



REPORT

**Active Coal Combustion Residuals Disposal Facility
2024 Annual Inspection**
Escalante Station

Submitted to:

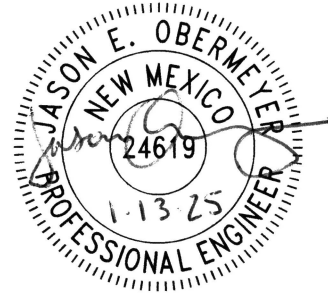
Tri-State Generation and Transmission Association, Inc.

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January 13, 2025



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1.0 INTRODUCTION

1.1 Background

WSP USA Inc. (WSP) has prepared this annual inspection report for Tri-State Generation and Transmission Association, Inc. (Tri-State) to summarize our review of available information and visual observation of the active disposal facility for coal combustion residuals (CCRs) at Escalante Station. The facility classifies as an existing CCR landfill under 40 CFR 257. The purpose of WSP's review of available information and visual observation was to satisfy the requirements of 40 CFR 257.84(b)(1), which prescribes periodic completion of these activities by a qualified Professional Engineer (PE) to verify that the design, construction, operation, and maintenance of the facility are consistent with recognized and generally accepted good engineering practice. The discussion presented in this report is limited to the active CCR disposal facility at Escalante Station and does not include consideration of the inactive CCR disposal facility at the site. WSP's visual observation took place on November 13, 2024.

This report presents a description of the facility (Section 1.0), a summary of WSP's review of available information about the facility (Section 2.0), the findings from WSP's visual observation of the facility (Section 3.0), and WSP's conclusions and recommendations (Section 4.0).

1.2 Facility Description

Escalante Station operated as a 270-megawatt coal-fired electric generation plant from 1984 until its retirement in August 2020. The site is located approximately 4.2 miles northwest of Prewitt, New Mexico. Tri-State generated fly ash, bottom ash, and flue gas desulfurization (FGD) material at Escalante Station and disposed of these materials in the facility. The facility is expected to continue receiving permitted waste materials and remains an active CCR disposal facility. The facility is one of several site features regulated by the New Mexico Environmental Department, Ground Water Quality Bureau, under Discharge Permit DP-206. Filling began at the facility in 2009, and CCRs have been deposited over approximately 25 acres to date. The total facility footprint is approximately 48 acres.

The facility is located immediately south of the inactive CCR disposal facility at the site. Placement of CCRs commenced at the east end of the facility and has progressed westward as design grades or interim grades were reached. As the height of the fill has increased, CCRs have been placed such that they abut (piggyback) the inactive CCR disposal facility on the north side of the active CCR disposal facility. The outer embankment slopes for the facility are designed at a slope ratio of 3 horizontal to 1 vertical.

2.0 REVIEW OF AVAILABLE INFORMATION

2.1 Information Reviewed

40 CFR 257.84(b)(1)(i) requires the annual inspection to include a review of information pertaining to the status and condition of the facility, including files that are available in the operating record. WSP reviewed information provided by Tri-State as part of our effort to verify that the design, construction, operation, and maintenance of the facility are consistent with recognized and generally accepted good engineering practice. The information WSP reviewed includes the following:

- Ground Water Discharge Permit Modification DP-206, which authorizes operation of the facility (New Mexico Environment Department 2023)
- the design and operation plan for the facility (Metric Corporation 2006)

- the fugitive dust control plan for the facility (Golder 2015)
- the run-on and runoff control system plan for the facility (Geosyntec Consultants 2021)
- the closure plan for the facility (Golder 2016a)
- the closure design plan for the facility under Ground Water Discharge Permit DP-206 (Geosyntec Consultants 2023)
- design drawings for the improvements to the facility described in Section 2.2 (Geosyntec Consultants 2024)
- previous annual inspection reports for the facility (Golder 2016b, 2017, 2018, 2019, 2020, 2021, and 2022; WSP 2023 and 2024)
- weekly inspection forms documenting weekly inspections conducted by qualified persons employed by Tri-State between November 8, 2023, and October 30, 2024

The weekly inspection forms provided valuable information regarding the status and condition of the facility since the previous annual inspection.

