2019 Coal Combustion Residuals Annual Inspection

Hunter Power Plant

Hunter CCR Landfill



Prepared for
PacifiCorp Energy
North Temple Office
1407 West North Temple
Salt Lake City, Utah 84116

FINAL December 18, 2019



AECOM

AECOM 756 East Winchester, Suite 400 Salt Lake City, Utah 84107

Contents

1	Find	ndings1				
2	Des	cripti	on and History of CCR Landfill	3		
	2.1	Gen	eral Overview	3		
	2.2	Loca	ation	3		
	2.3	Hun	ter Landfill Description	3		
	2.4	Perf	ormance History	3		
	2.5	Cons	struction History	4		
	2.6	Revi	iew of Operating Record Files	4		
	2.6.	.1	Design and Construction Information	4		
	2.6.	.2	Previous Periodic Structural Analyses	4		
	2.6.	.3	Results of Inspection by a Qualified Person	4		
	2.6.	4	Results of Previous Annual Inspections	4		
3	Field	d Insp	pection of Hunter Landfill	5		
	3.1	Gen	eral	5		
	3.2	Hun	ter Landfill Geometry	5		
	3.3	Instr	rumentation	5		
	3.4	Volu	ıme of CCR	7		
	3.5	Obse	erved or Potential Structural Weaknesses	7		
	3.6	Obse	erved Changes	7		
4	Limi	itatio	ns and Consultant Qualifications	8		
	4.1	Limi	tations	8		
	4.2	Prof	essional Engineer Qualifications	8		
5	Refe	erenc	res	9		

Appendices

Appendix A Photograph Log

Appendix B Annual Inspection Report Form

1 Findings

This annual inspection and report are being completed for the purpose of providing due diligence by PacifiCorp to ensure the safety of its coal combustion residual (CCR) facilities. The inspection was performed according to the requirements for annual inspections under Section 257.84 (for CCR landfills) of 40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, dated April 17, 2015 [1].

AECOM observed no signs, such as slumps, tension cracks or other movements that would indicate imminent failure of the embankment for the Hunter Power Plant CCR Landfill. Figure 1-1 on the following page is an aerial photograph of the landfill.

The CCR requirement for signage is not applicable to landfills. They are only required for surface water impoundments. The Hunter CCR Landfill does not accept hazardous wastes.

Maintenance items from the 2019 inspection include:

1. Obstruction of a culvert in the perimeter drainage ditches at the north access road. The obstructions in the culvert are the result of eroded sediment. Refer to photo 27, Appendix A.

Observations from the 2019 inspection include:

- Observation of erosion rills and shallow gullies at the north access road. Refer to photo 29, Appendix
 A.
- 2. Additional segments of the exterior slopes have partially been covered with straw. Vegetation continues to improve on straw-covered slopes observed in previous inspections. Refer to photos 8, 9, 14, and 15, Appendix A.
- 3. Energy dissipation structure at downstream end of retention pond conduit has standing water despite dry conditions. Water did not reach the slide gate at the upstream end of conduit. Refer to photos 22-26, Appendix A.

All of the photos in the Photograph Log (Appendix A) show landfill conditions as basis for comparison when performing future inspections.

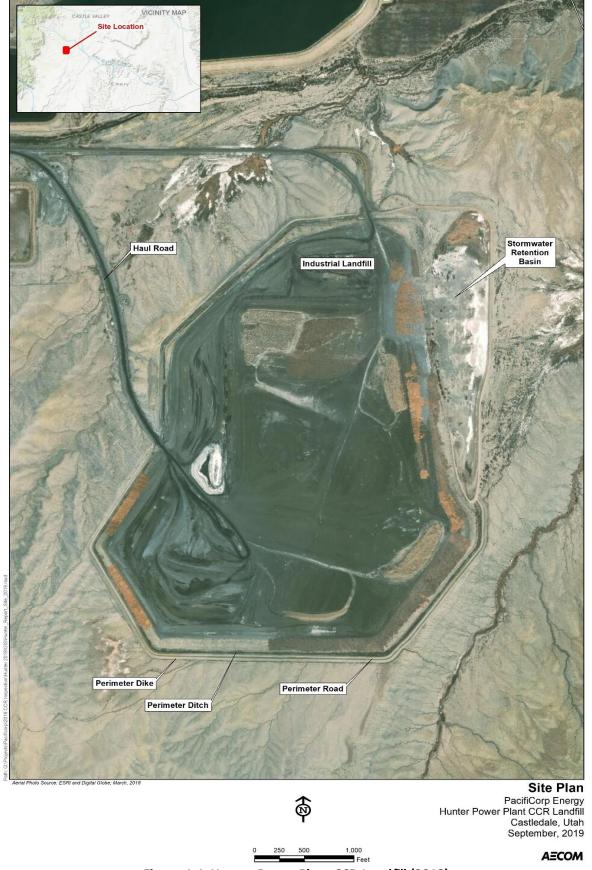


Figure 1-1. Hunter Power Plant CCR Landfill (2018)

2 Description and History of CCR Landfill

2.1 General Overview

The Hunter Power Plant is operated and majority-owned by PacifiCorp. The Hunter CCR Landfill is situated about one mile southeast of the plant.

