

**PLATTE RIVER POWER AUTHORITY – RAWHIDE ENERGY STATION  
BOTTOM ASH TRANSFER (BAT) IMPOUNDMENTS  
LARIMER COUNTY, CO**

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

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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Figure 1: Site Location Map

Figure 2: CCR Unit Site Overview

### APPENDIX

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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 other pertinent data and/or investigations that support historical conditions and operations of the Bottom Ash Transfer (BAT) Impoundments 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 BAT Impoundments are located northwest of the main plant and north of the Cooling Pond. A site location plan of the Rawhide Energy Station is depicted on **Figure 1**. An overview of the impoundments is presented in **Figure 2**

Bottom ash is produced during the coal combustion process and is hydraulically sluiced from the boiler to one of the two incised BAT impoundments located northwest of the plant. These impoundments also receive resin filter backwash water from the demineralizer at the wastewater treatment plant. The impoundments were constructed in the early 1980s by excavating below grade into the underlying Pierre Shale and then lining the bottom with 18 inches of compacted clay. Each of the two impoundments measure approximately 725 feet by

225 feet at the surface (approximately 7.5 acres total) with a bottom elevation of 5,660 feet above mean sea level (amsl), a normal water elevation of 5,674 feet amsl, and a dike crest elevation ranging between 5,678 and 5,679 feet amsl. It takes approximately one to two years to fill one of the ponds. Once the ponds are filled, the solids are excavated by an outside contractor and disposed of in the on-site monofill. The bottom clay liner has been surveyed during the cleanout. The ponds are cleaned out in an alternating manner, approximately every three years, and the material is then transported to the Monofill.

A plant shutdown event at the Rawhide facility is planned to occur during Fall 2018. The existing BAT impoundments will be permanently taken out of service following this shutdown event.

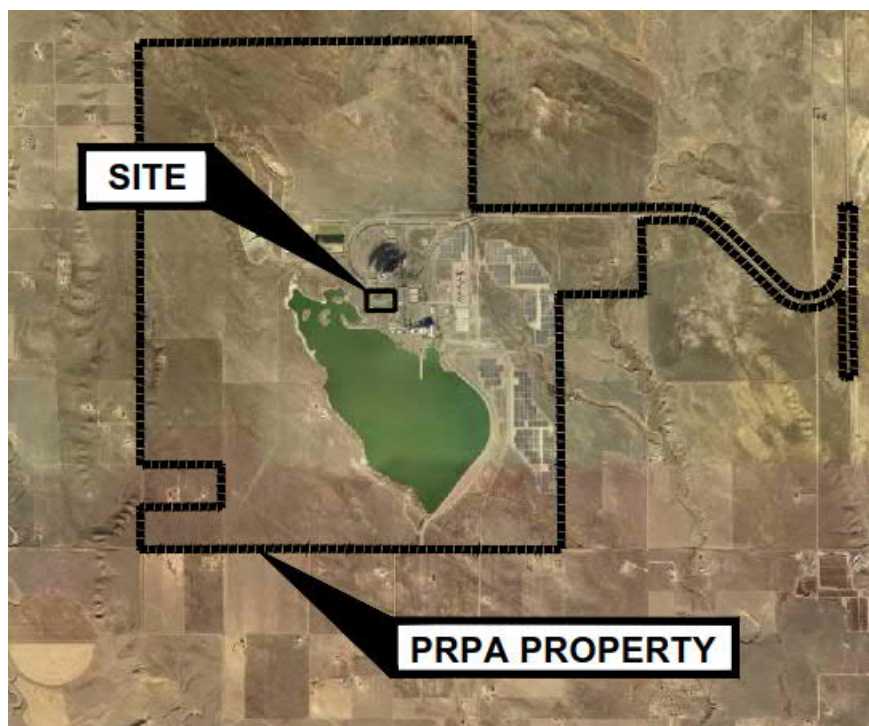


Figure 1: Site Location Map



Figure 2: CCR Unit Site Location

## 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

Black & Veatch Consulting Engineers completed a subsurface investigation of the Rawhide Energy Station within the footprint of the BAT Impoundments prior to their construction, which included two (2) borings, B-41 and B-104.