2.2 Changes in Facility Geometry

40 CFR 257.84(b)(2)(i) requires the annual inspection report to include a summary of changes in facility geometry since the previous annual inspection. On the east embankment slope, several improvements had been made since the previous annual inspection:

- slope regrading to construct mid-slope terrace channels
- installation of a downchute channel to route water collected by the terrace channels to the toe of the east embankment slope
- installation of a perimeter channel along the toe of the east embankment slope
- installation of culverts at the base of the downchute channel to collect stormwater from the perimeter channel and the downchute channel and route it away from the facility (to the east)
- placement of a layer of stone across the surface of the soil cover to enhance erosion resistance

These improvements are expected to enhance stormwater control and reduce rilling erosion.

Since the previous annual inspection, the CCR deposition area had moved from an area south of the facility access road to a location north of the facility access road. An area along the south end of the facility had also received waste materials (CCR and soil) resulting from the improvements described in this section and other improvements that are being made to the inactive CCR disposal facility at the site, so this area was higher in elevation than during the previous annual inspection.

2.3 CCR Volume Contained in the Facility

40 CFR 257.84(b)(2)(ii) requires the annual inspection report to include an estimate of the volume of CCRs contained within the facility at the time of the visual observation. Based on historical information and CCR placement data provided by Tri-State, WSP estimates that the volume of CCRs contained within the facility was 1,282,000 cubic yards at the time of the visual observation.

2.4 Changes Affecting Stability or Operation

40 CFR 257.84(b)(2)(iv) requires the annual inspection report to include a summary of changes that may have affected the stability or operation of the facility since the previous annual inspection. WSP's review of the weekly inspection forms completed between November 8, 2023, and October 30, 2024, indicates that changes affecting the stability or operation of the facility have not been identified during the weekly inspections. Indications of changes that affect stability or operation of the facility were not identified during WSP's visual observation on November 13, 2024 (refer to Section 3.0). Waste deposition rates have diminished since retirement of the generating unit in August 2020 and are expected to remain relatively low leading up to eventual closure of the facility.

3.0 VISUAL OBSERVATION

3.1 Overview

40 CFR 257.84(b)(1)(ii) requires the annual inspection to include visual observation of the facility that is intended to identify signs of distress or malfunction. 40 CFR 257.84(b)(2)(iii) requires the annual inspection report to include a description of appearances of structural weakness at the facility and existing conditions that are disrupting or have the potential to disrupt the operation and safety of the facility. These requirements are addressed in this section.

3.2 Visual Observation Terminology

Condition of Facility Component

Good:	A condition that is generally better than the minimum expected condition based on the design criteria and maintenance performed at the facility.
Fair:	A condition that is generally consistent with the minimum expected condition based on the design criteria and maintenance performed at the facility.
Poor:	A condition that is generally worse than the minimum expected condition based on the design criteria and maintenance performed at the facility.

Severity of Deficiency

Minor:	An observed deficiency where the current condition is worse than the minimum expected condition but does not currently pose a threat to structural stability.
Significant:	An observed deficiency where the current condition is worse than the minimum expected condition and could pose a threat to structural stability if it is not addressed.
Excessive:	An observed deficiency where the current condition is worse than the minimum expected condition and either hinders the ability of an inspector to evaluate the facility component or poses a threat to structural stability.

3.3 Findings

WSP conducted a visual observation of the facility on November 13, 2024. The condition of the deposition area, embankment slopes, embankment crest, embankment toe, and stormwater control features was observed. The annual inspection form is included in Appendix A. The locations and orientations of photographs presented in this section are shown on the annual inspection form.

