Rosebud Power Plant
2024 Annual Engineer's Inspection Report

Prepared for Rosebud Operating Services, Inc.
by Allied Engineering Services, Inc.
2024 Report
Posted: January 15, 2025
Project #: 15-125

Contents

Appendices

INTRODUCTION

This annual engineer's report presents Allied Engineering's inspection of the CCR landfill and assessment of the landfill operations for the Rosebud Power Plant in Rosebud County, Montana in order to fulfill the requirements of the CCR rule as published in the Federal Register on April 17, 2015 and July 2, 2015 and its effective date of October 19, 2015. The applicable rule section is 40 CFR Parts 257 and 261. The landfill in this report holds inert hydrated fly ash, which is solid and nearly impermeable to water, similar to concrete. This report follows the same format as the previous Engineer's Annual Inspection Reports.

The project site is located approximately seven miles north of the town of Colstrip, Montana in the southwest quarter of Section 29 and the northwest quarter of Section 32 Township 3 North, Range 41 East (Latitude 45.978859°, Longitude -106.663772° (WGS 84)). Maps of current existing conditions are included in Appendix A. The landfill serves an on-site Power Plant owned by Colstrip Energy Limited Partnership (CELP). The Power Plant and the landfill are operated by Rosebud Operating Services, Inc.

The area covered by this report is an active landfill located on the subject property. The active landfill includes Phase 1 and Phase 2 of a contiguous landfill permitted in 1996 and placed in service in October 2005. This active landfill is subject to regulation by the above referenced CCR rules. There is also a closed landfill, last used in October 2005, that has since been reclaimed in general accordance with permits and regulations at the time. This closed landfill is not subject to regulation by the above referenced rules and is not the subject of this report.

The information contained herein is based on an investigation and analysis of the property's topographical and subsurface conditions, a review of existing permits, regulatory requirements, maps and literature for the project area as related to the landfilling operations of combusted coal residuals (CCR), more familiarly referred to as fly ash. The purpose of this report is to assess existing conditions, fulfill the Engineer's Annual Inspection requirements of the CCR rule, and provide recommendations for the ongoing landfilling operations.

BACKGROUND

Rosebud Power Plant is a waste coal burning facility using a fluidized bed reactor. During the burning process of the coal, fly ash or combusted coal residuals (CCR) are produced. The CCR are either sold for commercial/industrial purposes or landfilled on-site near the power plant.

In 1996, Chandler Geotechnical, Inc. (a predecessor to Allied Engineering Services, Inc.) was hired as a sub-consultant to JSM, Inc. to provide engineering analysis and design for the current active landfill, consisting of two phases located northwest of the power plant. Phase 1 of the active landfill began receiving ash when the now retired landfill was closed; approximately 2005. During the initial construction of Phase 1, the planned landfill footprint/area was reduced. Over the course of operations at the plant, fly ash was sold in certain years; thus, the amount of fly ash placed in the Phase 1 area was less than anticipated with the original design and has yet to reach its maximum storage capacity.

The reduced fly ash placement from 2005 to 2015 and the smaller starting footprint of Phase 1 resulted in the need for minor modifications of the original design of the landfill area. Phase 2 design modifications began in September of 2015 and were completed in December of 2015. Construction and site preparation of Phase 2 was initiated in the first week of September 2015, completed in December 2015, and Phase 2 has been receiving ash since the Spring of 2016. The construction of Phase 2 was

completed in general conformance with the original 1996 design with field modifications undertaken during construction under the guidance of Allied Engineering Services, Inc. The active landfill modifications were designed to verify the availability of storage capacity for the anticipated remaining volume of ash for the balance of the anticipated life of the power plant. At the time of the 2015 analysis and design guidance, this volume was estimated to be 635,987 CY based on the average amount of ash placed prior to 2015. This volume also assumed that no fly ash would be sold. The original 1996 design had a final permitted storage volume of approximately 2,200,000 CY and the 2015 revised design anticipated a needed total storage volume of approximately 1,300,000 CY