## 3.0 FOUNDATION CONDITIONS

The foundation conditions are summarized below based on the boring logs and laboratory data from 1979 Black & Veatch Geotechnical Analysis Report.

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### 3.1 SITE SPECIFIC SOIL AND ROCK CONDITIONS

The BAT Impoundments at the Rawhide Energy Station are incised, meaning the overburden soils have been excavated and removed, and the bottom of each of the basins is located within the shale bedrock. No man-made dikes were constructed as a result.

Within the BAT Impoundments footprint (pre-construction), the following subsurface conditions were encountered:

- Silty Clay to Clay: The overburden soils encountered generally consisted of very stiff to hard, dry to moist, Silty Clay (CL-ML) or lean clay (CL) soils. The overburden soils had a thickness of 12.5 feet in boring B-41 and 25 feet in boring B-104. Below these soils, shale bedrock was encountered. It is noted that these soils were entirely removed from within the footprint of the BAT Impoundment units.
- Shale: Olive-green, weathered shale bedrock was encountered from around 5690.8 feet above mean sea level (amsl) in boring B-41 to 5671.4 feet amsl in B-104.
- Groundwater: no water was recorded as encountered during the subsurface investigation within the vicinity of the BAT Impoundments.

### 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 site.

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 BAT Impoundments. Furthermore, the overburden soils were entirely removed during the construction of the BAT Impoundment units.

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 generally not considered to be an issue for the BAT Impoundments due to the fact that no significant structures have been constructed within the BAT impoundments, and no damage has been historically noted to the impoundments during cleaning events.

### 3.3 MAN-MADE UNSTABLE AREAS

There is no evidence of man-made unstable areas, including previous mining or blasting activities.

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The BAT Impoundments at the Rawhide Energy Station are incised, meaning the overburden soils have been excavated and removed, and the bottom of each of the basins is located within the shale bedrock. No man-made dikes were constructed as a result. By inspection, due to the fact that the BAT Impoundments are incised into the bedrock at 4H:1V slopes, the units are not considered to be located in man-made unstable areas.

#### 4.0 CONCLUSIONS

Based upon our review of the available historical data and the results of the supplementary investigations, AECOM has concluded the BAT Impoundments at Rawhide Energy Station are in accordance with §257.64 and that the units meet the requirements of 40 CFR§ 257.64 Unstable Areas.

Pursuant to 40 C.F.R. § 257.64 (d)(1), for an existing surface impoundment, 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

- Black & Veatch Consulting Engineers, Geotechnical Analysis Report, Platte River Power Authority Rawhide Project: July 23, 1979.

## APPENDIX A

# ENGINEER'S CERTIFICATION



**ENGINEER'S CERTIFICATION OF UNSTABLE AREAS DEMONSTRATION  
CCR SURFACE IMPOUNDMENT: RAWHIDE ENERGY STATION  
CCR UNIT: BOTTOM ASH TRANSFER IMPOUNDMENTS**

AECOM ("Consultant") has been retained by Platte River Power Authority to prepare a demonstration of whether the above-referenced existing coal combustion residuals ("CCR") surface impoundment 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 surface impoundment, 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.

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
BAT Impoundments	<i>Meets the requirements of 40 C.F.R. § 257.64(a)</i>

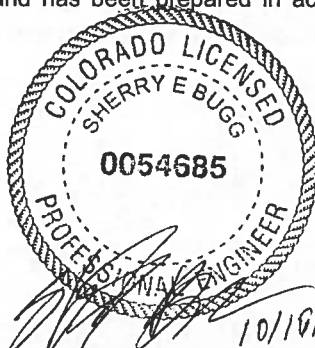
**3.0 LIMITATIONS**

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