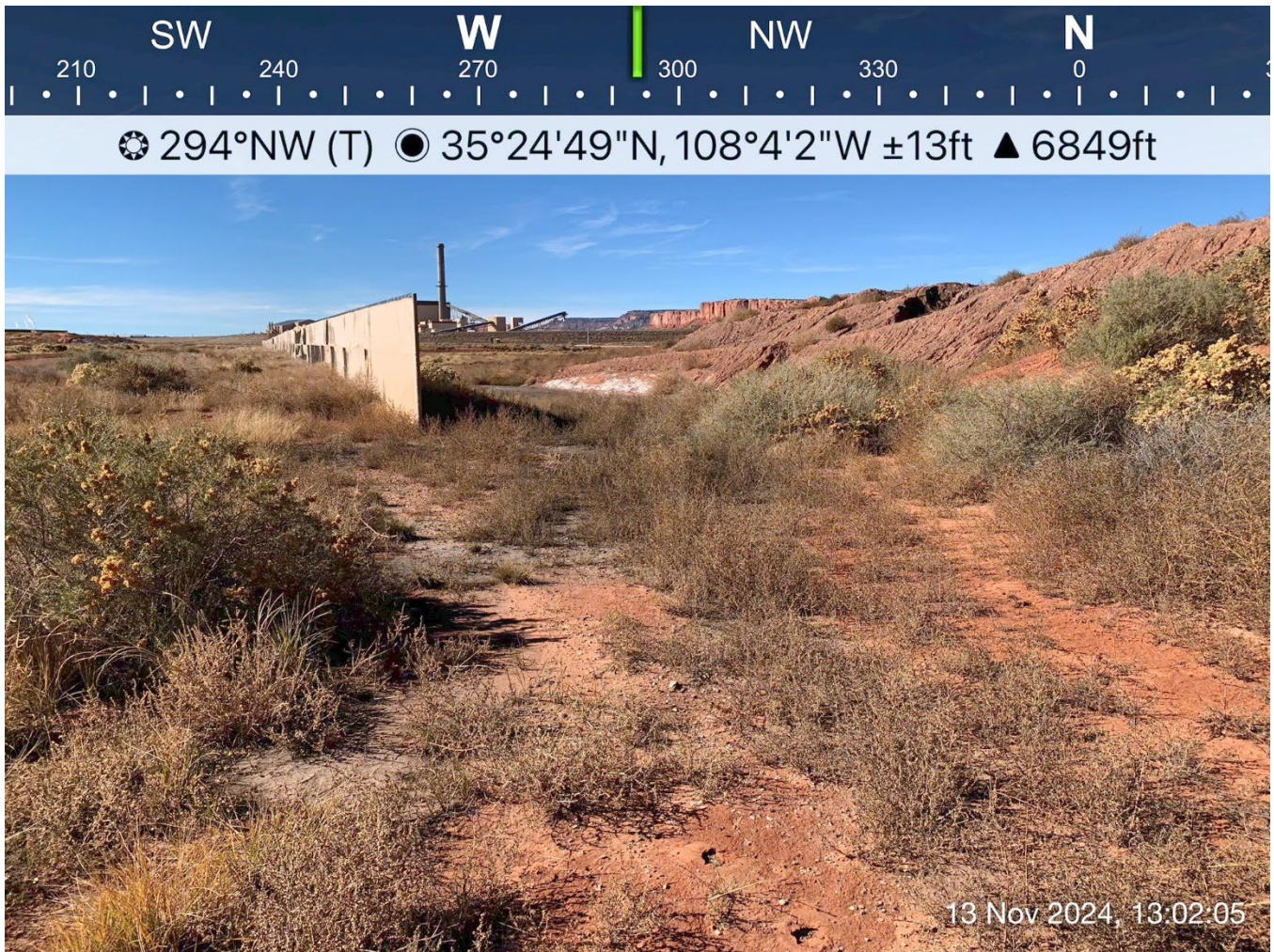
3.3.1 Deposition Area

The deposition area was observed to be in fair condition. Appendix A shows the deposition area location at the time of the visual observation. Signs of ground movement, such as sloughing or sliding, cracking, subsidence, or bulging, were not observed in the deposition area. The typical condition of the deposition area is depicted in Photograph 1. Appropriate grading had been established to collect CCR contact water within the facility, except in one location near the southeast corner of the facility where a berm should be installed to eliminate the potential for CCR contact water to accumulate after significant storm events and migrate outside of the facility boundary. This location is shown in Appendix A and depicted in Photograph 2. Fugitive dust was not observed at the time of the visual observation.

Significant erosion was observed on the relatively steep deposition slope in an area that had evidently been used for placement of waste materials earlier in 2024. This location is shown in Appendix A, and the erosion is depicted in Photograph 3. The erosion is limited to the interior of the facility and does not pose a threat to the structural stability of the embankment slopes. It is not disrupting the operation of the facility, but safeguards should be reviewed to protect personnel working in the area near the crest of the deposition slope. Weekly inspections should include verification that further erosion is not causing sedimentation that disrupts containment of CCR contact water.



