January 18, 2018

Colorado Springs Utilities
1521 Hancock Expressway
Colorado Springs, Colorado 80903

Attn.: Brad Pritekel

Re: Coal Combustion Residual (CCR) Landfill Annual (2017) Inspection
Clear Springs Ranch
Fountain, Colorado
Terracon Project No. 23155030

Dear Mr. Pritekel:

Terracon Consultants, Inc. (Terracon) is pleased to present this report of the Coal Combustion Residual (CCR) Landfill Annual (2017) Inspection services provided for the Clear Springs Ranch CCR landfill. Our services were provided in general accordance with Colorado Springs Utilities (UTILITIES) Purchase Order 201714013 received on October 5, 2017.

1.0 PROJECT INFORMATION

1.1 Site Location

ITEM	DESCRIPTION
Location	The CCR Landfill at Clear Springs Ranch in Fountain, Colorado
Existing improvements	An existing and active landfill containing non-volatile fly ash, bottom ash, waste salt / fly ash mixture, spent sandblasting media, flue gas desulfurization waste, sediment from the Martin Drake Power Plant's Storm Water Ponds, and ash derived from the co-combustion of biosolids, woody biomass, or other related solid fuels. The total capacity of the 75-acre landfill is 5 million cubic yards (CY) with about 1.3 million CY of capacity remaining.
Import Activity for 2016 and 2017	Fly Ash, Bottom Ash, and Scrubber by Product from January through October 31, 2017 § Nixon Fly Ash, 32,704 tons § Drake Fly Ash 16,771 tons
Existing topography	The active landfill has a relatively flat top with side slopes of about 3H:1V (Horizontal:Vertical) or flatter.

1.2 Background

The Clear Springs Ranch CCR Landfill is subject to the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals (CCR) from Electric Utilities rule published by the Environmental Protection Agency in the Code of Federal Regulations - 40 CFR Parts 257 and 261, dated April 17, 2015

In accordance with these regulations, UTILITIES must inspect the CCR landfill in accordance with the following requirements:

257.84 *(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

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

(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

The source of materials approved for placement in the CCR landfill include:

- Non-volatile fly ash, bottom ash, waste salt / fly ash mixture, spent sandblasting media, flue gas desulfurization (scrubber) waste, sediment from the Martin Drake Power Plant's Storm Water and Process Water Ponds, and ash derived from the co-combustion of biosolids, woody biomass, or other related solids fuels

We understand that the disposal of these materials at the CCR landfill are currently approved by El Paso County and the Colorado Department of Public Health and Environment (CDPHE).

2.0 SCOPE OF SERVICES

The following sections provide an overview of the work scope performed by Terracon.

2.1 Annual Inspection

Terracon's previous annual inspections of the CCR landfill included a review of available information regarding the status and condition of the CCR landfill and files provided by UTILITIES including results of previous inspections, land surveys, and CCR production and sales. Although

not specifically required in Section 257.84b, previous geotechnical studies of the CCR landfill, performed by others, included subsurface explorations, laboratory testing, and slope stability analyses.

For our 2017 annual inspection, we performed our services in accordance with Section 257.84b and included the following activities:

- Visual observations of the CCR unit by a professional geotechnical engineer to identify signs of distress or malfunction of the CCR unit
- Observations of existing or potential structural weakness associated with slope stability or erosion of the CCR unit, in addition to existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit
- Noted changes in geometry of the CCR structure since the 2016 annual inspection
- Estimate the approximate volume of the CCR at the time of the inspection based on survey information provided by UTILITIES, delivery quantities, and sales

3.0 CCR LANDFILL INSPECTION RESULTS

The results of our 2017 annual inspection are discussed below. Selected photographs taken during the inspection are included on the attached photograph log. Our services included a desktop review of the 2017 Volumetric Survey provided by UTILITIES, as well as site observations.

