

2017 Annual Inspection Report

for Compliance with the Coal
Combustion Residuals Rule
(40 CFR Part 257)

Comanche Station

*2005 Lime Road
Pueblo, Colorado 81006*

January 18, 2018



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Certification

Comanche Station CCR Unit 2017 Annual Inspection for Compliance with the Federal Coal Combustion Residuals Rule

I hereby certify that the Coal Combustion Residuals (CCR) unit (i.e. the landfill) at Comanche Station meets the inspection and operation standards specified in 40 CFR Part 257.84(b) of the Federal CCR Rule. The Comanche Station is owned by the Public Service Company of Colorado (PSCo), an Xcel Energy Company.

I am duly licensed Professional Engineer under the laws of the State of Colorado.



Brian Brown, PE

Colorado PE License 0041644

License renewal date October 31, 2019

1 Introduction

On April 17, 2015 the U.S. Environmental Protection Agency (EPA) published regulations under Subtitle D of the Resources Conservation and Control Act (RCRA) meant to control the safe disposal of coal combustion residuals (CCR) generated by coal fired electric utilities. The rule defines a set of requirements for the disposal and handling of CCR within CCR units (defined as either landfills or surface impoundments). As specified in 40 CFR 257.84(b), *“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.”* Comanche Station has one (1) CCR landfill subject to the inspection requirement.

This is the third annual inspection report for the existing Comanche CCR landfill. This report must be completed and placed into the facility operating record no later than January 18, 2018.

The requirements for the annual inspection include:

- A review of available information regarding the status and condition of the CCR unit - §257.84 (B)(1)(i),
- A visual inspection of the CCR unit to identify signs of distress or malfunction - §257.84 (B)(1)(ii),
- An inspection report that includes the following:
 - Changes in geometry since the last inspection - §257.84 (B)(2)(i)
 - Approximate volume of CCR in unit at time of inspection - §257.84 (B)(2)(ii)
 - Appearance of actual or potential structural weakness of the CCR unit - §257.84 (B)(2)(iii)
 - Any other changes which may have affected the stability or operation of the CCR unit since the last inspection - §257.84 (B)(2)(iv)

2 Site Inspection

In accordance with §257.84(b)(ii) a site inspection of the Comanche CCR landfill was conducted by an independent Professional Engineer on November 2, 2017. This inspection was performed in advance of the CCR submittal deadline to ensure that the inspection was completed prior to snow covering the ground. The inspection was conducted by Doug DeCesare, a Colorado Professional Engineer of HDR Engineering Inc. (HDR).

The weather during the site visit was mostly sunny with temperatures ranging from 50 to 55 degrees Fahrenheit. The site was free of snow cover.

3 Review of Available Information

Numerous documents pertaining to the site operation and structural integrity were reviewed including:

1. Engineering Design and Operation Plan (EDOP) (EDOP dated January 13, 2015, prepared by Tetra Tech). This included an Existing Conditions Plan, Proposed Base Grades, Proposed Final Grades, and intermediate final Operational Grades for each cell. The Existing Conditions Plan was surveyed in August, 2013 by Edward-James Surveying, Inc. and included on a Tetra Tech unsigned drawing dated August 14, 2014. Xcel Energy Environmental Analyst reported no changes to this document in 2017 and Xcel continues to operate following this document. Document not reviewed again since the document is unchanged. A revised EDOP has been submitted to the CDPHE and is expected to be approved in early 2018.
2. Weekly CCR Landfill Inspection Forms (per Section 257.84(a)).

Review of the Weekly Inspection Forms did not contain any indications of operational, safety, or structural concerns regarding the CCR landfill. Colorado Department of Public Health and Environment (CDPHE) did not perform a site inspection in 2017.

4 Visual Inspection

Doug DeCesare and Rob Norwillo of HDR completed a site inspection by walking or driving the entire landfill toe of slope, walking areas of the landfill side slopes, driving the landfill top access road, and driving and walking the top of the active landfill cell. As the CCR Rule pertains only to the CCR landfill itself, this report does not address existing topsoil stockpiles and native earth excavations outside the landfill cell.

The site inspection included an evaluation of the following landfill features:

1. Access roads; and,
2. Active CCR fill area.

The following are the findings of the site inspection:

- The landfill side slopes range from approximately 40 to 60 feet in vertical height from toe to plateau and are a constant grade of approximately 4H:1V without benching.
 - The east side slopes, with exception of the newly developed top lift, are covered with topsoil and covered with a dense stand of vegetation. A three foot to four foot top lift had been placed and was stepped back from the land fill side slope but was not soil covered. Upon completion of this lift, soil cover and vegetation will be required.