Photograph 1: Typical Condition of the Deposition Area



Photograph 2: Location Where Improvements Are Needed to Prevent CCR Contact Water Migration



3.3.2 Embankment Crest

The embankment crest was observed to be in good condition. Cracking that could be indicative of ground movement was not observed along the embankment crest. Low areas that could be indicative of differential settlement were not observed along the embankment crest. The typical condition of the embankment crest is depicted in Photograph 4.



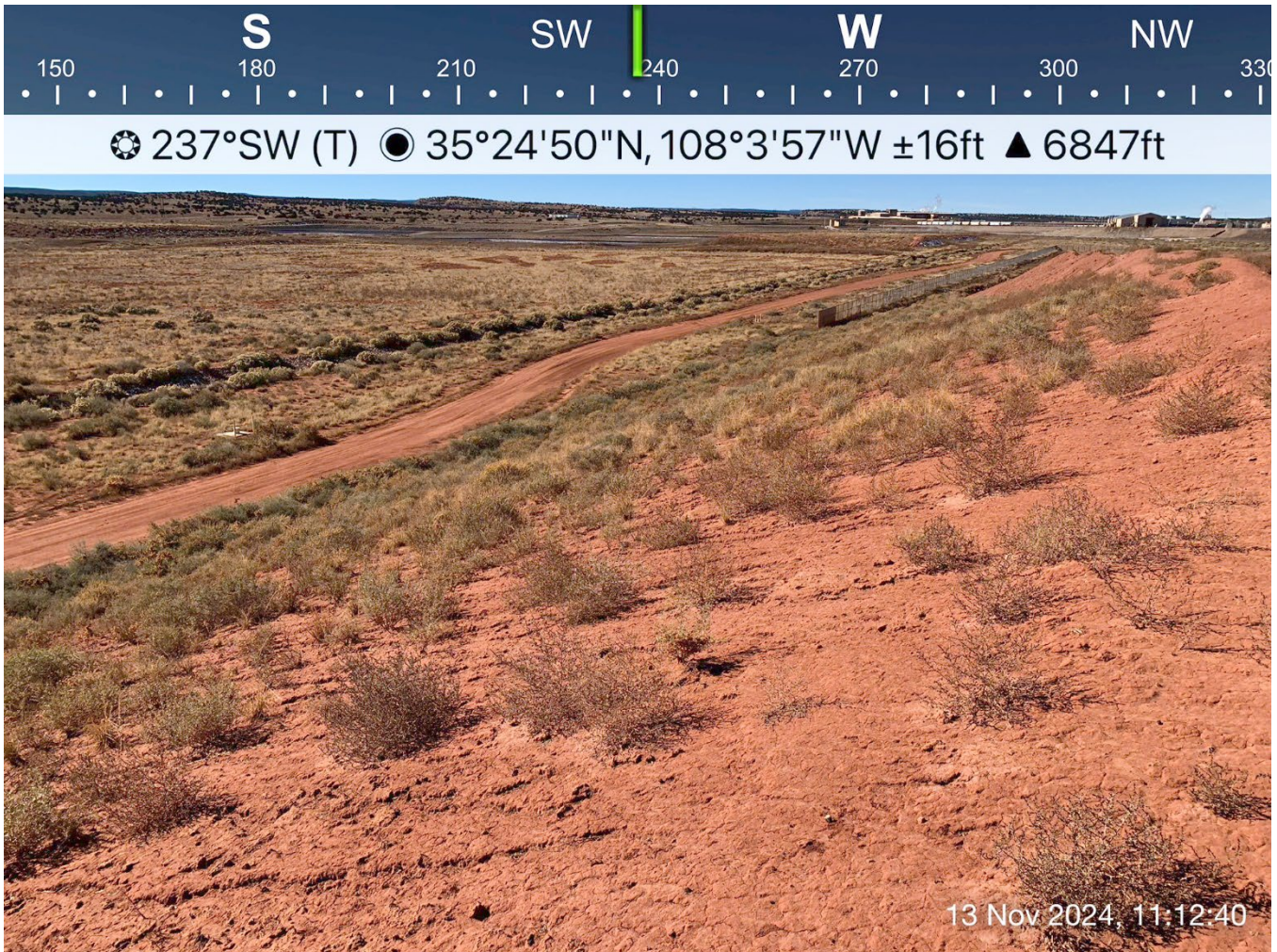
Photograph 4: Typical Condition of the Embankment Crest