Since 2015, ash has been deposited in both phases but is currently being placed predominately in the Phase 2 area. In 2022, the Phase 2 ash surface was filled to match the Phase 1 ash surface elevation of approximately 3,160-ft elevation. Since 2018, Phase 1 has been used as a reserve coal storage area and has not actively received CCR. During the 2024 annual engineering site visit, it was observed that Phase 1 is still being used as a coal storage area and did not receive any CCR. It is anticipated that Phase 1 and Phase 2 will operate as one surface in the future upon consumption of the coal reserve stockpile.

REGULATORY SETTING

As of April 17, 2015, new rules for coal combustion residuals (CCR) were published in the Federal Register Volume 80, Number 74, dated Friday April 17, 2015. The applicable sections include 40 CFR Parts 257 and 261. These rules outlined the conditions for existing operating CCR landfills such as the active landfill at the Rosebud Power Plant. The rules provide location restrictions, structural stability assessment requirements, groundwater monitoring requirements, surface water protection, design and operating criteria, along with inspection requirements.

The power plant is currently operating under several permits that include protection criteria for air, surface water, and groundwater quality. Permits include:

- Montana Air Quality Permit No. MAQP 2035-08
- Title V Air Permit: OP2035-05
- Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000052
- Montana Pollutant Discharge Elimination System (MPDES) Permit No. MT0031780
- Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity.
- Permit No. MTR000058

EXISTING CONDITIONS

This annual inspection report details the operation efforts of ash placement, landfill construction and maintenance, monitoring of the drainage piping system and groundwater at the Active Landfill's Phase 1 and 2 area. During 2024, the power plant experienced outages that are summarized below:

- Scheduled Outage (Maintenance): March 29—May 3, 2024
- Load Reduction (Boiler testing): September 25—October 31, 2024
- Load Reduction (Boiler testing): November 7—November 18, 2024
- Forced Outage (Maintenance): December 16—December 24, 2024

The power plant produced approximately 86,847 CY of fly ash in 2024. Of this 86,847 CY, approximately 857 tons (~814 CY) of fly ash was sold between 11/15/2023 and 11/18/2024 while the remainder was landfilled in Phase 2. See *Landfill Volumes Table* for additional volume details. The ash volume was calculated using the 2023 and 2024 site quantity surveys for the annual engineering inspection. Phase 1 continues to operate as a coal storage area and is not actively receiving CCR.

EXISTING CONDITIONS AND ANNUAL ENGINEER'S INSPECTION REPORT

The following section quotes the requirements of the EPA CCR rule with the findings from the Engineer's Annual Inspection written as a response to each. The EPA CCR rule excerpts are listed in *italics.* Responses are provided in **bold.**

40 CFR §257.64 Unstable Areas

a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted.

As demonstrated in the 2015 Annual Engineer's Inspection Report, this CCR landfill is not located in an unstable area.

b) The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable.

1) On-site or local soil conditions that may result in significant differential settling;

Differential settlement within the landfill was not observed. The design and construction included the removal of topsoil and 5-feet of subsoil prior to placement of fly ash. During the removal of the topsoil and subsoil, the operation of the haul trucks provided initial compaction to the subsoil. The base of the Phase 2 area of the active landfill was compacted by a vibratory roller before ash placement. Pozzolanic[1] characteristics of hydrated fly ash provide a relatively strong mass of material that distributes the load evenly across the landfill footprint. Point load tests of hydrated ash core samples were completed by Ray Womack in 1992 on the retired CCR landfill. The results of the testing indicated compressive strength values comparable to a weak rock or concrete. The shear stresses exerted at depth by the weight of the ash landfill are proportional to the steepness and the height of the finished slope, and to the unit weight of the landfill materials. Due to the gentle overall finished side slopes of 3H:1V (considering the 10' wide benches) and the low density of the ash (about 80 pounds per cubic foot), the ash landfill will exert considerably less stress on the foundation materials than many of the natural slopes in the immediate vicinity of the landfill.

