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# **ALTERNATIVE 10 REMEDIAL DESIGN AND REMEDIAL ACTION WORKPLAN PROPOSAL**

## **SOEP/STEP Remedial Area Colstrip Power Plant Colstrip, Montana**

*Prepared for*

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## 1. INTRODUCTION

### 1.1 Purpose of Remedial Design/Remedial Action Workplan Proposal

Talen Montana, LLC (Talen Montana) has prepared this proposal (Workplan Proposal) to outline development and implementation of the Alternative 10 Remedial Design and Remedial Action (RD/RA) Workplan at the Stage One and Stage Two Evaporation Ponds (SOEP/STEP) under the terms of Articles III.G and VI.A.1(a) of the October 2021 settlement agreement with Montana Department of Environmental Quality (MDEQ). Alternative 10 is the complete excavation remedial alternative for the SOEP/STEP area described in Talen Montana’s September 2020 Units I and II Evaporation Ponds Revised Remedy Evaluation – Integrated Report<sup>1</sup> Section 6.4 involving relocation of all SOEP/STEP ash to a new lined landfill on Talen Montana’s current Colstrip Power Plant property as described in Section 6.4.1 of that report<sup>2</sup>.

### 1.2 Requirements of the RD/RA Workplan

The RD/RA Workplan will serve as a roadmap for the design and implementation of Alternative 10. As shown in the schedule for Alternative 10 in the Integrated Report, the overall time to complete design and construction of the remedial systems for Alternative 10 is long (over ten years). The RD/RA Workplan will comprise a 30 percent design package for certain specific remedy components on the critical path that must be initiated early in the remedial design process. At this time, the components to be included in the RD/RA Workplan are: (i) construction of the landfill and ancillary features (discussed in Section 3 of this Workplan Proposal); (ii) ash excavation from SOEP/STEP and placement in the landfill (discussed in Section 4 of this Workplan Proposal); and (iii) restoration of the SOEP/STEP area (discussed in Section 4 of this Workplan Proposal). The remedy components to be included in the RD/RA Workplan are discussed in Sections 3 through 7 of this proposal. The remaining remedy components for Alternative 10 will be included in the Final Remedial Design Package to be prepared prior to full-scale remedy implementation. Article VI.D of the Administrative Order on Consent<sup>3</sup> (AOC) specifies that the RD/RA Workplan is to include the following components:

- a) Narrative description and detailed design of the selected remedy;
- b) Description of any required compliance monitoring and confirmatory soil sampling;

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<sup>1</sup> Units 1 & 2 Stage I and II Evaporation Ponds Revised Remedy Evaluation - Integrated Report, Colstrip Steam Electric Station, Colstrip Montana. Geosyntec Consultants, September 2020.

<sup>2</sup> To the extent Talen Montana continues to develop Alternative 11A, a Remedial Design/Remedial Action Work Plan for Alternative 11A will be separately prepared per Articles V & VII.C.2 of the October 2021 settlement agreement.

<sup>3</sup> 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.

- c) Description of emergency preparedness procedures;
- d) Health and safety plan;
- e) Engineering certification of the remediation design;
- f) A timetable for implementing the remedy;
- g) A statement that applicable health and safety regulations will be met during implementation of the remediation proposal;
- h) A description of how short-term disturbances during implementation of the remediation proposal will be minimized and contained;
- i) Identification of permits under 75-20-401, Montana Code Annotated (MCA), necessary to conduct the proposed remedies;
- j) A commitment to provide an Annual Progress Report if implementation of the remedy exceeds one year and periodic status reports as requested by the MDEQ;
- k) Any anticipated operation and maintenance requirements;
- l) A commitment to obtain approval from the MDEQ for any deviation from the approved RD/RA Workplan; and
- m) Such other information as appropriate based on conditions unique to the Site.

How these components will be addressed by the RD/RA Workplan is described in the following sections of this Workplan Proposal. In alignment with the approach used for the RD/RA Workplans Geosyntec prepared for the Plant Site and the Units 3 & 4 Effluent Holding Pond (EHP), the RD/RA Workplan proposed herein will not include completion of items b, c, d, i, and k, although some narrative discussion of those components will be included<sup>4</sup>. These items will be completed and included in the Final Remedial Design Package to be prepared prior to full-scale remedy implementation. The RD/RA Workplan will also include a certification by a Professional Engineer registered in the State of Montana that the RD/RA Workplan fulfills the minimum requirements of the AOC.

Where major deviations from the RD/RA Workplan are necessary, Talen Montana will, to the extent feasible and appropriate, obtain approval from the MDEQ.

### 1.3 Summary of Constituents of Interest

Per Article IV.F of the AOC, the constituents of interest (COIs) are those parameters [constituents] found in soil, groundwater, or surface water that: (i) result from plant operations and the

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<sup>4</sup> With respect to item K, identification of permits, the draft application for a state license from MDEQ under Title 75, Chapter 10, Part 2, Montana Code Annotated (MCA), to construct and operate a landfill will be completed as required under Article VI.A.1(c) of the October 2021 settlement agreement.

wastewater facilities; and (ii) exceed background or unaffected reference area concentrations. The Revised Cleanup Criteria and Risk Assessment (CCRA) Report identified COIs for groundwater in the Units 1 & 2 SOEP/STEP area<sup>5</sup>. The COIs identified for the Units 1 & 2 SOEP/STEP are boron, cobalt, lithium, manganese, selenium, and sulfate. The COIs and their respective cleanup criteria (CC) are presented in **Table 1-1**.

