

**PLATTE RIVER POWER AUTHORITY – RAWHIDE ENERGY STATION  
MONOFILL  
LARIMER COUNTY, CO**

**ENGINEER'S CERTIFICATION OF UNSTABLE AREAS  
DEMONSTRATION  
(40 CFR §257.64)  
FOR COAL COMBUSTION RESIDUALS (CCR)  
EXISTING LANDFILL**

Prepared for  
Platte River Power Authority



Platte River Power Authority  
2700 East County Road 82  
Wellington, CO 80549

October 16, 2018

Prepared by



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## 1.0 INTRODUCTION

### 1.1 OBJECTIVE

The purpose of this demonstration is to document compliance with 40 CFR 257.64 of the Environmental Protection Agency Final Coal Combustion Residual Rule (EPA Final CCR Rule). This Unstable Areas Demonstration is based on existing documentation such as construction drawings, record drawings, and any other pertinent data and/or investigations to support historical conditions and operations of the Monofill at the Rawhide Energy Station.

### 1.2 RULE REQUIREMENTS

According to *40 CFR 257.64* of the EPA Final CCR Rule, any new or existing CCR landfills, or CCR surface impoundments, and all lateral expansions of CCR units must not be located in unstable areas unless the owner or operator demonstrates 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.

The owner or operator must consider all 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;
- (2) On-site or local geologic or geomorphologic features; and
- (3) On-site or local human-made features or events (both surface and subsurface).

### 1.3 SITE BACKGROUND

Rawhide Energy Station (Rawhide) is a 4,560 acre facility located at 2700 East County Road 82 in Wellington, CO. Construction of Rawhide began in 1979 and it has operated as a coal-fired power plant since. The primary land use on the Rawhide property is related to utility service electric generation. Power generation at Rawhide produces coal combustion residuals (CCR). Rawhide places these residuals in the Solid Waste Management Facility (the Monofill), located in the northwest corner of the Rawhide site. The Rawhide materials currently authorized for placement in the Monofill include the following:

- dry waste products (including fly ash) collected by the flue gas cleaning process;
- bottom ash removed from the BAT Impoundments;
- sludge from the phosphorous removal system sludge ponds; and
- inorganic construction wastes.

A site location plan of the Rawhide Energy Station is depicted on **Figure 1**. An overview of the monofill is presented in **Figure 2**

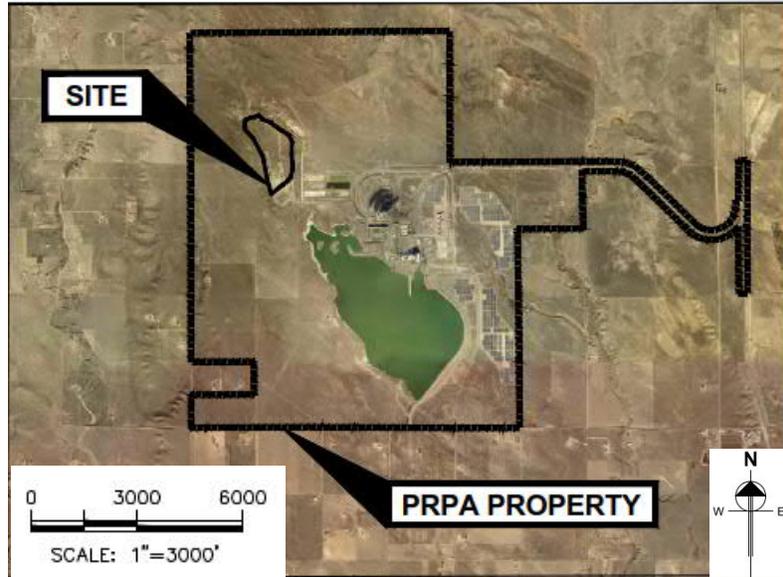


Figure 1: Site Location Map



Figure 2: CCR Unit Site Location

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## 2.0 SITE ASSESSMENT

AECOM performed a site assessment based on available information to evaluate the current conditions of the existing CCR units in accordance with the unstable area requirements of location restrictions under the USEPA CCR Rule §257.64. As part of the site assessment, AECOM has reviewed available historical information.

### 2.1 HISTORICAL AND PUBLIC AVAILABLE INFORMATION

Available historical information included desktop review of publicly available data and reports previously prepared. The details of the available historic information are presented in the following sections.

### 2.2 SITE INVESTIGATIONS

Several site investigations have been performed in the vicinity of the Monofill. Black & Veatch Consulting Engineers completed a subsurface investigation which included fifteen (15) borings drilled between February 1978 and June 1979. Another seven (7) borings were drilled for the landfill expansion as discussed in the Revised Design and Operations Plan (2007 Smith Geotechnical). Samples were obtained using a California Sampler with a 2.5 inch outer diameter barrel. Most recently, in 2018 AECOM prepared another field investigation which included four (4) test pits and three (3) soil borings within the vicinity of the Monofill. Continuous soil core sampling was performed along with undisturbed sampling (Shelby-tubes) at various depths.

## 3.0 FOUNDATION CONDITIONS

The foundation conditions are summarized below based on the boring logs and laboratory data from the subsurface investigations.