[1] Pozzolans are a siliceous or silico-aluminous material that will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds having cementitious properties (there are both natural and artificial pozzolans).

2) *On-site or local geologic or geomorphologic features*

The landfill is located in the mapped Lebo member of the Fort Union Formation. As mentioned previously, the relative low-density characteristics of the fly ash distributed over a large area should not exert significant force to the underlying geology. There are no observed or mapped faults in the immediate vicinity of the active landfill. In addition, there is no indication of settlement in the closed landfill located approximately 1,300 feet southeast of the active landfill.

The landfill is characterized as a cross valley fill across two ephemeral swales. The design includes water conveyance under the landfill by way of piping systems with bypass spillways designed to divert water around the perimeter in order to limit oversaturation of vicinity soil. To assure long term drainage stability, the final configuration for closure includes perimeter conveyance of water and abandonment of the piping system under the landfill (See 2016 Annual Engineer's Inspection Report for perimeter conveyance plans).

3) *On-site or local human-made features or events (both surface and subsurface).*

The design of the landfill accounted for appropriate side-slopes to limit the likelihood of instabilities. The original design as well as the 2015 design update utilized 3H:1V side slopes for the man-made berms surrounding the landfill area. This side slope is a common and conservative reclamation slope throughout the country, and specifically in the local Colstrip area which includes extensive coal mines.

The active landfill is located across two ephemeral drainages. The original design called for three pipes that convey the natural drainage of the active landfill site. The main drainage covers an area of 103 acres with a secondary drainage covering an area of 16 acres. The original design utilized a High Density Polyethylene (HDPE) dual wall corrugated pipe. The reason for the selection of this pipe was for its flexibility, which would allow bridging of the soil in a deep bury situation. The 2015 design update continued the use of an HDPE pipe but selected a steel-reinforced HDPE pipe for added stability. The storm water conveyance pipes themselves are likely the most vulnerable element in the landfill system in terms of long-term stability (in the event of a pipe failure). As stated previously, a surface conveyance system will replace the current piping system around the time of landfill closure.

c) *The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the demonstration meets the requirements of paragraph (a) of this section.*

The landfill area was designed by a professional engineer. Additionally, this report serves as Allied Engineering Services, Inc.'s certification that the landfill is not situated in an unstable area.

d) *The owner or operator of the CCR unit must complete the demonstration required by paragraph (a) of this section by the date specified in either paragraph (d)(1) or (2) of this section.*
   1) *For an existing CCR landfill or existing CCR surface impoundment, the owner or operator must complete the demonstration no later than October 17, 2018.*

This requirement was met prior to the first annual Engineer's Inspection Report (dated January 19, 2016) which was before the deadline and was provided to the facility for placement in their operating record.

2) *For a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit, the owner or operator must complete the demonstration no later than the date of initial receipt of CCR in the CCR unit.*

Not applicable, the active CCR landfill area has been in use prior to the regulatory timeframe of October 19, 2015.

3) *The owner or operator has completed the demonstration required by paragraph (a) of this section when the demonstration is placed in the facility's operating record as required by § 257.105(e)*

Reporting requirements as outlined in § 257.105(e) will be followed. CELP maintains operational requirements on their webpage (http://www.celpccr.com)

4) *An owner or operator of an existing CCR surface impoundment or existing CCR landfill who fails to demonstrate compliance with the requirements of paragraph (a) of this section by the date specified in paragraph (d)(1) of this section is subject to the requirements of § 257.101(b)(1) or (d)(1), respectively.*

Acknowledged.