3.3.3 Embankment Slopes

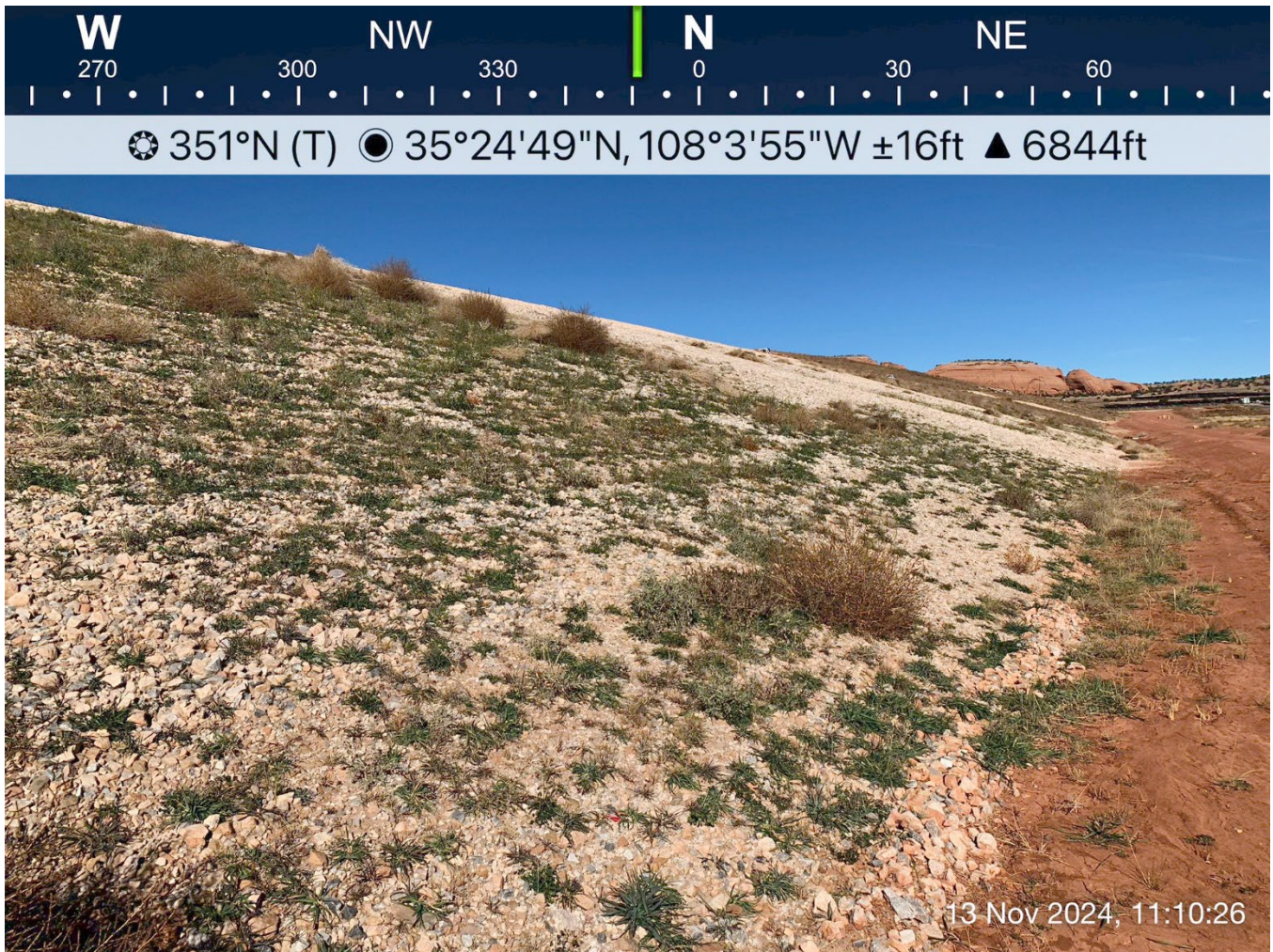
The embankment slopes were observed to be in fair to good condition. Signs of ground movement, such as sloughing or sliding, subsidence, or bulging, were not observed on the embankment slopes. Evidence of excessive erosion or slope deterioration was not observed on the embankment slopes, but minor rilling was observed on the south embankment slope. The severity of the rilling appeared to be slightly greater than during the previous annual inspection and was similarly observed to increase near the west end of the embankment slope. The rilling does not currently pose a threat to structural stability and is not disrupting the operation or safety of the facility, but it should be monitored and addressed if it becomes excessive. While localized repairs may periodically be needed for rills that become excessively deep or wide, WSP recommends that broad-scale rill repair efforts be deferred until the rills become more severe or a reseeding attempt is planned, as repair efforts would disrupt the erosion resistance provided by the vegetation and may therefore be counterproductive.