## 1.4 Health and Safety

Talen Montana's Contractor Safety Procedures for the Colstrip Power Plant will be reviewed, and addenda will be prepared, as necessary, to supplement the plan during RD/RA Workplan implementation. The Final Remedial Design Package will discuss how the existing, or addendums to, emergency preparedness procedures and health and safety plan will meet applicable health and safety regulations during implementation of the remedy.

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<sup>5</sup> Marietta Canty, LLC, 2018. Cleanup Criteria and Risk Assessment Report, Wastewater Facilities Comprising the Closed-Loop System, Units 1 & 2 Stage I and II Evaporation Pond Area, Colstrip Steam Electric Station, Colstrip, Montana. December 2018.

## 2. PREVIOUSLY APPROVED REMEDIAL ACTIONS

The MDEQ, in its letter dated 8 June 2020, conditionally approved aspects of the groundwater remedy for the Units 1&2 SOEP/STEP area that can be implemented regardless of source control methods. This section summarizes the conditionally approved actions implemented to date. The conditionally approved remedial actions will be included in the Final Remedial Design Package to be prepared prior to full-scale remedy implementation.

### 2.1 Small-Scale Freshwater Flushing System and Pilot Test

The small-scale freshwater flushing system was conditionally approved to target COIs in alluvium and shallow to mid-level Sub-McKay bedrock east of the STEP Main Dam. The small-scale flushing system is not expected to interfere with dewatering efforts for SOEP/STEP capping or removal, based on groundwater modeling.

Geosyntec designed the small-scale flushing system during the first half of 2021. Ten vertical injection wells for the small-scale flushing system were installed in August 2021, and three monitoring wells for a flushing pilot test were also installed. On 13 October 2021, the U.S. Environmental Protection Agency (USEPA) Region 8 Underground Injection Control (UIC) program authorized pilot testing two injection wells using City of Colstrip water from a nearby fire hydrant, which is sourced from the Surge Pond. The flushing pilot test was conducted in October 2021. A flushing pilot test report is being prepared for submittal to MDEQ in early 2022.

Talen Montana is constructing the small-scale flushing system. System startup is anticipated in September 2022. The small-scale flushing system will be incorporated into the full-scale flushing system design that will be included in the Final Remedial Design Package to be prepared prior to remedy implementation.

### 2.2 STEP Ash Dewatering

Ash dewatering in STEP A Cell and STEP E Cell was conditionally approved to facilitate future capping of the ash in place or future removal of the ash. A discussion of the installation, operations, and performance of the ash dewatering systems for STEP A Cell and STEP E Cell will be included in the Final Remedial Design Package to be prepared prior to full-scale remedy implementation.

#### STEP A Cell

A vacuum-assisted deep well dewatering system was installed for STEP A Cell. Twelve ash dewatering wells were installed in November 2020, and the remaining components of the dewatering system were installed between November 2020 and January 2021. The system operated during 2021 and was shut down for the winter of 2021-2022. The system will resume operating in the spring of 2022.

### STEP E Cell

A vacuum-assisted deep well dewatering system was installed for STEP E Cell. Eleven ash dewatering wells were installed in November and December 2020, and the remaining components of the dewatering system were installed between November 2020 and January 2021. The system operated during 2021 and was shut down for the winter of 2021-2022. The system will resume operating 2022.

## **2.3 Groundwater Capture System**

Talen Montana operates and maintains a groundwater capture system in the SOEP/STEP area to address COIs in groundwater. Several groundwater capture system upgrades were conditionally approved as they would not interfere with SOEP/STEP capping or removal.

- Attempts to increase pumping rates at eight existing vertical capture wells (2024D-2, 375D, 376D, 922A, 966A, 976D, EAP-205, and EAP-208) were made in 2021 by operating the capture wells at the maximum pumping rate and adjusting pump cycling times so the rate can be maintained. The wells were also serviced, redeveloped if necessary, and treated for scaling problems, if necessary.
- Construction of a Groundwater Capture Storage Pond at the Plant Site was completed in 2019, and it became operational in 2020. Captured groundwater from the SOEP/STEP area is routed to the Groundwater Capture Storage Pond.
- Eight new vertical capture wells (2084D through 2091D)<sup>6</sup> were installed north of SOEP to increase capture in shallow Sub-McKay bedrock in August 2021, which are planned to begin pumping in 2022.

Groundwater capture system upgrades are included in the annual hydrologic monitoring reports submitted to MDEQ in April each year.

## **2.4 Monitored Natural Attenuation and Permeable Reactive Barrier Studies**

The conditionally approved groundwater remedy includes a demonstration study of monitored natural attenuation (MNA) to address COIs remaining after the flushing/capture system is shut down. It also includes a feasibility study of a permeable reactive barrier (PRB) as a contingency in case it is demonstrated that MNA would not be sufficient. Geosyntec will prepare an MNA demonstration study workplan and a PRB feasibility study workplan in early 2023. These two workplans will be submitted to MDEQ as standalone documents prior to the RD/RA Work Plan.

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<sup>6</sup> These wells are w3, w4, w5, w8, w9, w10, w11, and w13 in the Integrated Report.