Flue-gas desulfurization (FGD) scrubber waste, fly ash, and bottom ash produced by the plant are disposed of in the CCR Landfill [2]. These waste materials are delivered to the landfill by truck by way of a haul road entering the CCR Landfill from the west. In addition, a small area at the north end of the CCR Landfill has been designated and permitted as a Class III bindustrial waste landfill [3], [4].

2.2 Location

The Hunter Power Plant is located in Emery County, Utah, approximately 2.5 miles south of Castle Dale, Utah. Access to the plant is provided by Utah Highway 10 (UT-10). See the vicinity map on Figure 1-1 for the site location.

2.3 Hunter Landfill Description

This inspection specifically addresses the CCR waste storage facility identified as the Hunter CCR Landfill (also known as Ash Landfill), which includes the Industrial Waste Landfill. An aerial map showing the location of the CCR Landfill and the location of the Industrial Waste Landfill within the perimeter of the CCR Landfill is shown in Figure 1-1.

Runoff from the Hunter CCR Landfill is directed to an unlined, zero-discharge retention basin located east of the landfill (see Figure 1-1). Water is held in the retention basin and evaporated. Although there are outlets to release water from the basin, they are not used. There is no evidence of water discharging from the basin.

A summary of pertinent data for the Hunter CCR Landfill at the Hunter Power Plant is provided in Table 2-1.

 Facility

 CCR Landfill

 Approximate Current Area (acres)
 290 ¹

 Length (feet)
 4,800 [5]

 Width (feet)
 3,600 [5]

 Maximum Elevation at Completion (feet amsl)
 5,810 [6]

 Slopes (H:V)
 4:1 [3]

 Status
 Active

Table 2-1. Hunter Power Plant Landfill Pertinent Data

Notes: H = Horizontal; V = Vertical

2.4 Performance History

The current 290-acre landfill is used as the sole depository of CCR material from the Hunter Power Plant. There have been no recorded incidences of embankment failure or other discharges of CCR from the Hunter Landfill.

^{1.} Estimated by AECOM from 2018 aerial photographs.

2.5 Construction History

Bottom ash, fly ash, and FGD waste is hauled by truck to the landfill. CCR in the form of fly ash and bottom ash is spread and compacted to approximately 87 pounds per cubic foot (pcf) [7] with only vehicular traffic. FGD waste is dumped throughout the landfill, but tends to be concentrated at the interior of the landfill.

2.6 Review of Operating Record Files

The list of operating records to be reviewed during the annual inspection as contained in 40 CFR §257, Disposal of Coal Combustion Residuals for Electric Utilities is "CCR unit design and construction information required by §§257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under §§257.73(d) and 257.74(d), the results of inspections by a qualified person, and results of previous annual inspections" [1]. The following subsections describe the review of operating record files.

2.6.1 Design and Construction Information

AECOM reviewed the documents listed in Section 5. However, there are no design or construction drawings in the record files for the current geometry of the landfill. Construction of a vertical expansion of the CCR Landfill had not begun at the time of this report; however, design drawings were produced and are kept on file at the plant [6].

2.6.2 Previous Periodic Structural Analyses

The Cornforth Phase 1 geotechnical study [5] was completed in 2009 and did not recommend a formal risk assessment of the landfill structure.

In 2015, URS completed a geotechnical study to evaluate the feasibility of expanding the landfill vertically [6]. The study includes geotechnical analyses assessing the stability of the landfill under the additional loading. This study concluded that it is feasible and that the landfill is stable for this expansion, provided that monitoring of internal pore pressures is performed. It also included a recommendation to relieve pore pressure in the landfill using horizontal drains.

2.6.3 Results of Inspection by a Qualified Person

The Hunter CCR Landfill is subject to periodic inspections by the Hunter Power Plant staff. AECOM reviewed inspection reports and did not find anything that would affect the safety of the landfill. These inspections are documented and retained by PacifiCorp. In the opinion of this report's author, the interim inspections by the plant staff are adequate and appropriate for this CCR unit.

2.6.4 Results of Previous Annual Inspections

The first annual inspection under CCR rules [1] for the Hunter CCR Landfill was conducted in September 2015 [8]. PacifiCorp has completed other independent inspections by third parties [9], [5]. None of the observations from this or previous inspections indicated imminent safety concerns.