3.1 2017 Annual Observation of the CCR Landfill Structure Geometry

Historical Information

The CCR landfill has been active since the late 1970's and is currently being used for disposal of relatively dry ash. We were provided with the design drawing, "East Expansion of Ash Landfill", dated March 29, 2008 that indicates the intended final geometry of the landfill (height and slope gradients). The acceptable slope gradients of 3H:1V are also based on the stability analyses presented in the November 17, 2009, Ash Landfill Slope Stability Investigation for the Clear Spring Ranch Facility, prepared by Kleinfelder.

Based on the Ash Landfill 2017 Volumetric Survey, dated December 22, 2017, the landfill varies from about 30 feet above the surrounding ground surface within the Bottom Ash area to the west and about 50 to 70 feet high at the eastern terminus. The lowest elevation at the toe of the landfill slope appears to be at the southeast corner at El. 5444. The highest elevation at of the landfill also appears to be at the southeast corner of the landfill at El. 5520. The side slopes are generally at a gradient of about 3H:1V.

Site Observations

Terracon visited the site on October 11, 2017 for our annual observations of the CCR landfill surface features. The purpose of our visit included observations for erosion control measures for

slopes and the perimeter road, isolated or surficial slope instability, proper soil cap thicknesses and competency, as well as understanding landfill earthwork and grading activities.

Activity at the landfill during our observations consisted of top-down cutting of slopes to mine Bottom Ash along the western terminus of the land fill, as well as on top of the land fill within the western third. Actively mined slopes appeared stable and consistent with the 3H:1V gradients observed along typical slopes of the landfill. New fly ash was being placed and compacted near the southeast portion of the landfill. The material was placed by pushing the fly ash up the slope in lifts of about 4 inches, then tracked into place using a CAT D8R bulldozer.

The current top of the landfill was relatively flat and sloped gently down gradient to the west (300 H:1V). The surface reportedly consisted of an approximate 1-foot thick temporary soil cap. The landfill has the capacity to increase approximately 20 feet in height. The ground surface was covered with a moderate amount of native vegetation.

The side slopes of the landfill also had an approximate 1-foot thick soil cap. Most of the perimeter sloped surfaces were sparse to moderately vegetated with dried-out, 6-inch to 3-foot high vegetation. We generally observed a 1- to 2-foot high soil berm at the toe of the landfill slopes and a 1- to 4-foot high soil berm at the crest of the perimeter slope.

During our initial site visit, we observed a slight to moderate amount of erosion rills and gullies along all slopes. Most erosion features were less than about 6 inches deep. However, several erosion features were up to about 10 inches below the south facing slope surface at the southeast corner of the landfill.

The perimeter earthen road at the toe of the landfill slopes generally had loose soil berms on the upslope and downslope edges of the roadway. There were three areas of discrepancies during our observations that include the following:

- The upslope roadway berm had one, approximate 1-foot wide erosion channel along the south face near the southeast corner of the landfill (See Photos #11).
- The east facing slope at the southeast corner of the landfill (see Photos #7 to #10) has rills and erosion features up to about 10 inches deep.
- Burrowing animal damage to top berm (see Photos #39 and #40). This could develop into a breach if not repaired

3.2 Approximate Volume of the CCR

Based on the provided Volumetric Surveys, the provided annual Net Volumes of the Ash Landfill are:

- 2013: 3,535,900 cubic yards
- 2014: 3,539,100 cubic yards
- 2015: 3,563,000 cubic yards
- 2016: 3,578,600 cubic yards
- 2017: 3,679,600 cubic yards

3.3 Observations of Existing or Potential Structural Weakness

Evidence of apparent existing and potential structural weaknesses was not observed.

3.4 Slope Stability Analysis

Slope stability analyses was beyond the scope of our services. Kleinfelder performed slope stability analyses as part of a November 17, 2009 study. The lowest presented slope stability analyses was 2.6. The January 29, 2009 State of Colorado letter indicated the slope stability analysis was acceptable. Furthermore, the State of Colorado letter indicated "in its present condition as well as proposed final configuration, the ash landfill is at a low risk to be impacted by slope stability issues." No apparent signs of slope instability were observed during our site visit.

3.5 Recommendations

We recommended to UTILITIES representatives that slopes with erosion features (gullies) greater than about 3 to 6 inches deep be filled and re-graded. We understand the grading activities are typically accomplished by tracking a bulldozer up and down the slopes. In addition, we recommended the soil berms adjacent to roadway and at the crest of the slope be repaired as necessary for continuity.