### 3. LANDFILL REMEDIAL DESIGN AND REMEDIAL ACTION

Under Alternative 10 in the Integrated Report, the SOEP and STEP would be closed by removal and relocation of impounded ash to a landfill. Alternative 10 also includes the removal of the SOEP and STEP Main Dams and, potentially, the placement of dam material in the landfill, if it is determined to be impacted. Specifically, Alternative 10 includes: (i) construction of a new 91-acre landfill; (ii) dewatering (where necessary) and removal of approximately 6.7 million cubic yards (cy) of ash from the SOEP and STEP to the landfill; and (iii) removal of up to approximately two million cy of impacted dam materials from the SOEP and STEP Main Dams to the landfill. This Section provides an outline of the RD/RA Workplan for the landfill remedial action component along with a description of that remedial action component and related identification of data gaps and further studies to address those gaps.

#### 3.1 Preliminary Proposed Landfill Location

Based on preliminary evaluations of the potential landfill locations, it is anticipated that the landfill will be located in a greenfield currently used for cattle grazing in the Stocker Creek drainage basin approximately 4,000 feet north of the SOEP and STEP areas.

This location was selected for its potential to take advantage of existing topography and ground conditions during construction of the landfill. The suitability of this location will be evaluated during the hydrogeologic and geotechnical investigations described below. Details of the existing conditions of the proposed landfill location and any changes to the proposed location based on the results of the hydrogeologic and geotechnical investigations will be presented in the RD/RA Workplan.

#### 3.2 Applicable Regulations and Required Permits and Approvals

This section of the RD/RA Workplan will present the applicable regulations and permit requirements guiding the investigation, design, and construction of the landfill. To ensure the landfill is designed and constructed in accordance with applicable regulations and appropriate permits, Talen Montana will review local, state, and federal regulations and present a summary that includes the regulatory citation, the specific requirement, and how each requirement is addressed in the RD/RA Workplan. At this time, Talen Montana anticipates the requirements will primarily be from the Federal Coal Combustion Residual (CCR) Rule, the Administrative Rules of Montana (ARM), and the MCA.

#### 3.3 Hydrogeologic Investigation

Talen Montana will develop and implement a hydrogeologic investigation to evaluate whether the preliminary landfill location is suitable relative to the hydrogeologic conditions at the proposed location. The scope of work proposed herein is based on the requirements for a Class IV landfill under ARM 17.50.1311 and the requirements for new CCR landfills under the CCR Rule.

### **3.3.1 Hydrogeologic Investigation Workplan**

This section of the RD/RA Workplan will present the methods and results of the hydrogeologic investigation to be performed to characterize the groundwater conditions at the proposed landfill location. Talen Montana will prepare the Hydrogeologic Investigation Workplan for submittal and approval by MDEQ prior to the spring 2022 drilling season. The Hydrogeologic Investigation Workplan will present the methods that will be used for conducting the following investigative tasks:

- Number and location of borings and monitoring wells;
- Monitoring well design;
- Monitoring well drilling;
- Monitoring well construction;
- Monitoring well development;
- Monitoring well pump testing; and
- Groundwater sampling and analysis.

Specific field procedures and quality assurance procedures for well installation and monitoring that are consistent with existing procedures used at the Site during previous hydrogeologic investigations will be referenced in the Hydrogeologic Investigation Workplan.

### **3.3.2 Monitoring Well Installation**

At this time, Talen Montana anticipates designing and installing five new Sub-McKay wells and up to two new alluvial wells for the hydrogeologic investigation. The monitoring wells will be completed using air rotary drilling methods in the upper aquifer. Hydraulic characteristics of the screened units in the new monitoring wells will be evaluated using short-term 100-minute pumping tests.

### **3.3.3 Groundwater Monitoring**

A minimum of eight independent samples will be collected from the monitoring well network for the landfill. The samples will be collected during the first six months of groundwater monitoring consistent with the Federal CCR Rule. Depth to groundwater measurements will also be completed monthly for one year to establish the seasonal high groundwater elevation in the landfill footprint area. The groundwater samples will be analyzed for the constituents listed in Appendices III and IV of the CCR Rule and the COIs for the SOEP/STEP area. Note there is a fundamental flaw in the sampling frequency specified by the Federal CCR Rule in that it is likely that these initial eight samples will not be 'statistically independent' samples and, therefore, additional baseline groundwater monitoring events might be necessary to develop a statistically defensible pre-disposal baseline for establishing defensible background concentrations.

### 3.3.4 Hydrogeologic Investigation Report

Talen Montana will prepare a Hydrogeologic Investigation Report to be included with the draft application for a state license to construct and operate the landfill, which will be provided to MDEQ by 15 October 2023. The investigation results will be summarized in the RD/RA Workplan with the Hydrogeologic Investigation Report (described below) appended to the RD/RA Workplan.

Talen anticipates that the Hydrogeologic Investigation Report will include the following:

- Introduction and Site Background
- Regional and Site-Specific Geologic and Hydrogeologic Characteristics
  - Topographic Setting
  - Regional and Site-Specific Stratigraphy
  - Structural Geology
  - Regional Hydrogeologic Setting
  - Identification of the Upper Aquifer under the CCR Rule
  - Discussion of Deep Regional Aquifers
- Previous Hydrogeologic Investigations
  - Existing Monitoring Wells
  - Groundwater Data for Existing Monitoring Wells
  - Groundwater Modeling for SOEP/STEP
- Hydrogeologic Investigation for Landfill
  - Drilling for New Monitoring Wells
  - Construction of New Monitoring Wells
  - Development of New Monitoring Wells
  - Pumping Tests of New Monitoring Wells
  - Groundwater Elevations and Flow Direction
  - Seasonal/Temporal Fluctuations
- Hydrogeologic Evaluation for Landfill
- Site-Specific Groundwater Flow Patterns/Gradients
- Assessment of Units Above Aquifer Through Which Landfill Leachate Could Potentially Migrate
  - Significant Sand and Gravel Layers
  - Confining Layers Above/Below Sandstone Unit
  - Description of Any Man-Made Structures
- Groundwater Quality
  - Groundwater quality data will be added to the existing database for the CSES.
- Tables summarizing well construction details, water level data, groundwater quality data, and hydraulic properties will be included in the report.
- Figures showing well locations relative to the proposed landfill, cross section locations, cross sections, surface water features, hydrographs, and groundwater flow directions will be included in the report.

