written disapproval of

the Plan and 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 30-day period within which to comment on the report. The notice shall also provide that, upon receipt of a written request within 10 days of posting the notice 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 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 may extend the public comment period to accommodate the public meeting. 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. In its discretion, the Department may combine the annual public meeting with any public meeting conducted to obtain public comment on a report submitted by Talen.

5. COST ESTIMATE FOR FACILITY CLOSURE

Cost estimates for the SOEP/STEP Site are based on recent cost experience at CSES for similar construction work and Geosyntec's experience with similar projects. Table 3 presents the cost estimate for the selected SOEP/STEP Site remedy, which includes the following: (i) design and construction of a dewatering system and freshwater flushing system; (ii) new landfill design and construction; (iii) closure-by-removal design and construction; (iv) decommissioning pipelines and the drain pond; (v) operation and maintenance costs; and (vi) remediation costs to meet the cleanup criteria. More detailed cost estimates will be developed during the design phase for each construction activity. Costs for closure-by-removal activities are presented in 2021 dollars.

6. REFERENCES

MDEQ (2012). Administrative Order on Consent Regarding Impacts Related to Wastewater Facilities Comprising the Closed-Loop System at Colstrip Steam Electric Station, Colstrip Montana. Montana Department of Environmental Quality, July 2012.

Geosyntec (2016). "History of Construction Per Requirements of 40 CFR §257.73 Colstrip Steam Electric Station Colstrip, Montana" Geosyntec Consultants. September 2016.

Hydrometrics (2016). "Units 1 & 2 Stage I and II Evaporation Ponds Site Report." Prepared for PPL Montana, LLC. Hydrometrics Inc., Billings, Montana. March 2016.

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Talen Montana (2020). "Water Resources Monitoring Plan, Talen Montana, LLC, Colstrip Power Plant, Revision 7." 8 December 2020.

USEPA (2015). "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule." Title 40 Code of Federal Regulations, Parts 257 and 261. United States Environmental Protection Agency.

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)	(previously closed per MDEQ approval)
Pond C North	
Pond C South	
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.
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-present	Decant water	Changed to the New Clearwell receiving decant water from the paste plant.
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.
STEP E Cell	Yes	46.8	1992-present	CCR water and solids	HDPE lined.
STEP Old Clearwell	Yes	10.9	1992-present	CCR water and solids	HDPE lined.

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
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-present	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.

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. Cost Estimates for Design and Implementation of the Selected Remedy for the Wastewater Facility at the SOEP/STEP Site

Year	Design and Construction Costs											Operation and Maintenance		Subtotal
	Dewatering System Design / Construction	Freshwater Flushing System Design / Construction	Landfill Design	Landfill Construction	Landfill Operation	Landfill Closure	Closure-by-Removal Design	Closure-by-Removal Construction	Decommission Pipeline / Drain Pond	Cost	Present Value	Cost	Present Value	
2021	$950,000	-	$908,000	-	-	-	$266,000	-	-	$2,124,000	$2,124,000	$578,000	$578,000	$2,702,000
2022	-	-	$383,000	-	-	-	$266,000	-	$100,000	$749,000	$727,000	$298,500	$571,000	$1,298,000
2023	-	-	$383,000	-	-	-	$566,000	$3,921,000	-	$4,870,000	$4,590,000	$298,500	$571,000	$5,161,000
2024	-	-	-	$6,029,000	-	-	-	-	-	$6,029,000	$5,517,000	$268,500	$484,500	$6,001,500
2025	-	-	-	$6,029,000	$731,000	-	-	$19,499,000	-	$26,259,000	$23,331,000	$268,500	$484,500	$23,815,500
2026	-	-	-	$6,029,000	$731,000	-	-	$19,499,000	-	$26,259,000	$22,651,000	$77,400	$315,000	$22,966,000
2027	-	-	$300,000	$6,537,000	$731,000	-	-	$23,034,000	-	$30,602,000	$25,629,000	$77,400	$315,000	$25,944,000
2028	-	-	-	-	$731,000	$5,301,000	-	$36,484,000	-	$42,516,000	$34,569,000	$77,400	$315,000	$34,884,000
2029	-	-	-	-	$731,000	$5,301,000	-	$7,705,000	-	$13,737,000	$10,844,000	$77,400	$315,000	$11,159,000
2030	-	$3,840,000	-	-	$731,000	$5,301,000	-	$5,176,000	-	$15,048,000	$11,533,000	$77,400	$315,000	$11,848,000
2031	-	-	-	-	-	$5,301,000	-	-	-	$5,301,000	$3,944,000	$495,000	$368,000	$4,312,000
2032-2050	-	-	-	-	-	-	-	-	-	-	-	$586,000	$6,246,000	$6,246,000
2051-2052	-	-	-	-	-	-	-	-	-	-	-	$316,000	$257,000	$257,000
2053	-	-	-	-	-	-	-	-	-	-	-	$366,000	$142,000	$142,000
2054	-	-	-	-	-	-	-	-	-	-	-	$136,000	$51,000	$51,000
2055-2061	-	-	-	-	-	-	-	-	-	-	-	$116,000	$272,000	$272,000
													TOTAL PRESENT VALUE	$157,059,000