5) *An owner or operator of a new CCR landfill, new CCR surface impoundment, or any lateral expansion of a CCR unit who fails to make the demonstration showing compliance with the requirements of paragraph (a) of this section is prohibited from placing CCR in the CCR unit.*

Not applicable to existing landfills and the requirements of paragraph (a) were met with the first annual Engineer's Inspection Report (dated January 19, 2016).

e) *The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in § 257.105(e), the notification requirements specified in § 257.106(e), and the Internet requirements specified in § 257.107(e)*

Acknowledged.

§257.84 Inspection requirements for CCR Landfills

b) *Annual inspections by a qualified professional engineer.*

1) *Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:*

i. A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections); and

Weekly inspections were undertaken by facility personnel during the calendar year of 2024. A review of the weekly inspection reports revealed no significant issues with the active CCR landfill. A few of the highlights of 2024 are as follows:

04/05/24 Start of spring vegetation growth.
04/19/2024 Both coal piles have been capped.
07/19/2024 Grass is starting to brown.
10/25/2024 Raised Access Road Base and began straightening Access Road. Began removing coal, about 2-3 loads per day.
11/15/2024 - Berm work and entrance work continue.
11/27/2024 - 12/27/2024 - Berm work in progress. Last received inspection report on 12/27/2024.

Copies of the weekly inspection reports are available upon request and are maintained onsite within the environmental records. The landfill continues to be operated in general conformance with the original design. The Phase 2 area has received all the ash for 2024.

Soil containment berms have been constructed on the perimeter of Phase 2 to allow the elevation of the landfill to continue to rise. In 2024, berm construction took place primarily along the north, south, and west sides of Phase 2 and the East side of Phase 1. Since the previous 2023 inspection, all of the Phase 2 Landfill is now contained by ash/soil berms and is no longer contained by portions of native ground. Specifically, the areas in the northeast, southeast, and northwest corners of the Phase 2 landfill have been contained by berms and are no longer in contact with native ground.

In addition to increasing the height of the perimeter berms, subsoil was placed on the exterior side slopes to cap the ash berms and grade the side slopes to be approximately 3H:1V. The north berm has an average elevation of 3,176-ft and approximately 5,650 CY of material was placed on the north berm of Phase 2 during 2024. The west berm has an average elevation of 3,177-ft and approximately 1,300 CY of material was placed on the west berm of Phase 2 during 2024. The east berm of Phase 1 has an average elevation of 3,168-ft and approximately 6,450 CY of material was placed on the east berm of Phase 1 during 2024. The southern berm was under construction at the time of the site visit and was not finish graded. The berm has an average elevation of 3,177-ft and approximately 4,930 CY of ash material was used for construction.

Berms have been constructed predominately using partially hydrated ash then capped with sub soil and topsoil. During 2024, Stockpile 2, Stockpile 4, and a Borrow Area located near the southeast corner of the landfill were used for source material in berm construction.

ii. A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

Personnel from Allied Engineering Services, Inc. visited the site on November 18, 2024 for the Annual Engineers Inspection. During the inspection, traditional survey and aerial drone mapping was performed across the site. The 2024 survey information is summarized in Appendix A.

2) *Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:*
   i. *Any changes in geometry of the structure since the previous annual inspection;*
   ii. *The approximate volume of CCR contained in the unit at the time of the inspection;*
   iii. *Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and*
   iv. *Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.*

The geometry of the landfill is actively changing as CCR is placed in lifts and hydrated. As the CCR surface continues to rise, a minimum of 3H:1V side slope should be maintained. Maintaining 3H:1V side slopes during placement of CCR lifts and construction of perimeter berms will ensure final configuration and reclamation geometry can be achieved.

The attached as-built survey sheets depict the topography of the ash surface as of November 18, 2024. The elevation of the ash placed in Phase 2 has risen an average of 5.8-ft since the last as-built survey on November 15, 2023. The general shape of Phase 2 is a depression which captures precipitation within the ash footprint. The average ash elevation of Phase 1 remains the same as the previous years (2018-2022) at 3160-FT. Phase 1 has been used as a coal storage area since 2018 and currently has about 15.5 feet of coal. Phase 2 has an average ash elevation of 3173.4-FT. A total of 86,847 CY of ash was placed in Phase 2 between as-built surveys (11/15/2023 – 11/18/2024). During this same timeframe, approximately 814 CY of ash was sold and not placed in the landfill area.