- Appendices will include well logs and pumping test raw data and plots

### **3.4 Geotechnical Investigation**

This section of the RD/RA Workplan will present the methods and results of the geotechnical investigation to be performed to characterize the subsurface geotechnical conditions at the proposed landfill location. Understanding the subsurface geotechnical conditions is necessary to prepare a landfill design appropriate for the subsurface conditions at the proposed location.

Talen Montana will prepare a brief Geotechnical Investigation Workplan for submittal and approval by MDEQ prior to the spring 2022 drilling season. The Geotechnical Investigation Workplan will describe the field and laboratory investigation methods to be used during the geotechnical investigation. The Geotechnical Investigation Workplan will guide the field and laboratory investigations and allow for changes to the investigation approach where necessary, as indicated by observations in the field and laboratory.

The investigation results will be summarized in the RD/RA Workplan with the Geotechnical Investigation Report (described below) appended to the RD/RA Workplan.

#### **3.4.1 Field Investigation**

The geotechnical field investigation will include the completion of geotechnical borings, including Standard Penetration Testing, where applicable, and the collection of soil samples for laboratory testing. Data collected during the geotechnical field investigation will provide the basis for establishing subsurface stratigraphy and provide context for selecting soil and rock design parameters to be used in the landfill design.

Details of the field investigation, including the number of borings, planned boring depths and locations, and samples to be collected, will be described in the Geotechnical Investigation Workplan. Based on previous investigations of the SOEP/STEP area, it is anticipated that bedrock will be shallow at the proposed landfill location. Therefore, geotechnical borings will be advanced to refusal or some depth into bedrock using rock coring depending on their location.

#### **3.4.2 Laboratory Investigation**

Soil and rock samples collected during the geotechnical field investigation will be sent to a geotechnical laboratory to evaluate the index and engineering properties of the soil and rock. Results of the laboratory investigation will supplement field testing and observations when establishing subsurface stratigraphy and selecting soil and rock design parameters to be used in the landfill design.

Details of the proposed laboratory investigation, including the methods and frequency of testing, will be described in the Geotechnical Investigation Workplan.

### **3.4.3 Geotechnical Investigation Report**

The results of the geotechnical investigation will be presented in a Geotechnical Investigation Report. The data and conclusions presented in the Geotechnical Investigation Report will provide the basis for the landfill design. The Geotechnical Investigation Report will include field documentation (e.g., geotechnical boring logs), results of laboratory testing, and recommendations for soil and rock design parameters.

## **3.5 Natural Resources Review**

This section of the RD/RA Workplan will present the results of the natural resources review, which will identify and address regulations related to the landfill location, such as location restrictions and potential impacts to endangered and threatened species. Based on similar reviews performed previously for the Colstrip Power Plant, it is expected that only desktop studies will be needed to complete the natural resources review, and, therefore, no field studies are anticipated at this time.

### **3.5.1 Summary of Applicable Regulations**

The RD/RA Workplan will summarize relevant regulations applicable to the natural resources review. It is anticipated that the natural resources review will address applicable regulations of the Federal CCR Rule and ARM and will generally be limited to regulations restricting the landfill's location (e.g., floodplains, wetlands, impacts to threatened and endangered species, etc.).

### **3.5.2 Demonstration of Compliance**

The RD/RA Workplan will demonstrate compliance of the proposed landfill location and design with the applicable regulations summarized above by presenting the results of the desktop natural resources review. It is anticipated that the RD/RA Workplan will demonstrate compliance with the regulations using similar justifications and references to those used in compliance reports prepared for other portions of the Site.

## **3.6 Landfill Design and Permit Application Materials**

This section of the RD/RA Workplan will present the initial basis for the landfill design, including 30 Percent Design Drawings, and draft permit application materials in accordance with the ARM. The basis of design and 30 Percent Design Drawings will provide a general understanding of the objectives of the landfill and how they will be addressed by the landfill design. The draft permit application materials will demonstrate how the landfill design meets the applicable design regulations identified in Section 3.3.

### **3.6.1 Permit Drawings**

The RD/RA Workplan will contain a set of 30 Percent Landfill Design Drawings, including preliminary versions of the following drawings.

1. Cover Sheet

2. Existing Conditions Plan
3. Site Development Plan
4. Prepared Subgrade Plan
5. Leachate Management System Plan
6. Final Cover Grading and Stormwater Management System Plan
7. Final Cover System Details

A complete permit drawing set that includes groundwater potentiometric contours, leachate and liner system details, stormwater management system details, and landfill cross-sections will be prepared after completion of the geotechnical and hydrogeologic investigations and approval of the RD/RA Workplan. A complete list of drawings expected to be included in the full permit design drawing set will be included in the RD/RA Workplan.

### **3.6.2 Leachate Management Design**

The landfill will include a leachate management system to collect and remove liquids from the bottom of the landfill and minimize accumulation of liquids on the landfill liner system. The RD/RA Workplan will include a discussion of the basis of design for the leachate management system, the results of preliminary design analyses performed to support the 30 Percent Design, and the additional analyses needed to complete the design. The final leachate management system design calculations will be presented in the Landfill Engineering Report discussed in Section 3.7.8 of this Proposal.