This report and other pertinent reports and data are accessible at the following website:

http://www.berkshirehathawayenergyco.com/ccr/ppw.html

Section 5 of this report is a list of references for the Hunter Landfill.

3 Field Inspection of Hunter Landfill

A field inspection was conducted on September 17, 2019, by AECOM staff, Bryan Franke, P.E., and Michael Smith. Mr. Franke participated previously in the CCR impoundment inspections in 2014 for Hunter CCR Landfill [9], and subsequent periodic annual inspections [10], [11] under the CCR rule.

A photo log documenting features and their condition at the time of the inspection is presented in Appendix A. These photos are referenced in this report.

The completed Annual Inspection Report Form is presented in Appendix B. This checklist should be considered an integral part of this report and remain attached whenever the report is forwarded or otherwise reproduced.

3.1 General

The field inspection was performed by the AECOM inspectors by driving the perimeter road and the crest, stopping at approximately ¼-mile intervals or when observations warranted stopping. Intermittently, photos of the outer face of the embankment provide a baseline for future inspections (Appendix A).

Features and conditions were documented on the Annual Inspection Report form (Appendix B) and were photographed. The approximate locations of the photos are detailed in the inspection photograph log overview map located at the beginning of the Photograph Log, Appendix A. In addition to documenting current features, the photo log of existing conditions is intended on aiding future inspections.

3.2 Hunter Landfill Geometry

Figure 3-1 shows a cross section of the embankment slope on the south face of the landfill. This section is found in the Industrial Landfill Renewal Application, June 27, 2006, Plan Sheet 3 [3] and is typical of the other landfill faces. The slopes are a maximum of 4 horizontal to 1 vertical.

The landfill has both a perimeter road and a perimeter drainage ditch at the toe of the landfill slope. On the south side of the landfill, there is a drainage berm and diversion ditch outside the perimeter road to prevent off-site runoff from discharging to the road or the perimeter ditch.

The plant received a permit to dispose of and store industrial waste in two designated portions of the CCR Landfill [3], [4], [12]. The primary location was in the north-central portion of the embankment with an area of 6.2 acres [13]. The secondary location, where the industrial waste is disposed of at present, is located near the north boundary of the CCR embankment with an area of 9.8 acres.

3.3 Instrumentation

There is currently no permanent instrumentation within the landfill itself. Landfill instrumentation is not required by the CCR rule.

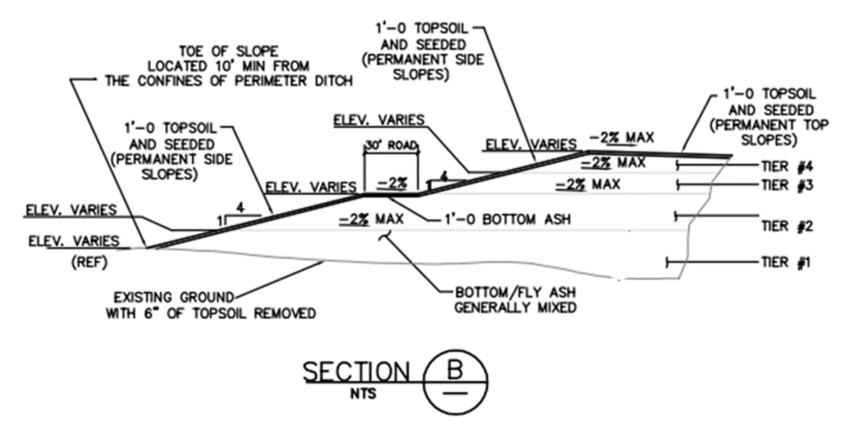


Figure 3-1. Section of South Face of Hunter Landfill [3]

3.4 Volume of CCR

AECOM estimated the current volume of CCR stored in the landfill in 2019 at approximately 15.8 million cubic yards. This was based on the estimate of 12.6 million cubic yards [6] in 2014 plus 1.2 million additional cubic yards reported as being added in 2015 and 2016¹, 0.8 million cubic yards added in 2016 and 2017, 0.9 million cubic yards added in 2017 and 2018, and 0.3 million cubic yards added in 2019.

3.5 Observed or Potential Structural Weaknesses

There were no appearances of actual or potential structural weakness or existing conditions that are disrupting, or have the potential to disrupt the operation and safety of the CCR unit.

3.6 Observed Changes

There were no observable changes in the structure of the CCR Landfill's embankments. Locations were chosen along the embankments to document this year compared to 2018. These locations are marked on the overview map in Appendix A and should be monitored in any further inspection for change.