During our subsequent site visit on December 11, 2017, the three areas described in the Observations Section of this report had been repaired and were noted in Photos #59 through #63. The erosion channel within the upslope roadway berm (Photo #11) was filled in to re-establish a continuous berm. The erosion gullies observed within the slopes at the southeast corner of the landfill, as well as other areas of the landfill had also been regraded, covering the erosion features (See Photos #59 through #61). The burrowing animal damage to top berm was filled in to also re-establish a continuous berm (see Photos #62 and #63).

It is our opinion that the mitigation described within the previous paragraph adequately re-established proper soil cover on the slopes within these areas.

4.0 GENERAL COMMENTS

The observations and recommendations presented in this report are based upon the data and information discussed in this report. This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety and excavation support are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

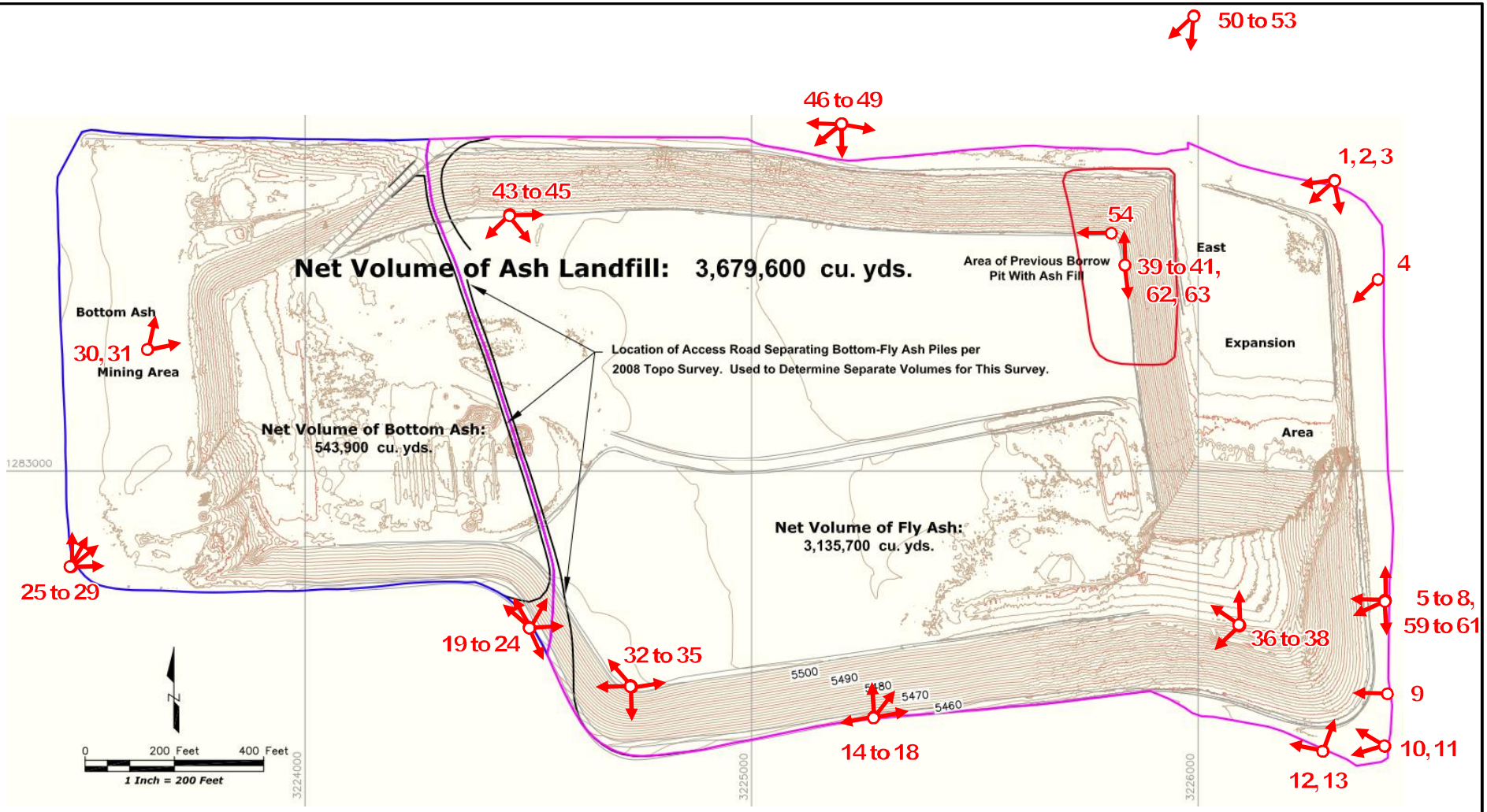
Sincerely,
Terracon Consultants, Inc.