Notes:

(1) Costs for project management and construction management are included. For construction activities, construction quality assurance (CQA) is assumed to be five percent of the total construction cost, which is included in this table.

(2) A discount factor of 3% was used to calculate the present value of the total cost per year for the range of years in 2021 dollars.

FIGURES

East Fork Armells Creek

UNITS 1 & 2 STAGE I AND II EVAPORATION PONDS SITE AREA

North 1AD Drain Pond

Castle Rock Lake

City of Colstrip

PLANT SITE AREA

Drain Pit 3

Drain Pit 5

UNITS 3 & 4 EFFLUENT HOLDING PONDS SITE AREA

N

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.

1 0.5 0 1 Miles

Administrative Order on Consent Site Areas

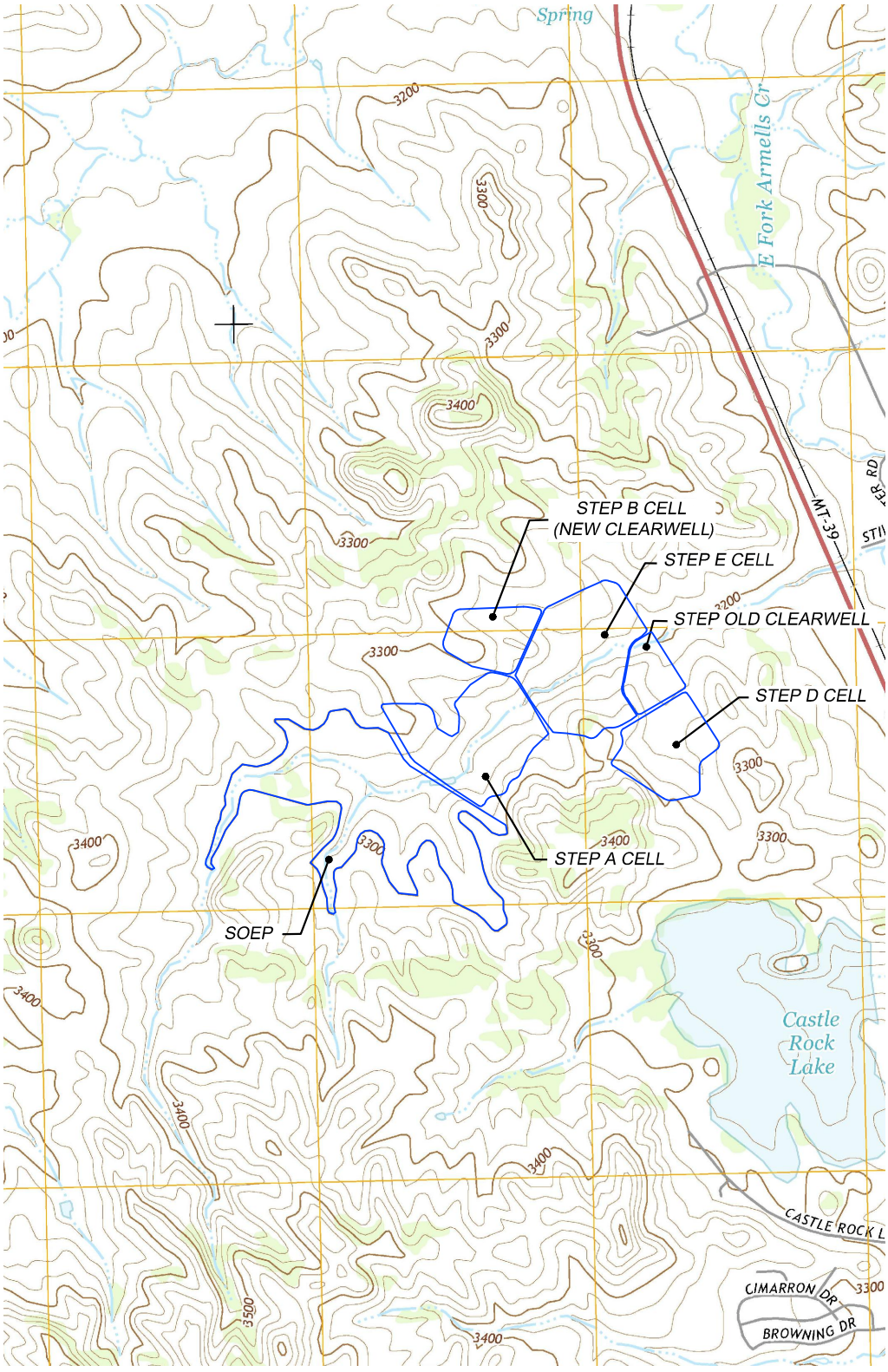
Colstrip Steam Electric Station
Colstrip, Montana