Following are 2019 observations:

- 1. Obstruction of culvert in the perimeter drainage ditch at the north access road. The obstructions in culverts are the result of eroded sediment. Refer to photo 27 Appendix A. Other obstructions were observed in the 2018 inspection report and all have been cleared.
- 2. Observation of erosion rills and shallow gullies at the north access road. Refer to photo 29, Appendix A. Operations personnel stated that these rills and gullies developed from snow melt this past spring. These do not represent a threat to safety or the integrity of the slopes. The eroded material has been retained at the toe of the embankment and runoff collection ditch and there is no potential for it to move off site.
- 3. Additional segments of the exterior slopes have partially been covered with straw. These segments include the south and west exterior slopes, south of the haul road, and the east exterior slopes. Vegetation continues to improve on straw-covered slopes observed in previous inspections. Refer to photos 8, 9, 14, and 15, Appendix A.
- 4. Energy dissipation structure at downstream end of retention pond outlet conduit has standing water despite dry conditions. No water was observed near the slide gate at the upstream end of conduit. The inspection team could not identify the source of the water. Refer to photos 22-26, Appendix A.

¹ Aerographics volume computation from difference in LIDAR between 2014 and 2015.

4 Limitations and Consultant Qualifications

4.1 Limitations

This report presents observations, and conclusions drawn from a review of pertinent documents referenced in Section 5, and a field inspection of the Hunter CCR Landfill. The field inspection was limited to the interior of the perimeter road. The purpose of the review and inspection has been to assess the safety or adequacy of the facilities against catastrophic failure of the major constructed elements during normal operations or unusual or extreme events based on visual inspection and available information. A secondary purpose is to identify any potential deficiencies related to the CCR rules [1].

The conclusions and professional opinions presented herein were developed by the independent consultant and are in accordance with generally accepted engineering principles and practices at the time and location the services were provided. AECOM makes no other warranty, either expressed or implied.

4.2 Professional Engineer Qualifications

The professional engineer for this inspection is Bryan Franke. He is licensed in the State of Utah (9819797) as a geotechnical engineer. He has over 6 years' experience in geotechnical and mining engineering and has performed inspections and safety evaluations on dams, slopes, and other waste depositories.