- The east side slope had a uniform grade and showed no signs of operational or functional concerns. The perimeter drainage channel area at the toe of the slope had disturbance as part of the current ongoing construction of Cell 2 East that includes improvements to the drainage channel. This area once completely graded will likely be seeded.
- The southeast corner of the landfill does not have a uniform grade. The perimeter access road cuts into the southeast landfill side slope and forms a very steep grade near the toe of slope. This steep grade area showed no signs of sloughing or movement, but this area should be closely monitored as it is also susceptible to rill erosion. This slope is shown on the Existing Conditions Plan and Proposed Final Grades Plan in the EDOP. As part of the Cell 2 East construction Xcel Energy included plans to reconstruct this corner with a rip rap downslope structure in early 2018. As of this inspection, this plan remains unchanged and the installation of the downslope structure had not begun.
- The south side slopes, with exception of the newly developed top lift, are covered with topsoil and a dense stand of vegetation is established. A three foot to four foot top lift had been placed and was stepped back from the land fill side slope but was not soil covered. The side slope has a uniform grade and showed no signs of operational or functional concerns.
- The west side slopes, with the exception of the newly developed top lift, are covered with topsoil and a dense stand of vegetation is established. A three foot to four foot top lift had been placed and was stepped back from the land fill side slope but was not soil covered. The side slope has a uniform grade and showed no signs of operational or functional concerns.
- Along the lower fourth of the west side slopes, the vegetation has been disturbed due to the current construction of Cell 2. This area is currently being graded to facilitate construction of the Cell 2 tie in area and is being used as an area to distribute and grade some excess soil. Erosive properties of the area did not appear to be a concern.
- The north side slope had a uniform grade with topsoil and vegetation on the lower half. The upper half of the slope is an active fill area where no topsoil has been placed with limited signs of rill erosion or slope instability. This area will require final grading with topsoil cover and vegetation once permit grades are achieved. Per the EDOP, this material is a Class C ash and does not require daily or intermediate soil cover, assuming the material has adequate moisture for self-cementing. The side slope showed no signs of operational or functional concerns.
- The top of the landfill unit is graded to a flat plateau and has exposed ash, which is EDOP compliant as long as wind erosion is not an issue. No wind erosion of the CCR was observed during the inspection; which was conducted on a day of slight winds from the west.
- In general, landfill areas recently covered with soil and areas with little vegetation established, showed signs of rill erosion. This is expected due to the slope grades and

lack of vegetation. Rill erosion in these areas posed no apparent operational or structural concerns. These landfill areas are anticipated to stabilize as vegetation is established.

- The contact water pond, immediately north of active Cell 1, appears to be functioning as designed. However, at the time of the inspection, the pond had no standing water due to the area's normal scarce precipitation. The pond showed no signs of stability, functional or operational issues.
- The access road to the top of the landfill showed no signs of operational or structural concern. The sides were vegetated and had minimal rill erosion.
- The perimeter access road at the toe of slope showed no signs of operational or structural concern.

5 Changes in Geometry

The Federal CCR Rules require that site geometry changes be identified since the last inspection. The site geometry changed since the initial inspection due to continued CCR disposal and soil cover placement. Normal operations have raised the landfill's top plateau height by approximately 30 feet over the southern two-thirds of the fill areas. Ash placement had also proceeded in the northern third of the Cell 1 fill area with a maximum depth of 53 feet of fill. The landfill sides slopes continue to be maintained at approximately a 4H:1V slope.

6 Approximate CCR Volume

As reported by Xcel Energy, prior to 1987 the CCR for the Comanche Station was disposed of off-site. From 1987 to 2007, the CCR was predominately utilized off-site for beneficial use. Since 2007, the CCR has been disposed of within the on-site CCR landfill. From 2007 through November of 2016, Xcel estimates the total combined volume of CCR on-site to be 2,823,900 cubic yards (CY). In addition, fly ash and bottom ash disposed in the CCR landfill from December 2016 through October 2017 is estimated to be 324,760 CY. The total CCR volume within the landfill as of the end of October 2017 is estimated to be 3,148,700 CY.

7 Appearance of Structural Weakness

Based on the site inspection and review of available materials, excepting the southeast toe of slope discussed above in Section 4, the site showed no signs of operational and structural concern. Xcel intends to reconstruct the southeast corner in early 2018 with a rip rap downslope structure to minimize slope instability potential and reduce the occurrence of rill erosion in this steeply sloped area.

8 Changes Affecting Stability or Operation

There were no observed or reported operation changes that are anticipated to impact the site's near-term or long-term stability. Areas of potential long-term stability concern noted in the prior