### 3.1 SITE SPECIFIC SOIL AND ROCK CONDITIONS

Within and near the Monofill footprint, the following subsurface conditions were encountered:

- Silty Clay to Clay: The overburden soils encountered generally consisted of stiff, dry to moist, silty clay (CL-ML) or lean clay (CL) soils. The clay soils had a thickness of 1 to 13 feet. Typically the clay soils were encountered overlying or were imbedded with deposits of sand overlying bedrock or directly overlying bedrock.
- Sand: The cohesionless materials encountered in the borings generally consisted of medium dense to dense, dry to moist, clayey sand (SC) or silty sand (SM). The sand deposit had a thickness of 4 to 50 feet.
- Shale: Olive-green to gray, highly weathered shale bedrock was encountered between 0 and 50 feet below ground surface (bgs).

- Claystone: Tan, completely to severely weathered claystone was described in the Smith Geotechnical logs as ranging from 3 to 8 feet bgs.
- Groundwater: no water was recorded as encountered during the subsurface investigation within the vicinity of the Monofill.

### 3.2 NATURAL UNSTABLE AREAS

Based on review of historical data and observations in the borings performed during the geotechnical explorations at the site, there is no karst terrain at the Rawhide Energy Station.

Within the state of Colorado, both swelling and collapsible soils may be encountered in the natural overburden and could cause potential issues pertaining to the stability of an area. In the Black & Veatch Geotechnical Report (1979), wind-deposited or Aeolian soils were encountered at the project site primarily in the area of the plant and coal yard but were not found specifically within the area of the Monofill.

Bedrock swell, or "heaving bedrock" is another cause for potential concern regarding unstable areas. It is noted that this phenomenon was not mentioned in the existing historical information for the site; however, it is not considered to be an issue for the Monofill due to the fact that no damage has been historically noted during routine inspections.

### 3.3 MAN-MADE UNSTABLE AREAS

There is no history of mines or blasting within the footprint of the unit or within the vicinity of the plant; therefore the unit is not considered to be located in a man-made unstable area.

## 4.0 CONCLUSIONS

Based upon our review of the available historical data and the results of the supplementary investigations, AECOM has concluded the Monofill at Rawhide Energy Station meets the requirements of 40 CFR§ 257.64 Unstable Areas.

Pursuant to 40 C.F.R. § 257.64 (d)(1), for an existing landfill, the owner or operator must complete the demonstration no later than October 17, 2018. Certification by a qualified professional engineer is included in **Appendix A**.

## 5.0 REFERENCES

- AECOM, Monofill Field Investigation Report, Platte River Power Authority: March 2018.
- Black & Veatch Consulting Engineers, Geotechnical Analysis Report, Platte River Power Authority Rawhide Project: July 23, 1979.
- Smith Geotechnical, Revised Design and Operations Plan for the Solid Waste Disposal Facility Rawhide Energy Station Prepared for Platte River Power Authority: November 2007.

# APPENDIX A

## ENGINEER'S CERTIFICATION

**ENGINEER'S CERTIFICATION OF UNSTABLE AREAS DEMONSTRATION  
CCR EXISTING LANDFILL: RAWHIDE ENERGY STATION  
CCR UNIT: MONOFILL**

AECOM ("Consultant") has been retained by Platte River Power Authority to prepare the following assessment of whether the above-referenced existing coal combustion residuals ("CCR") landfill meets the location restriction for unstable areas requirements set out in 40 C.F.R. § 257.64(a). Presented below are the project background, summary of findings, limitations, and certification.

**1.0 BACKGROUND**

Pursuant to 40 C.F.R. § 257.64(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 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. Pursuant to 40 C.F.R. § 257.64(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;
- 2) On-site or local geologic or geomorphologic features; and
- 3) On-site or local human-made features or events (both surface and subsurface).

Pursuant to 40 C.F.R. § 257.64(c) and (d)(1), for an existing landfill, the owner or operator must obtain a certification from a qualified professional engineer stating that the owner or operator has demonstrated that the CCR unit meets the requirements for unstable areas no later than October 17, 2018.

In support of Consultant's assessment, Consultant completed a desktop evaluation of the location of the CCR unit and determined that sufficient information is available to document the required unstable areas location demonstration.

**2.0 SUMMARY OF FINDINGS**

Based upon a review of available geologic mapping, historical information and geotechnical explorations by AECOM and other consultants, Consultant concludes as follows:

CCR Unit	Unstable areas
Monofill	<i>Meets the requirements of 40 C.F.R. § 257.64(a)</i>

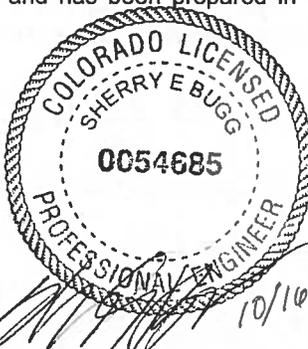
**3.0 LIMITATIONS**

The signature of Consultant's authorized representative on this document represents that to the best of Consultant's knowledge, information, and belief in the exercise of its professional judgment, it is Consultant's professional opinion that the aforementioned information is accurate as of the date of such signature. Any opinion or decisions by Consultant are made on the basis of Consultant's experience, qualifications, and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data, and actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

**4.0 CERTIFICATION**

I, Sherry Bugg, being a Registered Professional Engineer, in accordance with the Colorado Professional Engineer's Registration, do hereby certify to the best of my knowledge, information, and belief, that the CCR unit that is the subject of this report dated October 16, 2018 meets the location restriction for unstable areas requirements pursuant to 40 C.F.R. § 257.64(a), and that this report is true and correct and has been prepared in accordance with generally accepted good engineering practices.

SIGNATURE



DATE 10/16/2018

Rev.0