Landfill Surface Area Table

Description	Surface Area*
Phase 1 Open Ash Area	2.6 Acres
Phase 2 Open Ash Area	8.7 Acres
***Areas are approximate and estimated from topographic data taken on 11/18/2024. Ash volume calculations and surface statistics for Phase 2 have been developed by comparing the 2023 and 2024 ash surface areas.**	

As Phase 2 continues to receive CCR, the landfill has expanded into the previous Phase 1 landfill Furthermore, berm construction in 2024 reduced the Phase 1 open ash area from previous years. The combination of these two factors has reduced the Phase 1 surface area from 3.4 acres in 2023 to 2.6 acres in 2024.

Landfill Volumes Table

Description	Volume
Total Ash Stored in Phase 1	344,310 CY
Total Ash Stored in Phase 2	677,662 CY
Estimated Closed Landfill Ash Storage	836,000 CY
Stockpile 1 – Top Soil	6,000 CY
Stockpile 2 – Sub Soil	77,046 CY
Stockpile 3 – Top Soil	5,090 CY
Stockpile 4 – Sub Soil	8,377 CY
Borrow Area – Southeast Corner Phase 2	950 CY
***Soil volumes are approximate and estimated from topographic data taken on 11/18/2024. Stockpile volumes may have changed since this survey date.**	

Sub soil Stockpiles 2 and 4 were used for berm construction during 2024. The remaining volume of Stockpile 4 is 8,377 CY indicated in the table above is the volume that was used to fill a depression during the initial construction of Phase 2. Stockpile 4 has been graded to match the existing grade adjacent to Haul Road 1. Stockpile 2 contributed approximately 5,400 CY of material for berm construction. The Borrow Area contributed approximately 950 CY of material for berm construction and haul road construction.

All piping installed in 2015, along with the previously existing piping is functioning as designed with in-place trash racks and rock riprap. A small amount of sedimentation was observed at the inlets and outlet of the pipes. This sediment should be removed during routine site maintenance in the coming year and when found moving forward.

3) *Timeframes for conducting the initial inspection -*
   i. *Existing CCR landfills. The owner or operator of the CCR unit must complete the initial inspection required by paragraphs (b)(1) and (2) of this section no later than January 18, 2016.*

The first Annual Inspection report was completed prior to the stated deadline and has therefore addressed this requirement.

   ii. *New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator of the CCR unit must complete the initial annual inspection required by paragraphs (b)(1) and (2) of this section no later than 14 months following the date of initial receipt of CCR in the CCR unit.*

Not applicable to the existing landfill.

4) *Frequency of inspections. The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the*

completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by § 257.105(g)(9).

The Engineer's Inspection Report will continue to be completed annually with the potential to complete them more frequently if a deficiency or release is identified during the weekly facility inspections.

5) *If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.*

Acknowledged.

CONCLUSION

The landfill inspection at the Rosebud Power Plant found that there is currently no significant or damaging active settlement or significant stability issues related to landfilling of CCR. All existing piping appears to be functioning as designed.

See below for a list of recommendations for continued operation and maintenance of the landfill:

1. Continue grading outward facing slopes for berm construction (2025 and future) to ensure a 3H:1V side slope or flatter geometry. Any existing (2024 or earlier) or future finished slopes steeper than 3H:1V will require flattening from the bottom (i.e., additional fill placement) during final closure. See the attached Slope Figure for existing slopes. Note, areas that are orange and purple represent slopes steeper than 3H:1V.
2. Place soil on any outward facing slopes of berms constructed of CCR. The minimum required soil cover is 0.5-FT of topsoil and 1.5-ft of sub soil. Topsoil should be applied at the minimum cover requirement to conserve topsoil volumes until final reclamation. Subsoil should be compacted as recommended in the original and post construction design reports.
3. In an effort to conserve topsoil, only use the available topsoil stockpiles for covering 3H:1V slopes as Phase 2 elevation continues to rise.
4. Issues may arise from coal dust depositing onto vegetated areas on the embankment. Monitor for this situation and enact additional measures as needed to suppress coal dust from the stockpile in Phase 1 from blowing onto existing vegetation. Suppression may include water or chemical applications.
5. As ash is placed, ensure berms are in place and grading is sloped toward the center of the landfill to reduce erosion potential near the perimeter.
6. Apply compactive effort to subsoil during berm construction in accordance with the 1996 Chandler Geotechnical Engineering Design and Construction Specifications.
7. Perform grading to repair erosion that may be occurring on finished areas to prevent ash from being exposed.
8. Perform seeding of all disturbed areas in the spring or fall to promote vegetation growth on bare ground.
9. For Subsoil Stockpile 2 perform grading to repair erosion and seed eroded areas in the spring or fall to promote vegetation growth on bare ground.
10. Perform routine cleaning and maintenance of the installed piping under the landfill, including inlet and outlet areas. Specifically, remove sediment that has collected at the inlet to Pipe 3 and Pipe 2. Continue periodic cleaning of sediment deposits and vegetation obstructions from drainpipe inlets and outlets and note the days of such maintenance in the weekly inspection reports.
11. Strip and stockpile all topsoil to a minimum depth of 12 inches from all proposed disturbance areas and maintain a 10-foot buffer strip around the perimeter of the landfill. Topsoil and sub soil to be stored separately for final reclamation or ongoing berm construction.

CERTIFICATION

This report was prepared by Allied Engineering Services, Inc., under the direction of Craig R. Madson, PE with assistance from Conner Switzer EI, Andrew Graham, PE, Eric Wegren, PE, Ron Orton, and QC review by Brock Athman, PE.

ALLIED ENGINEERING SERVICES, INC

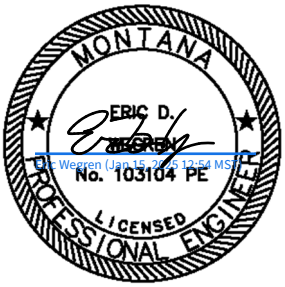
Craig Madson, PE

Craig Madson

Andrew Graham, PE

Eric Wegren, PE

Eric Wegren (Jan 15, 2025 12:54 MST)



Ron Orton, Environmental Scientist

QC Approval: Brock D. Athman, PE

REFERENCES

1. American Concrete Institute, 2021. ACI CT-21: ACI Concrete Terminology
2. Environmental Protection Agency, 2015. "*Federal Register*", Vol. 80, No. 74, Part 257.
3. Hydrologic Analysis and Design, Third Edition. McCuen, Richard. 2005
4. Montana Bureau of Mines and Geology, 2007. Geologic Map of the Lame Deer 30' x 60' quadrangle, eastern Montana. Vuke, S.M., Heffern, E.L., Bergantino, R.N., and Colton, R.B. Accessed via the USGS National Geologic Map Database Map View. Accessed 12/23/15 http://ngmdb.usgs.gov/maps/mapview/
5. Montana Bureau of Mines and Geology, Groundwater Information Center, Well log data website, http://mbmggwic.mtech.edu/sqlserver/v11/menus/menuData.asp. Accessed 1/6/15
6. Natural Resource Conservation Service, Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm Accessed 12/23/15.
7. Rosebud Power Plant Ash Disposal Site Engineering Design and Construction Specifications by Chandler Geotechnical. Chandler, D.S. dated July 16, 1996.