Geosyntec consultants

Columbia, MD | January 2018

Figure 1

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



N

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

0 1,000'

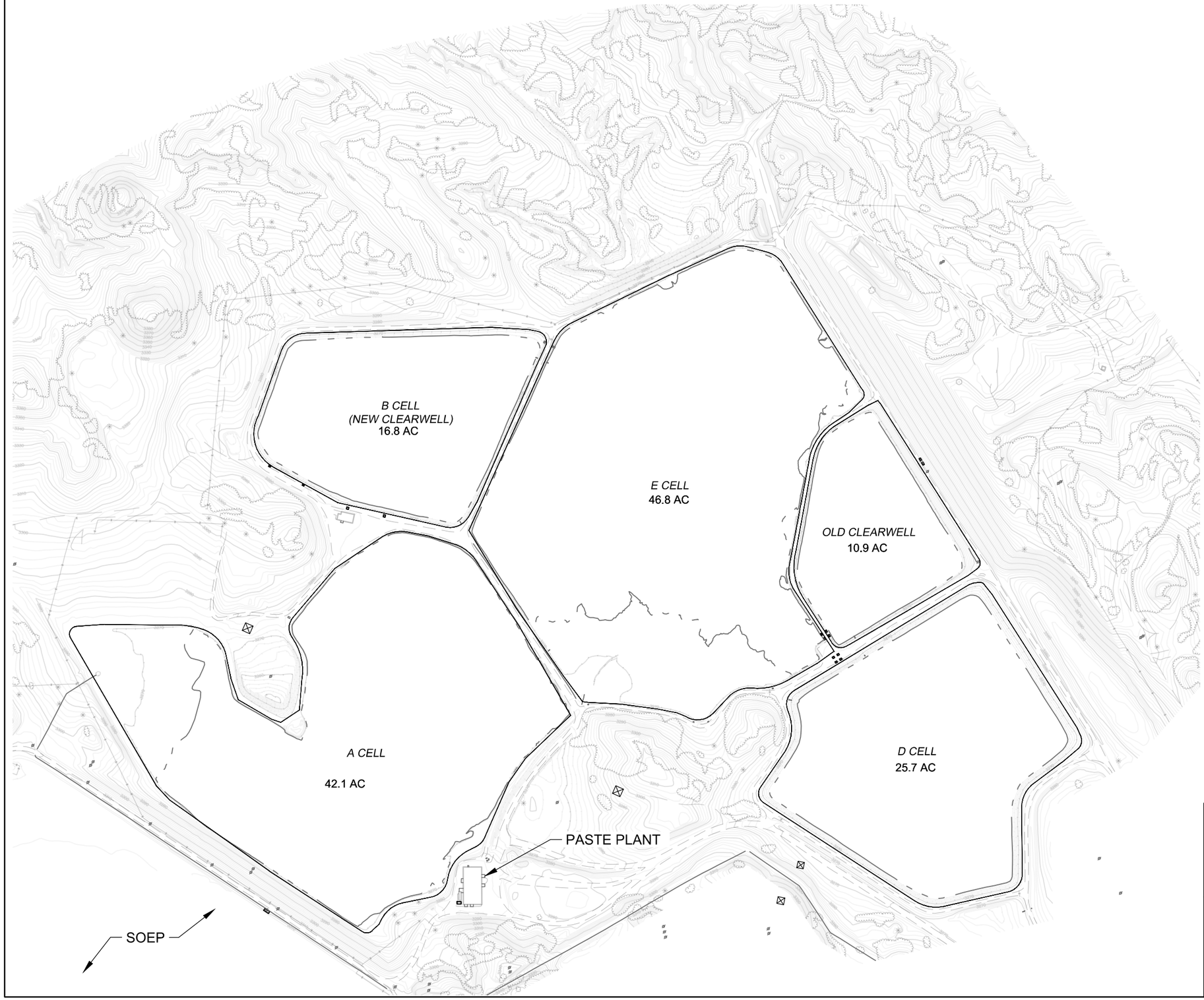
SCALE IN FEET

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



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.

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

APPENDICES

Appendix A

Drain Pit Plans

POND LINER INSPECTION REPORT

POND LOCATION / NAME: Units 1&2 Pipeline / Drain Pond

DATE OF INSPECTION: 7/19/2017 (morning)

INSPECTOR(S): Glenn Logan, Ray Schwaller

WEATHER/TEMPERATURE: Warm (near 80), light northwest wind, sunny

SURFACE LINER TYPE: Black 60-mil smooth HDPE

WATER LEVEL: Empty with 0 to 6 inches of brine at bottom of pond.

GENERAL CONDITIONS: Liner is in excellent condition and shows no apparent degradation from environmental factors. The only damage noted is by the crest at the southwest corner, from human activities.

SPECIFIC DEFICIENCIES: Refer to attached diagram for location of specific deficiencies.

Deficiencies Found During Inspection

Location	Description	Position on Slope
#1	Small (<1") puncture at SW corner.	At crest.
#2	No seal at end of pipe boot by SS clamp.	Upper slope, south side.

Other Notes:

1. Edge of seam exposed at bottom, center of pond – plant personnel concerned it may be a tear but close examination shows the liner is intact and not damaged in that area.
2. The gate was partially open upon arrival.
3. About 1 foot of water was in the bottom of the pipe valve vault.

RECOMMENDATIONS: Repair the puncture (#1) by extrusion welding. Install neoprene seal at outer end of pipe boot and clamp with SS band. Complete regularly scheduled inspections of the liner, and monitor for damage during periods of very cold weather.

UNITS 1&2 SLURRY DRAIN POND

Pond Name	Units 1&2 Slurry Drain Pond
Pond Location	Approximately 0.4 mile north of Colstrip along the east side of Highway 39, as shown on Map 2.
Year Constructed	2000
Function and Purpose	Currently functions as a drain pond for the Units 1&2 fly ash slurry and return water pipelines.
Pond Size	0.4 acre
Crest Elevation	3,192 ft
Bottom Elevation	3,186 ft
Liner System	The geosynthetic liner system layers (listed from top to bottom) include: 1. Black 60-mil high density polyethylene (HDPE) liner 2. 10-oz/yd^2 nonwoven geotextile
Prior Inspections	Periodic inspections by operations personnel and Environmental Department since 2000.
History and Description of Repairs	No repairs have been made to this pond since it was constructed in 2000.
Recommended Inspection Schedule	Annually, preferably during cold weather.