5 References

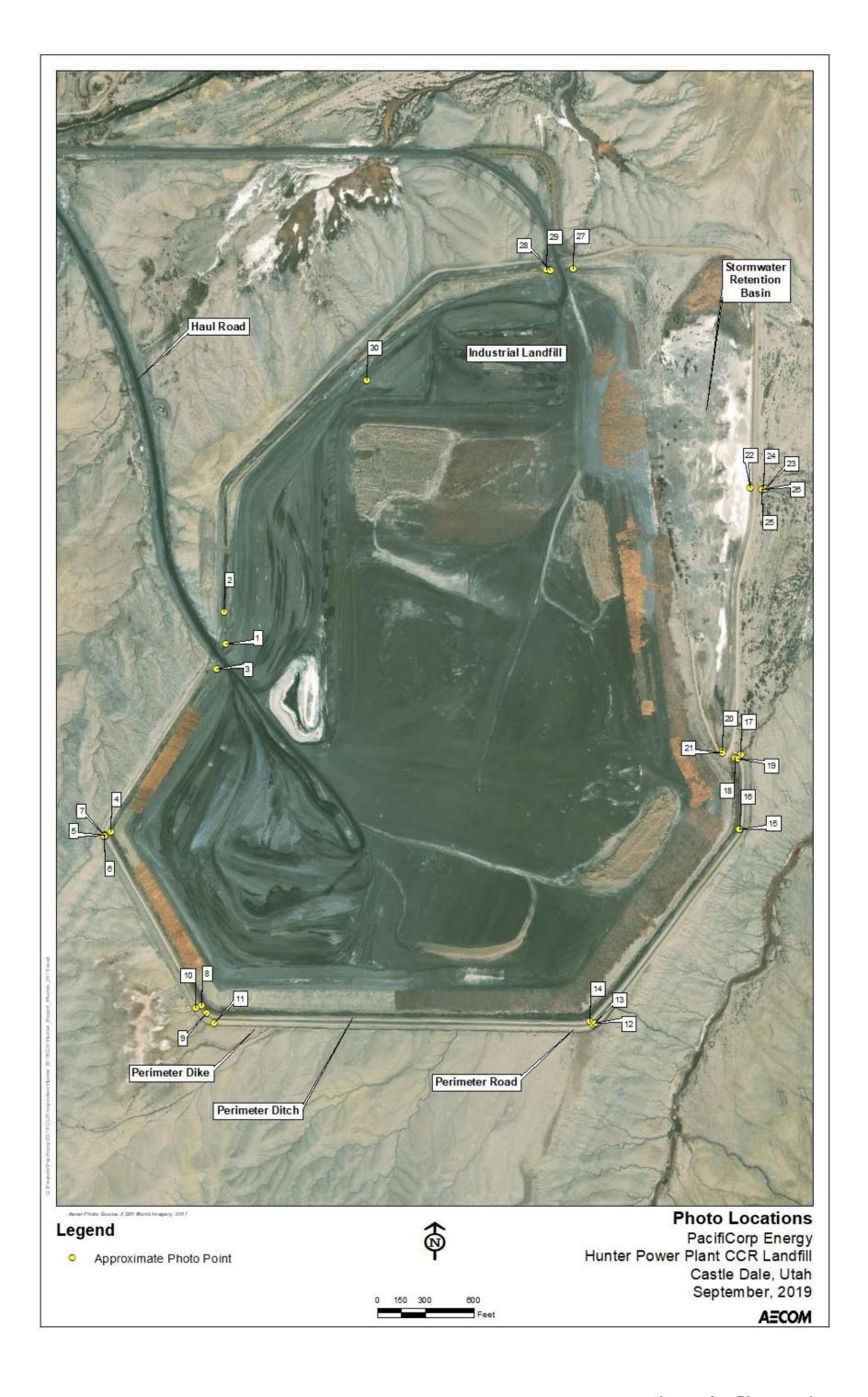
- [1] 40 CFR § 257 Disposal of Coal Combustion Residuals from Electric Utilities, April 17, 2015.
- [2] O'Brien & Gere, "Dam Safety Assessment of CCW Impoundments: Hunter Power Plant, Castle Dale, Utah," Washington, D.C., 2013.
- [3] Water & Environmental Technologies PC, "Industrial Landfill Permit Renewal Application: Hunter Power Plant," Salt Lake City, Utah, 2006.
- [4] Utah Division of Solid and Hazardous Waste, "Solid Waste Permit Renewal: Hunter Power Plant Class IIIb Landfill," Salt Lake City, Utah, 2007.
- [5] Cornforth Consultants Inc., "Phase I Geotechnical Assessments: Scrubber Emergency Holding Pond and FGD Cell/Ash Landfill, Hunter Power Plant," Castle Dale, Utah, 2009.
- [6] URS, "Memorandum Hunter CCR Landfill Vertical Expansion Feasibility Evaluation", February 17, 2015.
- [7] PacifiCorp Electric Operations, "Combustion Waste Embankment Expansion Project: Operations Manual," Hunter Power Plant, Castle Dale, Utah, 1997.
- [8] URS, "2015 Coal Combustion Residuals Annual Inspection: Hunter Power Plant Landfill," December 29, 2015.
- [9] URS, "2014 Coal Combustion Residuals Impoundment Inspection and Assessment Hunter Power Plant Ash Landfill, ," January 6, 2015.
- [10] URS, "2017 Coal Combustion Residuals Annual Inspection: Hunter Power Plant Landfill," November 30, 2017.
- [11] AECOM, "2018 Coal Combustion Residuals Annual Inspection: Hunter Power Plant, Hunter CCR Landfill," December 11, 2018.
- [12] Utah Division of Solid and Hazardous Waste, "Solid Waste Facility Fact Sheet: Hunter Power Plant Class IIIb Landfill," 2014. [Online]. Available: http://www.deq.utah.gov/businesses/P/PacificCorp/HunterPowerPlantClassIIIbLandfill.htm. [Accessed: 12-Nov-2014].
- [13] PacifiCorp Energy, "Thermal Generation Fact Sheets: Hunter Plant," 2011. [Online]. Available: http://www.pacificorp.com/es/thermal.html. [Accessed: 14-Nov-2014].

References not cited:

[14] URS, "2016 Coal Combustion Residuals Annual Inspection: Hunter Power Plant Landfill," November 29, 2016.

9

Appendix A Photograph Log





Photograph No. 1 View of culvert under main haul road at rumble rack, looking south.





Photograph No. 2 View of west slope of CCR Landfill south of main haul road entrance into landfill, looking north.





Photograph No. 3 View of culvert under main haul road at rumble rack, looking north.