Appendix A: Existing Conditions Survey, Orthomosaic, & Slopes Figures

SURVEY OF PHASE 1 & 2 LANDFILL AND SURROUNDING AREA BASED ON TOPOGRAPHIC SURVEYS COMPLETED ON:
09/14/15 BY GREG FINCK OF AESI
01/27/16 BY GREG FINCK & KYLE THOMPSON OF AESI
11/9/16 BY ANDREW GRAHAM OF AESI
11/14/17 BY ANDREW GRAHAM OF AESI
09/19/18 BY CONNER SWITZER OF AESI
11/13/19 BY CONNER SWITZER OF AESI
11/05/20 BY CONNER SWITZER OF AESI
11/30/21 BY CONNER SWITZER OF AESI
11/01/22 BY CONNER SWITZER OF AESI
11/15/23 BY CONNER SWITZER OF AESI
11/18/24 BY CONNER SWITZER OF AESI

LEGEND

APPROXIMATE ASH PLACEMENT BOUNDARY
APPROXIMATE COAL STORAGE BOUNDARY

INLET ROCK RIPRAP
SURVEY BASE POINT
PT# 402
ELEV: 3182.13
PHASE 1 AVERAGE ASH ELEV=3160.0'. AREA CONTINUES TO BE USED FOR COAL STORAGE CONTOURS REFLECT THE ELEVATION OF THE COAL STOCKPILE ON 11/18/2024
TOPSOIL STOCKPILE 3
CENTERLINE TWO TRACK ROAD
ROCK RIPRAP STORAGE
PIPE 3
SUBSOIL STOCKPILE 2
PHASE 2 AVERAGE ASH ELEV: 3173.4'
INLET ROCK RIPRAP
PIPE 2
EXISTING 48-IN DUAL WALL HDPE
LENGTH: 989FT
SLOPE: 1.89%
MONITORING WELL OMW-7
OUTLET ROCK RIPRAP
BOREHOLE BH-11
BOREHOLE BH-12
MONITORING WELL OMW-10
MONITORING WELL OMW-9
MONITORING WELL OMW-8
OBSERVATION WELL E
TOPSOIL STOCKPILE 1
BORROW AREA
HAUL ROAD 1 NEW ALIGNMENT
PRODUCTION WELL E
HAUL ROAD 1
ABANDONED DEEP WELL
ABANDONED SHALLOW WELL
APPROX. EXISTING LANDFILL ASH BOUNDARY
PROPERTY BOUNDARY
EXISTING FENCE
DEEP SOURCE WELL

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NO.	REVISIONS	DRAWN BY	DATE

0 80 160 240
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: CCS
DESIGNED BY: CCS	REVIEWED BY: ASG,BDA

ROSEBUD SURVEY FIGURE
2024 ACTIVE LANDFILL (AS-BUILT)
ROSEBUD COUNTY, MT

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com

Civil Engineering
Geotechnical Engineering
Land Surveying

ALLIED ENGINEERING SERVICES, INC.

PROJECT #: 15-125	SHEET 1
DATE: 1/7/2025	

ACTIVE LANDFILL

SURVEY OF PHASE 1 & 2 LANDFILL AND SURROUNDING AREA BASED ON TOPOGRAPHIC SURVEYS COMPLETED ON:
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11/30/21 BY CONNER SWITZER OF AESI
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11/18/24 BY CONNER SWITZER OF AESI

LEGEND

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APPROXIMATE COAL STORAGE BOUNDARY

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BOREHOLE BH-12
MONITORING WELL OMW-10
MONITORING WELL OMW-8
MONITORING WELL OMW-9
TOPSOIL STOCKPILE 1
OBSERVATION WELL E
BORROW AREA
HAUL ROAD 1 NEW ALIGNMENT
PRODUCTION WELL E
HAUL ROAD 1
ABANDONED DEEP WELL
ABANDONED SHALLOW WELL
PROPERTY BOUNDARY
EXISTING FENCE
APPROX. EXISTING LANDFILL ASH BOUNDARY
DEEP SOURCE WELL

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NO.	REVISIONS	DRAWN BY	DATE

0 80 160 240
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: CCS
DESIGNED BY: CCS	REVIEWED BY: ASG,BDA

ROSEBUD SURVEY FIGURE
2024 ACTIVE LANDFILL (ORTHOMOSAIC)
ROSEBUD COUNTY, MT

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com

Civil Engineering
Geotechnical Engineering
Land Surveying

ALLIED ENGINEERING SERVICES, INC.