### **3.6.3 Stormwater Management Design**

The landfill will include a stormwater management system to convey and collect stormwater run-off from the landfill during operations and post-closure conditions. The stormwater management system will be designed to minimize stormwater run-off contact with waste, prevent run-off of water that does contact waste, and minimize accumulation of water on and erosion of the final cover. The RD/RA Workplan will include a discussion of the basis of design for the stormwater management system, the results of preliminary design analyses performed to support the 30 Percent Design, and the additional analyses needed to complete the design. A narrative discussion of the final stormwater management system, stormwater computations, and conclusions will be presented in the Landfill Engineering Report.

Erosion and sedimentation (E&S) control plans are typically prepared as part of construction documentation and, therefore, will not be included in the RD/RA Workplan.

### **3.6.4 Additional Engineering Calculations**

In addition to the leachate and stormwater management calculations described previously, the permit design will require the following additional supporting design calculations:

1. Global slope stability calculations confirming the landfill slopes and foundation and landfill liner system will remain stable under design static and seismic loading;
2. Veneer slope stability calculations confirming the liner and final cover systems will not experience veneer instability under short- and long-term conditions;
3. Liner and cover system settlement to evaluate potential for differential settlement that could create localized low points; and
4. Liner and cover system geomembrane integrity to evaluate resistance to yielding and puncture due to differential settlement and construction and operations loads, respectively.

The RD/RA Workplan will include a discussion of the basis of design for the above calculations, the results of preliminary design analyses performed to support the 30 Percent Design, and the additional analyses to be performed to complete the respective analyses. A narrative discussion of the final analyses, computations, and conclusions will be presented in the Landfill Engineering Report.

Electrical and mechanical design will be completed as part of the construction documentation and, therefore, will not be included in the RD/RA Workplan. Similarly, detailed design of the haul road from SOEP/STEP to the landfill will be completed as part of construction document preparation rather than as part of the RD/RA Workplan.

### **3.6.5 Operations Plan**

An operations plan will be required to guide the operations, inspections, and maintenance requirements of the landfill and associated systems such that the landfill continues to be protective of human health and the environment during the operating period. The operations plan will be prepared considering industry best practices and plans available from other CCR landfill facilities. The procedures in the operations plan will be written to be compliant with the applicable regulations identified in Section 3.3.

The RD/RA Workplan will include a table of contents of the operations plan and discuss the main components of the operations plan, including which materials will be accepted in the landfill and how such materials will be verified. The operations plan will be developed during the final design phase and will be presented as an attachment to the Landfill Engineering Report.

### **3.6.6 Closure and Post-Closure Care Plan**

A closure and post-closure care (CPCC) plan will be required to document the approved approach to close the landfill and monitor and maintain the landfill during the post-closure period. The CPCC Plan will address the following:

1. The activities, procedures, and processes that will be used to close the landfill, or any part thereof, in a manner that minimizes post-closure maintenance;
2. A description of the design of the final cover system and stormwater management system;

3. The plan for post-closure care (PCC) to minimize the escape of, or exposure to, leachate or waste; and
4. The estimated costs for closure and PCC of the facility, including capital costs and operation and maintenance costs.

The CPCC plan will be prepared considering industry best practices, the existing CPCC plans prepared for other CCR disposal units at the Site, and the applicable regulations identified in Section 3.3.

The RD/RA Workplan will include a table of contents of the CPCC plan and discuss the main components of the CPCC plan to be developed during the final design phase.

### **3.6.7 Technical Specifications and Construction Quality Assurance Plan**

Technical specifications and a construction quality assurance (CQA) plan document the materials, construction techniques, and documentation required to construct the landfill. The RD/RA Workplan will include a list of technical specifications and a table of contents of the CQA plan. The RD/RA Workplan will also include example technical specifications of the major technical items taken from other CCR unit construction projects at the Colstrip Power Plant that will be required for the landfill construction. Complete technical specifications will be prepared during the final design phase and will be included in the Landfill Engineering Report.

The technical specifications will focus on the major technical items required for landfill construction (i.e., soils, geosynthetics) and will not include administrative sections (i.e., submittal review, measurement and payment) that will be developed as part of construction documentation.

## **3.7 Landfill Engineering Report and Permit Application Materials**

A Landfill Engineering Report will be prepared to present and discuss the results of investigations and analyses, design documents, and plans described in Section 3 of this Proposal. The Landfill Engineering Report will support and be appended to the permit submission. The RD/RA Workplan will include a draft table of contents of the Landfill Engineering Report and a list of the applicable permit application materials (e.g., application forms, certifications, etc.) that will be included in the permit submission.

Talen Montana will prepare a draft permit application, including the Landfill Engineering Report, and provide it to MDEQ within two years of the October 2021 settlement agreement. The documentation will be substantially complete to provide MDEQ with a basis for review, but consistent with Article VI.A.1(c) Talen Montana is not required to formally submit the draft permit application to MDEQ Solid Waste Management Section at that time.



## 4. SOEP/STEP ASH EXCAVATION AND RESTORATION

This section of the RD/RA Workplan will discuss the activities that will be completed to excavate and relocate ash and, as necessary, soil from the SOEP/STEP area to the landfill and restore the SOEP/STEP area upon completion of excavation activities. This Section provides an outline of the RD/RA Workplan for the excavation and restoration remedial action components along with a description of those remedial action components and related identification of data gaps and further studies to address those gaps.