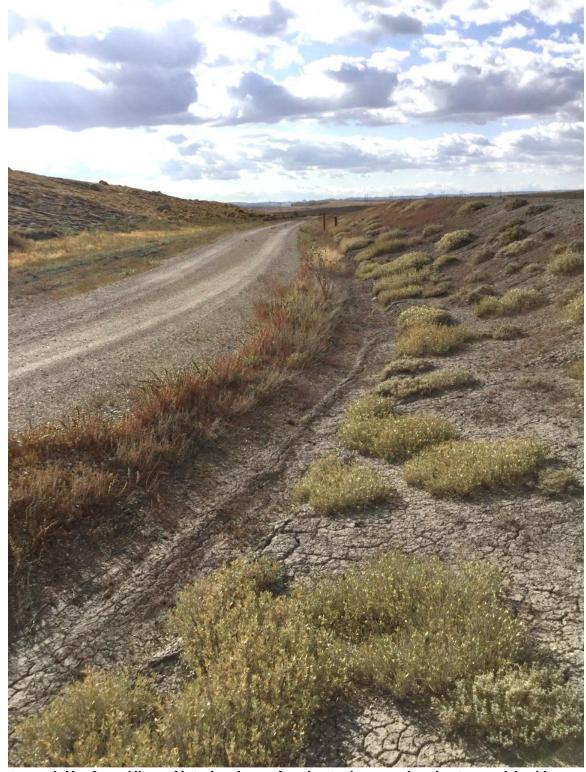
Photograph No. 4 View of west slope of CCR Landfill and onsite runoff collection ditch running along the toe of the slope, looking southeast.





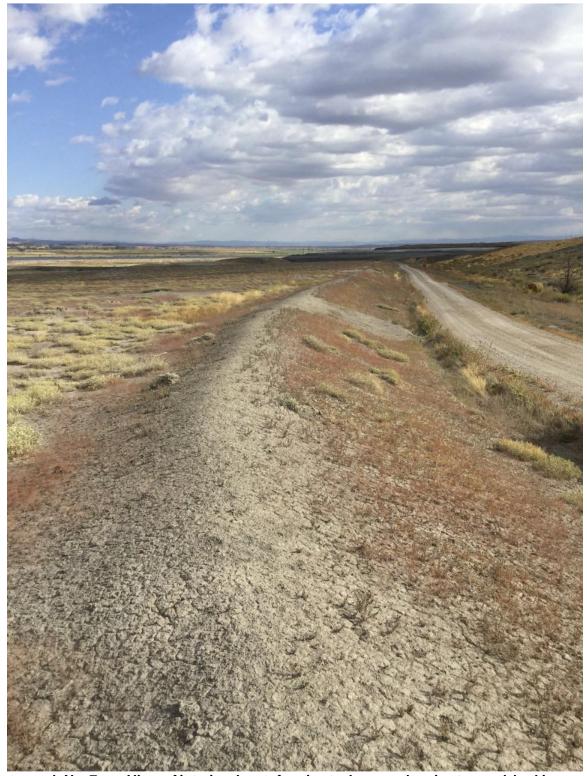
Photograph No. 5 View of west slope of CCR Landfill and onsite runoff collection ditch running along the toe of the slope, looking north.





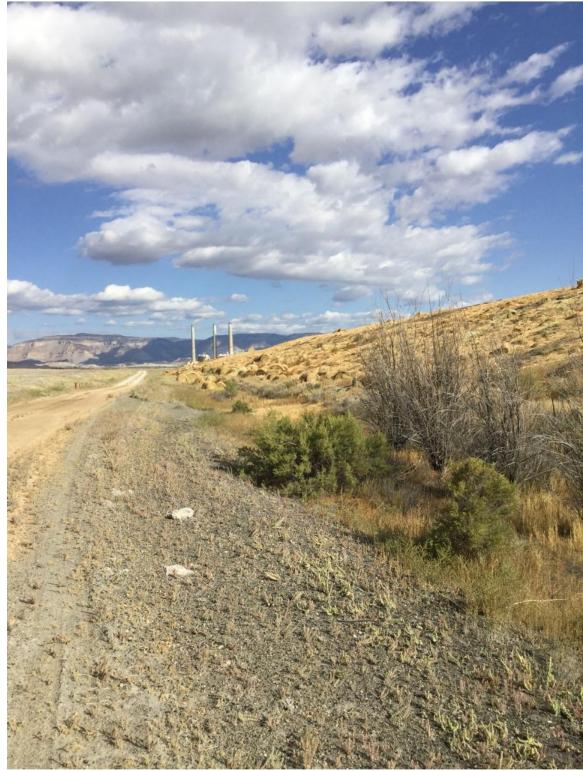
Photograph No. 6 View of interior slope of perimeter berm and perimeter road, looking southeast.





Photograph No. 7 View of interior slope of perimeter berm and perimeter road, looking north.





Photograph No. 8 View of southwest slope of CCR Landfill, runoff collection ditch running along the toe of the slope, and perimeter road, looking northwest





Photograph No. 9 View of southwest slope of CCR Landfill, runoff collection ditch running along the toe of the slope, and perimeter road, looking east.





Photograph No. 10 View of offsite drainage channel discharging into offsite diversion channel and diverted around permitted CCR Landfill, looking southeast.





Photograph No. 11 View of offsite diversion channel around permitted CCR Landfill, looking east. Channel is approximately 6 feet deep.