PROJECT #: 15-125	SHEET 2
DATE: 1/7/2025	
ACTIVE LANDFILL	

LEGEND

- APPROXIMATE ASH PLACEMENT BOUNDARY
- APPROXIMATE COAL STORAGE BOUNDARY

SURVEY OF PHASE 1 & 2 LANDFILL AND SURROUNDING AREA BASED ON TOPOGRAPHIC SURVEYS COMPLETED ON:
9/14/15 BY GREG FINCK OF AESI
1/27/16 BY GREG FINCK & KYLE THOMPSON OF AESI
11/9/16 BY ANDREW GRAHAM OF AESI
11/14/17 BY ANDREW GRAHAM OF AESI
09/19/18 BY CONNER SWITZER OF AESI
11/13/19 BY CONNER SWITZER OF AESI
11/05/20 BY CONNER SWITZER OF AESI
11/30/21 BY CONNER SWITZER OF AESI
11/01/22 BY CONNER SWITZER OF AESI
11/15/23 BY CONNER SWITZER OF AESI
11/18/24 BY CONNER SWITZER OF AESI

INLET ROCK RIPRAP
SURVEY BASE POINT
PT# 402
ELEV: 3182.13
PHASE 1 AVERAGE ASH ELEV=3160.0'. AREA CONTINUES TO BE USED FOR COAL STORAGE CONTOURS REFLECT THE ELEVATION OF THE COAL STOCKPILE ON 11/18/2024
TOPSOIL STOCKPILE 3
CENTERLINE TWO TRACK ROAD
ROCK RIPRAP STORAGE
PIPE 3
PHASE 2 AVERAGE ASH ELEV: 3173.4'
SUBSOIL STOCKPILE 2
INLET ROCK RIPRAP
PIPE 2
EXISTING 48-IN DUAL WALL HDPE
LENGTH: 989FT
SLOPE: 1.89%
MONITORING WELL OMW-7
BOREHOLE BH-11
MONITORING WELL OMW-10
MONITORING WELL OMW-9
OUTLET ROCK RIPRAP
BOREHOLE BH-12
MONITORING WELL OMW-8
TOPSOIL STOCKPILE 1
OBSERVATION WELL E
BORROW AREA
HAUL ROAD 1 NEW ALIGNMENT
PRODUCTION WELL E
HAUL ROAD 1
ABANDONED DEEP WELL
ABANDONED SHALLOW WELL
APPROX. EXISTING LANDFILL ASH BOUNDARY
DEEP SOURCE WELL
PROPERTY BOUNDARY
EXISTING FENCE

SLOPES TABLE

ID No.	MINIMUM SLOPE	MAXIMUM SLOPE	AREA [AC.]	COLOR
1	10000.0:1	5.0:1	12.6	
2	5.0:1	3.0:1	3.4	
3	3.0:1	2.5:1	1.7	
4	2.5:1	2.2:1	0.8	
5	2.2:1	0.5:1	1.2	

NO.	REVISIONS	DRAWN BY	DATE

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SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: CCS
DESIGNED BY: CCS	REVIEWED BY: ASG,BDA

ROSEBUD SURVEY FIGURE
2024 ACTIVE LANDFILL (SLOPES)
ROSEBUD COUNTY, MT

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
PHONE (406) 582-0221
FAX (406) 582-5770
www.alliedengineering.com

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PROJECT #: 15-125	SHEET 3
DATE: 1/7/2025	

ACTIVE LANDFILL

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2024_CELP Final AER_Sign_REV

Final Audit Report 2025-01-15

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