### 4.1 Ash Dewatering

The ash currently impounded in STEP A and E Cells and saturated ash in SOEP 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 as discussed in Section 2.2. The ash dewatering wells installed in STEP A and E Cells in November and December 2020 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 and E Cells 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. The RD/RA Workplan will evaluate the effectiveness of the ash dewatering systems in STEP A and E Cells and present a plan for dewatering the remaining ash that is not expected to be dewatered by the current dewatering systems.

### 4.2 Description of Short-Term Disturbances

Short-term disturbances expected during ash excavation activities include: (i) earth-disturbing activities; and (ii) fugitive dust generation.

Short-term earth disturbance activities are expected to include the areas immediately surrounding SOEP and the STEP cells, portions of the SOEP and STEP dams, and the haul route from the SOEP/STEP area to the landfill. To address the stabilization of the disturbed areas, E&S control plans will be prepared as part of construction documentation. These plans will provide details on the 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, tire washes, etc.

Fugitive dust generated during excavation and transportation should be controlled primarily through the conditioning and wetting of ash and haul roads, respectively. The RD/RA Workplan will provide a framework for minimizing fugitive dust events originating from day-to-day operations during excavation. However, detailed dust control plans are typically prepared as part of construction documentation and, therefore, will not be included in the RD/RA Workplan. Plans

for fugitive dust control are expected to be based on Colstrip Power Plant's existing fugitive dust control plan prepared in accordance with the CCR Rule.

### **4.3 Ash Excavation and Transportation Procedures**

This section of the RD/RA Workplan will present specific procedures to safely and effectively excavate ash and other impacted materials and transport them to the landfill. The RD/RA Workplan will also include an estimate of required excavation rates to complete closure by removal and restoration activities within the prescribed timeline. Other requirements related to ash excavation and transportation are described below.

#### **4.3.1 Design Drawings**

The RD/RA Workplan will contain a set of 30 Percent Ash Excavation Design Drawings, including preliminary versions of the following drawings.

1. Cover Sheet
2. Existing Conditions Plan
3. Demolition, Abandonment, and Removal Plan
4. Dewatering Plan
5. Excavation Plan
6. Site Restoration Plan
7. Erosion and Sediment Control Plan

If results of the 30 Percent Design Phase indicate that additional drawings will be required, a revised list of drawings expected to be included in the full design drawing set will be provided in the RD/RA Workplan.

#### **4.3.2 Staging and Moisture Conditioning**

Prior to transportation, the excavated ash will need to be moisture conditioned (i.e., additional drying or wetting) to facilitate handling, transportation, compaction, and control of fugitive dust emissions. The RD/RA Workplan will present the requirements for moisture conditioning ash and temporary staging of ash within the SOEP/STEP area to promote decanting as needed.

#### **4.3.3 Excavation Slopes**

As excavation progresses in the SOEP/STEP area, temporary slopes will be cut into the in-place ash as various areas reach different excavation depths. Additionally, dams and dikes will be uncovered by excavation activities and may experience loading conditions that were not anticipated in their original design. Therefore, the RD/RA Workplan will present a summary of preliminary slope stability calculations evaluating various slope and construction dewatering scenarios that may be acceptable for safe and efficient completion of the excavation.

A detailed slope stability analysis will be presented in the Landfill Engineering Report to address equipment setbacks from the edge of slope crests, contingencies to account for downtime during construction dewatering system maintenance, or other incidents such as large storm events that could result in seepage faces developing, will be presented in the Landfill Engineering Report.

The RD/RA Workplan will also describe recommendations for instrumentation types, locations, depths, and monitoring procedures during excavation. The RD/RA Workplan will also establish a framework for visual observations of slopes and surfaces by appropriately trained personnel.

#### **4.3.4 Transportation**

Haul roads will need to be constructed and maintained to safety and efficiently transport ash and impacted materials from the SOEP/STEP area to the landfill. The RD/RA Workplan will provide recommendations for haul road locations, design, and maintenance activities, along with other ancillary features such as truck scales and tire washes, as needed. While recommendations for the primary haul routes will be included in the RD/RA Workplan, the actual haul route locations, to the extent changes do not constitute major deviations from the RD/RA Workplan, will be determined by the contractor during the pre-construction period.

#### **4.3.5 Removal Verification**

The RD/RA Workplan will prescribe the requirements for verifying and certifying that closure by removal has been completed. This may include documentation of visual observations (e.g., photographic evidence), classification indicators for visual observation of ash, soil sampling, and testing for the presence of ash.

#### **4.3.6 Final Disposition**

Excavated ash (and other impacted materials) will be disposed of at the landfill. Specific placement, compaction, and moisture requirements will be described in the landfill operations plan.

#### **4.3.7 Technical Specifications and Construction Quality Assurance Plan**

Technical specifications and a CQA plan document the excavation techniques and documentation required to excavate and transport the ash and impacted soil, maintain E&S and stormwater controls, and restore the excavation area upon completion. The RD/RA Workplan will include a list of technical specifications and a table of contents of the CQA plan. The RD/RA Workplan will also include example technical specifications of the major technical items taken from other CCR unit closure by removal projects that will be required for the ash excavation. Complete technical specifications will be prepared during the final design phase.

The technical specifications will focus on the major technical items required for ash excavation and will not include administrative sections (i.e., submittal review, measurement and payment) that will be developed as part of construction documentation.