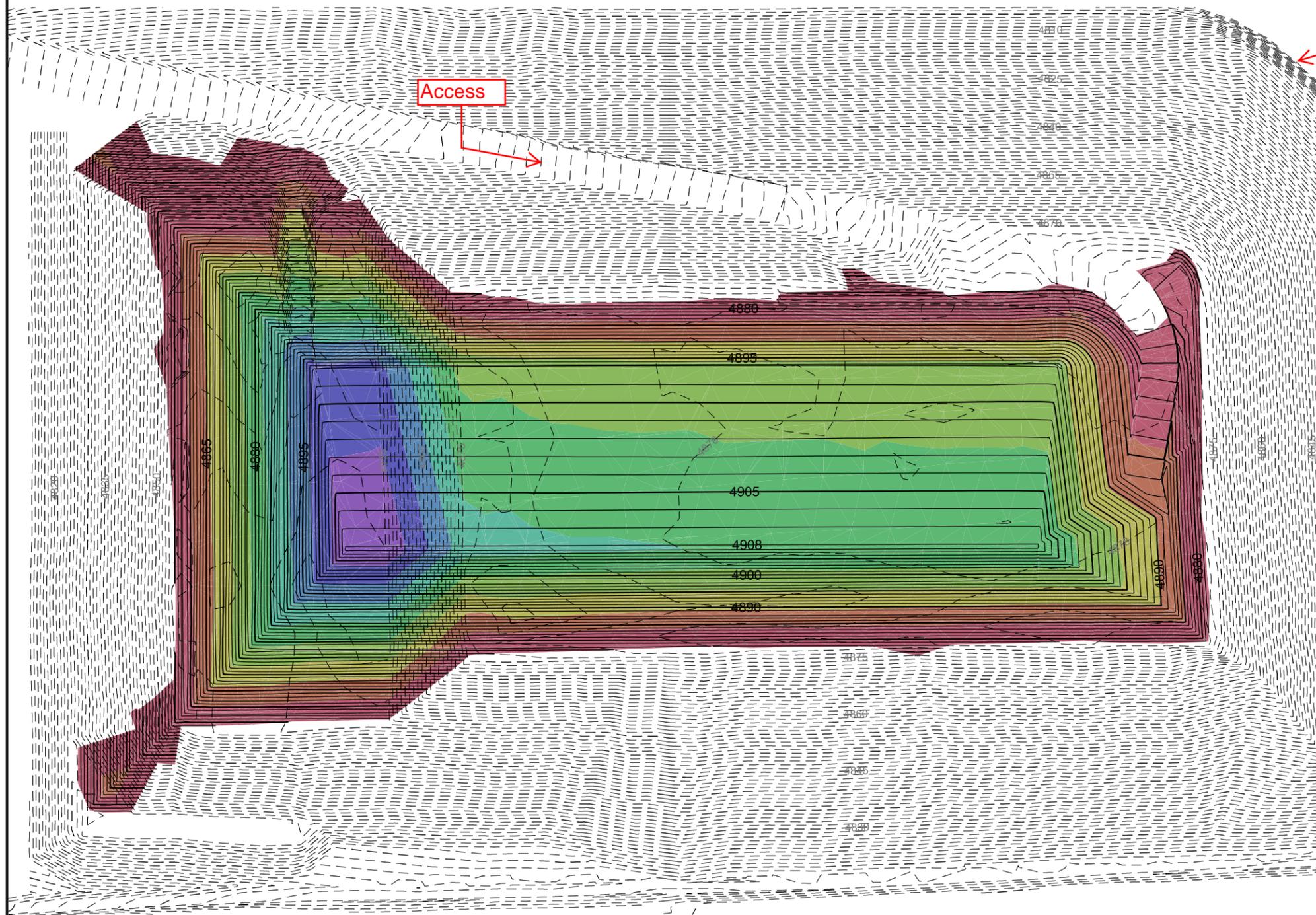
inspection, areas of severe rill or gully erosion, were remedied. Excepting the southeast corner of the landfill, which is scheduled to be reconstructed in early 2018, there are no new stability concerns observed or reported.

Appendix A – Landfill Site Map

COMANCHE ASH LANDFILL

APPROXIMATE REMAINING VOLUME

AS OF SURVEY DATE: 8/15/2017



SE embankment corner with cut toe.

Access

FIELD SURVEY DATE FOR EXISTING TOPOGRAPHY
AUGUST 15, 2017

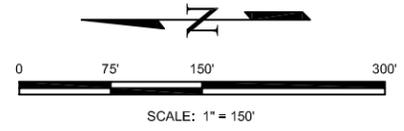
SURVEYOR
DIEGO MINNICH

BASE SURFACE
EXISTING CELL 1 AS OF 08-15-2017

COMPARISON SURFACE
BOUNDED CELL 1 ASH (2' BELOW FINISHED GRADES SHOWN ON SHEET D17803-EPD0L00002 SH.5 DATED 8-14-14)

FILL
453,050 CY

Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-0.5	6.0	
2	6.0	12.0	
3	12.0	18.0	
4	18.0	24.0	
5	24.0	30.0	
6	30.0	36.0	
7	36.0	42.0	
8	42.0	48.0	
9	48.0	53.0	



Noets added in red by HDR Engineering for CCR Annual Inspection Report, January 2018.

NO.	REVISIONS DESCRIPTION	DATE

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COMANCHE ASH LANDFILL
APPROXIMATE REMAINING VOLUME

AS OF SURVEY DATE: 8/15/2017

DRAWN BY	ERF
CHECKED BY	ERF
H-SCALE	1" = 150'
JOB NO.	1313-00
DATE CREATED	09/05/17
DATE ISSUED	09/14/17
SHEET NO.	1 OF 1