Native vegetation was observed across the south embankment slope and was being established in most areas on the east embankment slope following the completion of the improvements described in Section 2.2. Some areas on the east embankment slope had recently been resurfaced at the time of the visual observation to repair rill erosion, and reseeding will need to be conducted in these areas. Unusually poor or thriving vegetative growth was

not observed on the embankment slopes, but establishment of a mature vegetative community continues to be challenging given the climatic conditions at the site. No trees were observed on the embankment slopes. Active animal burrows were not observed on the embankment slopes. The typical condition of the south embankment slope is depicted in Photograph 5. The typical condition of the east embankment slope is depicted in Photograph 6.



Photograph 5: Typical Condition of the South Embankment Slope



Photograph 6: Typical Condition of the East Embankment Slope

3.3.4 Embankment Toe

The embankment toe was observed to be in good condition. Signs of seepage, such as springs or boggy areas, were not observed along the embankment toe. The typical condition of the embankment toe is depicted in Photograph 7.

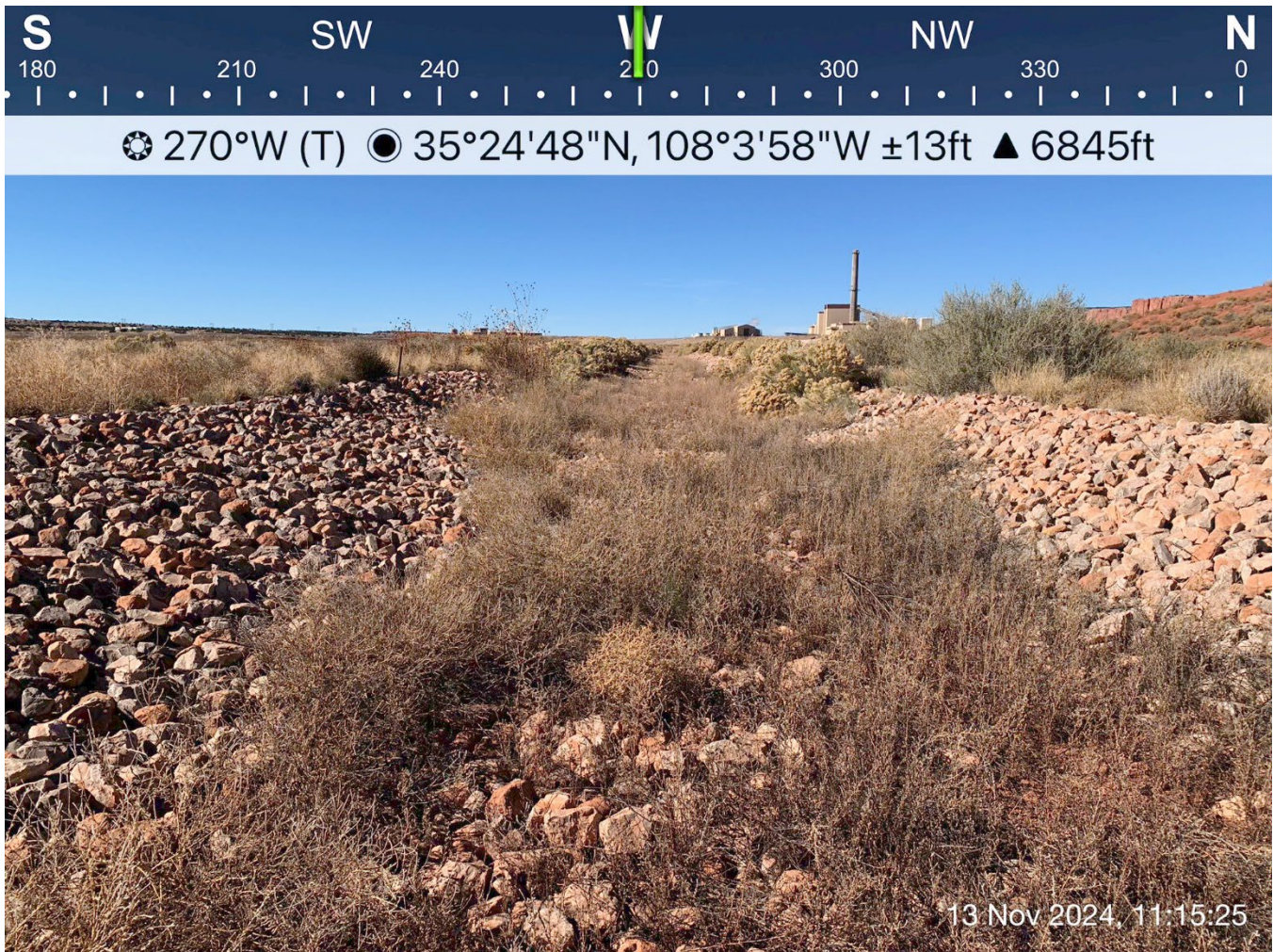


Photograph 7: Typical Condition of the Embankment Toe

3.3.5 Stormwater Control Features

The stormwater control features at the facility were observed to be in fair condition. At the time of the visual observation, the permanent stormwater control features at the facility consisted of a run-on control channel that is designed to convey stormwater from west to east outside the south end of the facility, terrace channels on the east embankment slope, a downchute channel on the east embankment slope, and a perimeter channel and culverts along the toe of the east embankment slope. The run-on control channel is armored with riprap. Shrubs were observed to be growing in the flow path, and an area of sediment accumulation was observed near the east end of the channel. The shrubs and sediment are not