#### **4.4 Post-Excavation Restoration**

This section of the RD/RA Workplan will present the requirements for restoration of the SOEP/STEP area following the removal of ash. General recommendations for temporary and permanent E&S controls will be developed. However, detailed E&S control plans are typically prepared as part of construction documentation and, therefore, will not be included in the RD/RA Workplan.

During final restoration activities, the SOEP and STEP Main Dams and internal divider dikes will need to be breached. 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. The RD/RA Workplan will provide recommendations for breaching the dams and dikes and regrading to promote runoff towards the original drainage basin.

## 5. COMPLIANCE MONITORING PLAN

This section of the RD/RA Workplan will discuss the monitoring that will be conducted to demonstrate compliance for Alternative 10. Ongoing groundwater monitoring activities in the SOEP/STEP area are conducted according to the Water Resources Monitoring Plan (WRMP)<sup>7</sup>. Groundwater monitoring activities for the SOEP/STEP area presented in the WRMP will continue during the design and implementation of Alternative 10. After the monitoring wells are installed for the hydrogeologic investigation for the landfill, those wells will be added to the WRMP.

Stormwater or air monitoring requirements that may be identified during the regulatory and permit review described in Section 3.3 will also be discussed in this section of the RD/RA Workplan.

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<sup>7</sup> Talen Montana, 2020. Water Resources Monitoring Plan, Talen Montana, LLC, Colstrip Power Plant, Rev. 7, December 8, 2020.

## 6. DELIVERABLES

### 6.1 Interim Deliverables

Talen Montana anticipates preparing and providing to MDEQ a series of interim deliverables for the Alternative 10 investigation and design. Such interim deliverables will likely include, but may not be limited to, the following:

- Small-Scale Flushing Pilot Test Report
- Hydrogeologic Investigation Workplan
- Geotechnical Investigation Workplan
- MNA Demonstration Study Workplan
- PRB Feasibility Study Workplan
- Geotechnical Investigation Report
- 30 Percent Design Drawings
- Hydrogeologic Investigation Report
- Draft Landfill Permit Application Materials

If necessary, a revised list of interim deliverables and a schedule for the remaining interim deliverables will be included the RD/RA Workplan.

### 6.2 Annual Report

Talen Montana will prepare and submit to MDEQ annual reports for each year of remedy implementation and periodic status reports at MDEQ's request. The major components of the annual report(s) will be presented in RD/RA Workplan.

## 7. SCHEDULE

A Gantt chart of the Alternative 10 RD/RA Workplan is presented in **Figure 7-1**. The schedule includes key milestones described in the Settlement Agreement and interim deliverables discussed with MDEQ in previous communications and listed in Section 6.1.

The RD/RA Workplan will include a narrative of the general timeline of remaining pre-design investigations, the final remedial design, ash relocations, landfill construction, etc.

# TABLES



**TABLE 1-1  
CLEANUP CRITERIA FOR GROUNDWATER CONSTITUENTS  
ALTERNATIVE 10 REMEDIAL DESIGN/REMEDIAL ACTION WORKPLAN PROPOSAL**

**SOEP/STEP Remedial Area  
Colstrip Power Plant  
Colstrip, Montana**

COI/COPC	Groundwater DEQ-7	USEPA MCL	USEPA Tapwater RSL	Ecological (Livestock) Cleanup Criterion	BSL Range	Cleanup Criteria [1]					
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	Alluvium (mg/L)	Spoils (mg/L)	Clinker (mg/L)	Coal-Related [7] (mg/L)	Sub-McKay (mg/L)	
<b>CCR Rule Appendix III Constituents</b>											
Boron	NA	NA	4	39 [2]	0.8 – 3.9	<b>4 (RSL)</b>	<b>4 (RSL)</b>	<b>4 (RSL)</b>	<b>4 (RSL)</b>	<b>4 (RSL)</b>	
Sulfate	NA	NA	NA	3,000 [3]	2,150 – 3,140	<b>3,000 (livestock)</b>	<b>3,000 (livestock)</b>	<b>3,140 (BSL)</b>	<b>3,000 (livestock)</b>	<b>3,000 (livestock)</b>	
<b>CCR Rule Appendix IV Constituents</b>											
Cobalt	NA	NA	0.006	0.03 [2]	0.00066 – 0.0232	<b>0.02 (BSL)</b>	<b>0.0232 (BSL)</b>	<b>0.0232 [5] (BSL)</b>	<b>0.006 (RSL)</b>	<b>0.006 (RSL)</b>	
Lithium	NA	NA	0.04	NA [4]	0.072 – 0.12	<b>0.12 (BSL)</b>	<b>0.09 (BSL)</b>	<b>0.09 [5] (BSL)</b>	<b>0.072 (BSL)</b>	<b>0.072 [5] (BSL)</b>	
Selenium	0.05	0.05	0.1	0.28 [2]	0.0024 – 0.01	<b>0.05 (DEQ-7)</b>	<b>0.05 (DEQ-7)</b>	<b>0.05 (DEQ-7)</b>	<b>0.05 (DEQ-7)</b>	<b>0.05 (DEQ-7)</b>	
<b>Other Potential SOEP/STEP Site Constituents</b>											
Manganese	NA	NA	0.43	61 [2]	0.26 – 2.48 [6]	<b>0.61 (BSL)</b>	<b>2.48 (BSL)</b>	<b>0.67 (BSL)</b>	<b>0.48 (BSL)</b>	<b>0.43 (RSL)</b>	

Notes:

DEQ-7 The Department of Environmental Quality Circular DEQ-7 contains numeric water quality standards for Montana's surface and ground waters (MDEQ, 2019).

mg/L milligrams per liter

COI Constituent of Interest

COPC Chemical of Potential Concern

USEPA United States Environmental Protection Agency

RSL Regional Screening Level (USEPA, November 2018)

BSL Background Screening Level (Neptune, 2017)

MCL Maximum Contaminant Level

NA Not applicable/not available

[1] Cleanup criteria for groundwater provided in the Revised CCRA for use in the Remedy Evaluation (Marietta Canty, LLC, 2018)

[2] Calculated Cleanup Criterion protective of livestock (calf) provided in the CCRA.