Photograph No. 12 View of interior slope of perimeter berm and perimeter road, looking west.





Photograph No. 13 View of southeast slope of CCR Landfill, perimeter road, and interior slope of perimeter berm, looking northeast.





Photograph No. 14 View of southeast slope of CCR Landfill, looking northwest. Note hay and increased vegetation on slope.





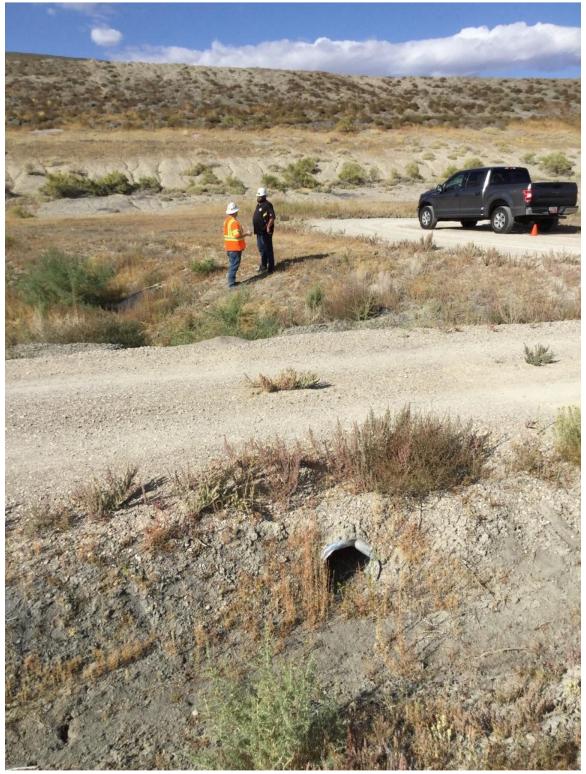
Photograph No. 15 View of southeast slope of CCR Landfill, looking southwest.





Photograph No. 16 View of southeast slope of CCR Landfill, perimeter road, and perimeter berm, looking northeast.





Photograph No. 17 View of pipe culvert passing under perimeter road (upstream end), looking west.





Photograph No. 18 View of pipe culvert passing under perimeter road (downstream end), looking east.





Photograph No. 19 View of retention pond inlet culvert (upstream end), looking west.





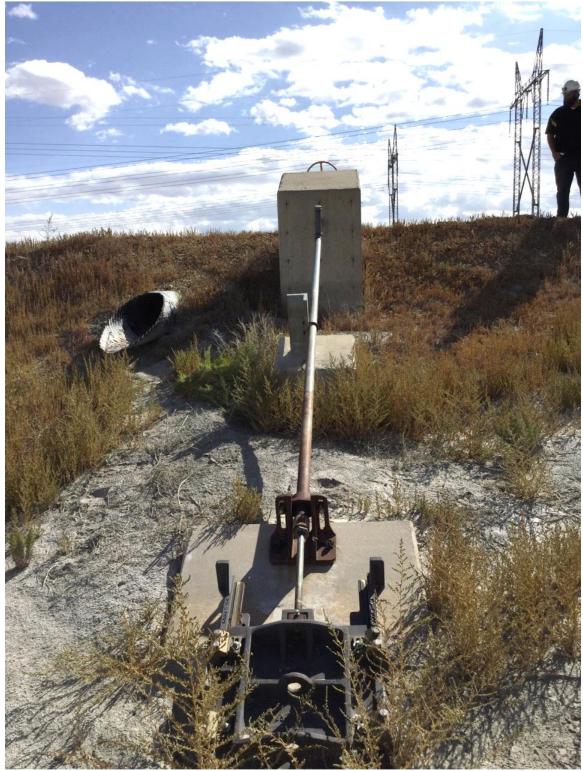
Photograph No. 20 View of retention pond inlet culvert (downstream end), looking east.





Photograph No. 21 View of south end of retention pond, looking north.





Photograph No. 22 View of slide gate control and auxiliary outlet conduit, looking east. The slide gate control appeared to be straight and in good condition.





Photograph No. 23 View of energy dissipation structure at downstream end of retention pond outlet conduit, looking west. This facility is a zero-discharge facility and gate remains closed.





Photograph No. 24 View of energy dissipation structure at downstream end of retention pond outlet conduit and downstream of baffle. Note ponding water despite no water present at upstream end.





Photograph No. 25 View of energy dissipation structure at downstream end of retention pond outlet conduit and upstream of baffle. Note discharge conduit from auxiliary spillway (top).





Photograph No. 26 View of energy dissipation structure at downstream end of retention pond outlet conduit and upstream of baffle. Note dry material in outlet conduit.





Photograph No. 27 View of north inlet pipe (downstream end), looking approximately south-southwest. Pipe was partially obstructed.