disrupting the operation or safety of the facility, but they should be removed periodically to help maintain the channel’s flow capacity. The typical condition of the run-on control channel is depicted in Photograph 8. Portions of the terrace channels were being reshaped at the time of the visual inspection to prevent overtopping and resultant rill erosion. The typical condition of the terrace channels is depicted in Photograph 9. The perimeter channel and culverts are depicted in Photograph 7 and Photograph 10. The downchute channel is armored with riprap. Shrubs were observed to be growing in the flow path. The shrubs are not disrupting the operation or safety of the facility, but they should be removed periodically

to help maintain the channel's flow capacity. The typical condition of the downchute channel is depicted in Photograph 11.



Photograph 8: Typical Condition of the Run-on Control Channel



Photograph 9: Typical Condition of the Terrace Channels



Photograph 10: Culvert Inlets



Photograph 11: Typical Condition of the Downchute Channel

4.0 CONCLUSIONS AND RECOMMENDATIONS

WSP completed an annual inspection of the active CCR disposal facility at Escalante Station to address the requirements of 40 CFR 257.84(b)(1). Signs of distress or malfunction of the facility were not observed, and appearances of actual or potential structural weakness of the facility were not identified. A berm should be installed in one location near the southeast corner of the facility, where shown in Appendix A, to eliminate the potential for CCR contact water to accumulate after significant storm events and migrate outside of the facility boundary. Facility maintenance activities that should be carried out as the need is indicated by weekly inspections conducted in accordance with 40 CFR 257.84(a) include control of burrowing animals, repair of significant erosion damage on embankment slopes, revegetation of embankment slopes, control and containment of CCR contact water, and periodic removal of shrubs and sediment from the run-on control channel and the downchute channel.