[3] Upper limit of “marginal” sulfate range for livestock (USDA-ARS, 2009).

[4] According to the CCRA, Cleanup Criterion could not be calculated because no mammalian Toxicity Reference Value (TRV) is available.

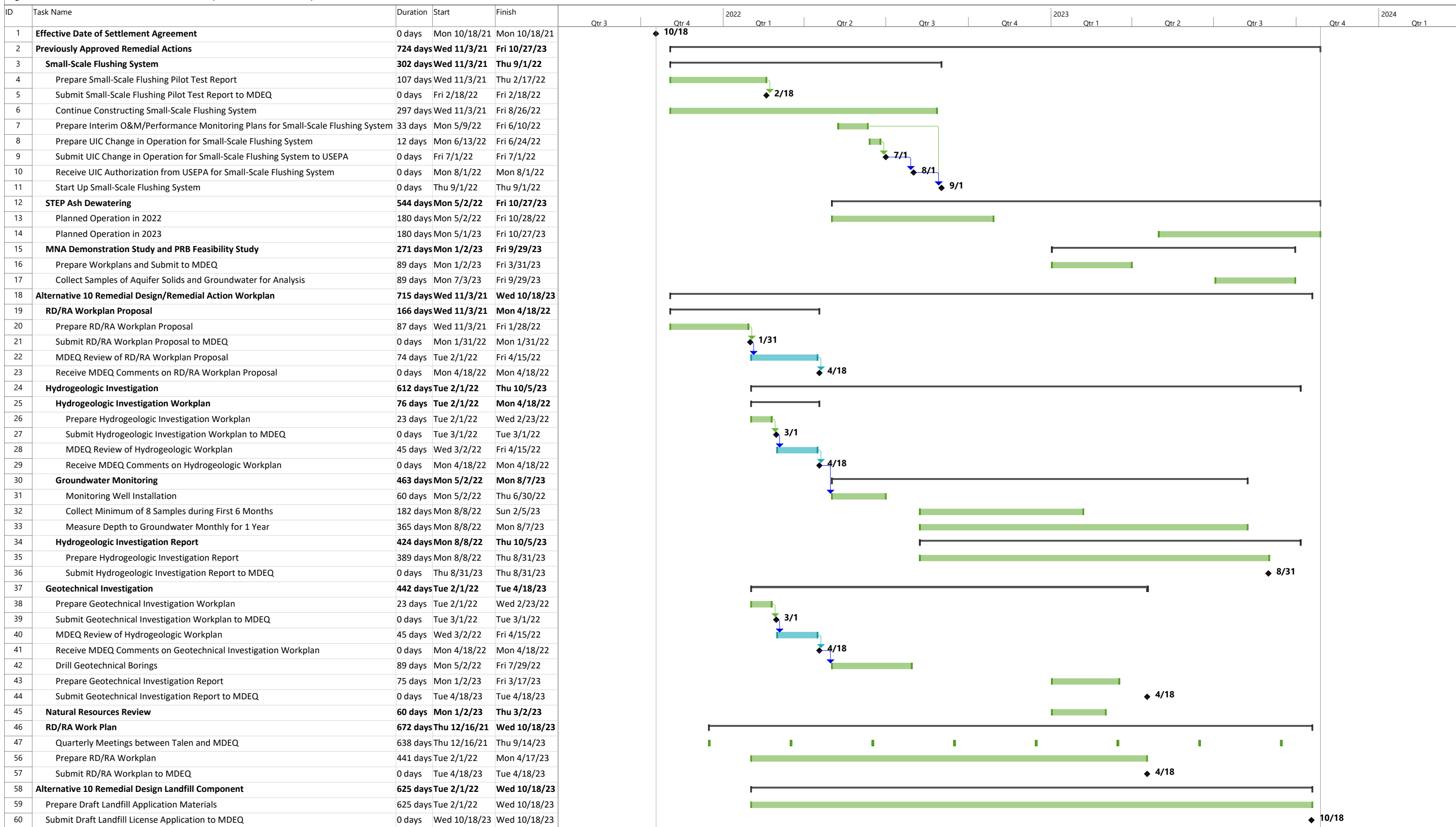
[5] BSL is not available for this hydrostratigraphic unit. BSL for overlying hydrostratigraphic unit is used as a proxy value.

[6] The upper limit is for spoils.

[7] McKay Coal, Interburden and Rosebud Coal are generally dry in this area.

# FIGURES

Figure 7-1. Schedule for Alternative 10 RD/RA Workplan - SOEP/STEP, Colstrip MT



Project: SOEPSTEP Alts 10 and  
Date: Sun 1/30/22

Task		Summary		Inactive Milestone		Duration-only		Start-only		External Milestone		Manual Progress	
Split		Project Summary		Inactive Summary		Manual Summary Rollup		Finish-only		Deadline		Progress	
Milestone		Inactive Task		Manual Task		Manual Summary		External Tasks		Progress			