Photograph No. 28 View of retention basin north inlet pipe (upstream end), looking east.





Photograph No. 29 View of erosion from snowmelt on north slope of CCR Landfill, looking southeast.





Photograph No. 30 View of active CCR placement at Landfill, looking northeast.



Appendix B Annual Inspection Report Form



Report

Issue Date: 8-24-2015 Form XXXXX Revision A

Page 1 of 2

Feature Name: Feature ID: Date: **September 17, 2019 Hunter CCR Landfill**

CCR La	ndfill Name	Date Inspected By							
Hunter	· CCR Landfill	09-17-19	Bryan Franke, P.E., &	Bryan Franke, P.E., & Michael Smith					
Inspec	tion Frequency: $oxtimes$ Routine $oxtimes$ Weather/S	Seismic Event DOther:							
Type of Landfill: ☑ Active ☐ Inactive Weather Conditions: ☐ Wet ☑ Dry ☐ Snow Cover ☐ Windy ☐									
<u> </u>									
	Checks and Observations								
S	1. Placement procedures are being followed	⊠Yes □No □NA							
ion	2. Dust control is effective.	☑Yes ☐No ☐NA							
rat	3. Dust control logs are complete and availa	☐Yes ☐No ☒NA							
Operations	4. Haul road maintained and dust controlled	☑Yes ☐No ☐NA							
0									
	Actions None Maintenance	Monitoring Engineering Problems	g Notification/Work Order#						
		Cover							
<u></u>	☐ None ☐ Slope Stabil		☐ Seepage	☑ Vegetation					
ple	☐ Animal burrows ☐ Settlement ☐ Cracks	☐ Erosion ☐ Rills	☐ Ponding	☐ Gravel ☑ Soil					
lica	☐ Animal damage ☐ Cracks	□ RIIIS	☐ Other	Other					
Cover (if applicable <mark>)</mark>	5. Exterior slopes in good condition, with no	exposed CCR waste (non-benefic	:ial).	Yes No NA					
(if a									
'er	Observations: Cover included soil, annual vegetation, and hay; some erosion rills observed on bare soil cover (hay obstructed view of possible rills beneath). Slopes on north of landfill typically uncovered or temporary slopes. Industrial waste not exposed suggests frequent								
Ç	cover.								
	Actions None Maintenance	Т .							
SI	M Nove D Store States	Problems		Cover					
erm	None ☐ Slope Stabili☐ Animal burrows ☐ Settlement	ty 🛮 🖟 Erosion	Seepage	☑ Vegetation ☐ Gravel					
r B	☐ Animal damage ☐ Cracks	Rills	Ponding	Soil					
ete	S	— ······	☐ Other	Other					
ri	None Slope Stability Settlement Seepage Gravel Soil Other Other Observations Observations								
Pe	6. Slopes and berms provide positive draina	⊠Yes □No □NA							
and	Observations: Ponding is between perimeter berm and roadway but does not affect operation.								
es 3									
dol									
0,	Actions ☐ None ☑ Maintenance ☐ Monitoring ☐ Engineering Notification/Work Order#								
	Problems								
sle	Ditch Failure	. Debris	Berms						
ıtro	None Ditch Washo	•	☐ Bales/Waddles	Other					
Cor	<u> </u>	 Observations							
int	7. Erosion or sediment controls in good con	⊠Yes □No □NA							
ime									
edi	8. Drop inlet or other storm water controls								
on S	9. Perimeter run-on and run-off diversion di	Yes □ No □ NA							
Erosion Sediment Controls	Observations: Culvert on north side of CCR Landfill, which was observed in 2018, appears to have been removed (see photographs 26 and 27 from 2018 report).								
Er									
	Actions None Maintenance	☐ Monitoring ☐ Engineering	g Notification/Work Order#						



Annual Landfill Inspection Report

Issue Date: 8-24-2015 Form XXXXX Revision A

Page 2 of 2

Feature Name: Feature ID: Hunter CCR Landfill

Date: September 17, 2019

	Observations							
	10. Temporary covers functioning as intended.	⊠Yes □ No □ N/A						
	11. Storm water systems functioning as intended.	⊠Yes □ No □ N/A						
ı	12. Any appearance of actual or potential structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR landfill?	☐ Yes No ☐ N/A						
Other	13.Other non-structural or non-emergency safety issues.	☐ Yes No ☐ N/A						
0	Observations: Stagnant water observed in stilling basin. AECOM Engineer asked landfill operations personnel to keep an eye on it as the water source is not evident.							
	Actions ☑ None ☐ Maintenance ☐ Monitoring ☐ Engineering Notification/Work Order#	:						
Inspector Signature Bryan Franke								
Date 09-17-2019								