Robert M. Hernandez, P.E.
Geotechnical Services Manager

COLORADO REGISTERED
RYAN W. FEIST
37787
1/18/18
PROFESSIONAL ENGINEER

Ryan W. Feist, P.E.
Senior Associate

Attachments: Photograph Location Diagram
Photograph Log



# INDICATES PHOTO NUMBER AND ORIENTATION, PHOTOS DATED OCTOBER 11, 2017

54 to 58

BASE DRAWING OBTAINED FROM THE CSU 2014 SURVEY DRAWING, DATED DECEMBER 21, 2017

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	RWF
Drawn by:	RWF
Checked by:	RWF
Approved by:	RWF

Project No.	23155030
Scale:	AS SHOWN
File Name:	A-1
Date:	12/21/17

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PHOTOGRAPH LOCATION DIAGRAM

CCR LANDFILL ANNUAL INSPECTION
CLEAR SPRINGS RANCH
FOUNTAIN, COLORADO

Exhibit

A-1

PHOTO LOG

Photo #1 Facing West

Photo #2 Facing South

Photo #3 Facing Southwest

Photo #4 Facing Southwest

Photo #5 Facing North

Photo #6 Facing South

PHOTO LOG

Photo #7 Facing Southwest

Photo #8 Facing West

Photo #9 Facing West

Photo #10 Facing Northwest

Photo #11 Facing Southwest

Photo #12 Facing North by Northwest

PHOTO LOG

Photo #13 Facing West

Photo #14 Facing North

Photo #15 Facing North Close-Up

Photo #16 Facing Northeast

Photo #17 Facing West

Photo #18 Facing East

PHOTO LOG

Photo #19 Facing North

Photo #20 Facing Northwest

Photo #21 Facing West

Photo #22 Facing Southeast

Photo #23 Facing East by Southeast

Photo #24 Facing East

PHOTO LOG

Photo #25 Facing North

Photo #26 Facing Northwest

Photo #27 Facing North by Northeast

Photo #28 Facing Northeast

Photo #29 Facing East

Photo #30 Facing Northeast

PHOTO LOG

Photo #31 Facing Southeast

Photo #32 Facing East

Photo #33 Facing South

Photo #34 Facing West

Photo #35 Facing Northwest

Photo #36 Facing North

PHOTO LOG

Photo #37 Facing Northwest

Photo #38 Facing Southwest

Photo #39 Facing North Burrowing Hole

Photo #40 Facing North Burrowing Hole Close-Up

Photo #41 Facing Southeast

Photo #42 Facing West

PHOTO LOG

Photo #43 Facing East

Photo #44 Facing Southeast

Photo #45 Facing Southwest

Photo #46 Facing East

Photo #47 Facing South

Photo #48 Facing Southwest

PHOTO LOG

Photo #49 Facing West

Photo #50 Facing South

Photo #51 Facing Southwest

Photo #52 Facing Southwest

Photo #53 Facing Southwest

Photo #54 Facing North

PHOTO LOG

Photo #55 Facing North

Photo #56 Facing North

Photo #57 Facing Northwest

Photo #58 Facing Northwest

PHOTO LOG

Photo #59 Facing Northwest

Photo #60 Facing West

Photo #61 Facing Southwest

Photo #62 Facing South

Photo #63 Facing South