5.0 REFERENCES

- Geosyntec Consultants. 2021. Run-On and Run-Off Control System Plan Periodic Update for CCR Landfill, Escalante Generating Station. Plan prepared for Tri-State Generation and Transmission Association, Inc. October 30.
- Geosyntec Consultants. 2023. Active and Inactive Landfill Closure Design Plan, Revision 0. Plan prepared for Tri-State Generation and Transmission Association, Inc. April.
- Geosyntec Consultants. 2024. Escalante Generating Station, Phase 1 - Inactive Landfill Repair, Revision 01. Design drawings prepared for Tri-State Generation and Transmission Association, Inc. April.
- Golder (Golder Associates Inc.). 2015. Escalante Generating Station Coal Combustion Residuals Fugitive Dust Control Plan. Plan prepared for Tri-State Generation and Transmission Association, Inc. October.
- Golder. 2016a. Escalante Generating Station Active Ash Landfill Closure Plan. Plan prepared for Tri-State Generation and Transmission Association, Inc. October.
- Golder. 2016b. Coal Combustion Residuals Landfill Annual Inspection Report, Escalante Generating Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 18.
- Golder. 2017. Coal Combustion Residuals Landfill Annual Inspection Report, Escalante Generating Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 18.
- Golder. 2018. Active Coal Combustion Residuals Landfill Annual Inspection Report, Escalante Generating Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 15.
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- Golder. 2021. Active Coal Combustion Residuals Disposal Facility 2020 Annual Inspection, Escalante Generating Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 15.
- Golder. 2022. Active Coal Combustion Residuals Disposal Facility 2021 Annual Inspection, Escalante Generating Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 14.
- Metric Corporation. 2006. Scrubber Sludge/Fly Ash Landfill Expansion Plan for the Tri-State Escalante Generating Station. Plan prepared for Tri-State Generation and Transmission Association, Inc. August 14.
- New Mexico Environment Department. 2023. Discharge Permit DP-206. July 26.
- WSP (WSP USA Inc.). 2023. Active Coal Combustion Residuals Disposal Facility 2022 Annual Inspection, Escalante Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 13.
- WSP. 2024. Active Coal Combustion Residuals Disposal Facility 2023 Annual Inspection, Escalante Station. Report prepared for Tri-State Generation and Transmission Association, Inc. January 13.

Signature Page

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[https://wspnlinenam.sharepoint.com/sites/us-firstategroundwater/shared documents/project files/escalante ccr/2024 escalante0_deliverables/001-rpt-2024_annual_inspection/rev031403149.3784-001-rpt-0-2024_annual_inspection_13jan25.docx](https://wspnlinenam.sharepoint.com/sites/us-firstategroundwater/shared%20documents/project%20files/escalante%20ccr/2024%20escalante%20deliverables/001-rpt-2024_annual_inspection/rev031403149.3784-001-rpt-0-2024_annual_inspection_13jan25.docx)

APPENDIX A

Annual Inspection Form



TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION
ESCALANTE STATION ACTIVE CCR DISPOSAL FACILITY
ANNUAL INSPECTION FORM

Inspection Date: November 13, 2024	Inspection Time: 10:30-11:30am, 12:30-1:30pm	Legend: Y Yes N No NI Not inspected NA Not applicable RA Requires action
Inspector(s): Jason Obermeyer	Title(s): Vice President	
Reviewer: Brendan Purcell	Title: Senior Consultant	

Instructions: Complete each part of the annual inspection form. Indicate areas of concern on the plan view on page 3. Elaborate on deficiencies in Section J.

A. Previous Open Items

1. List open items from the previous inspection form (Section I.) and indicate whether or not the open items have been resolved:

a.	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
b.	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
c.	Y	N	NI	NA	RA	If N and/or RA, please elaborate.

B. Atmospheric Conditions

1. Briefly describe precipitation conditions (rainy, dry, snowy) or notable precipitation events over the last five days: Dry

2. Briefly describe wind (calm, breezy, windy, gusty) and weather (cold, warm, cloudy, sunny) conditions during the inspection: Clear, sunny, calm, cool (40°F)

C. Facility Access

1. Are facility access roads in good condition? Y N NI NA RA If N and/or RA, please elaborate.

D. Deposition Area

1. Where are CCRs and/or other materials currently being deposited (indicate on the plan view on page 3 or write N/A)? See page 3

2. Do you observe signs of ground movement in the deposition area? Y N NI NA RA If Y and/or RA, please elaborate.

If Y, circle those that apply: Slough or Slide Cracking Subsidence Bulging

3. Do you observe ponding in the deposition area (if Y, sketch on the plan view on page 3)? Y N NI NA RA If RA, please elaborate.

4. Does it appear that fugitive dust is being adequately controlled? Y N NI NA RA If N and/or RA, please elaborate.

5. Are controls adequate to keep CCR contact water from migrating away from the facility? Y N NI NA RA If N and/or RA, please elaborate.

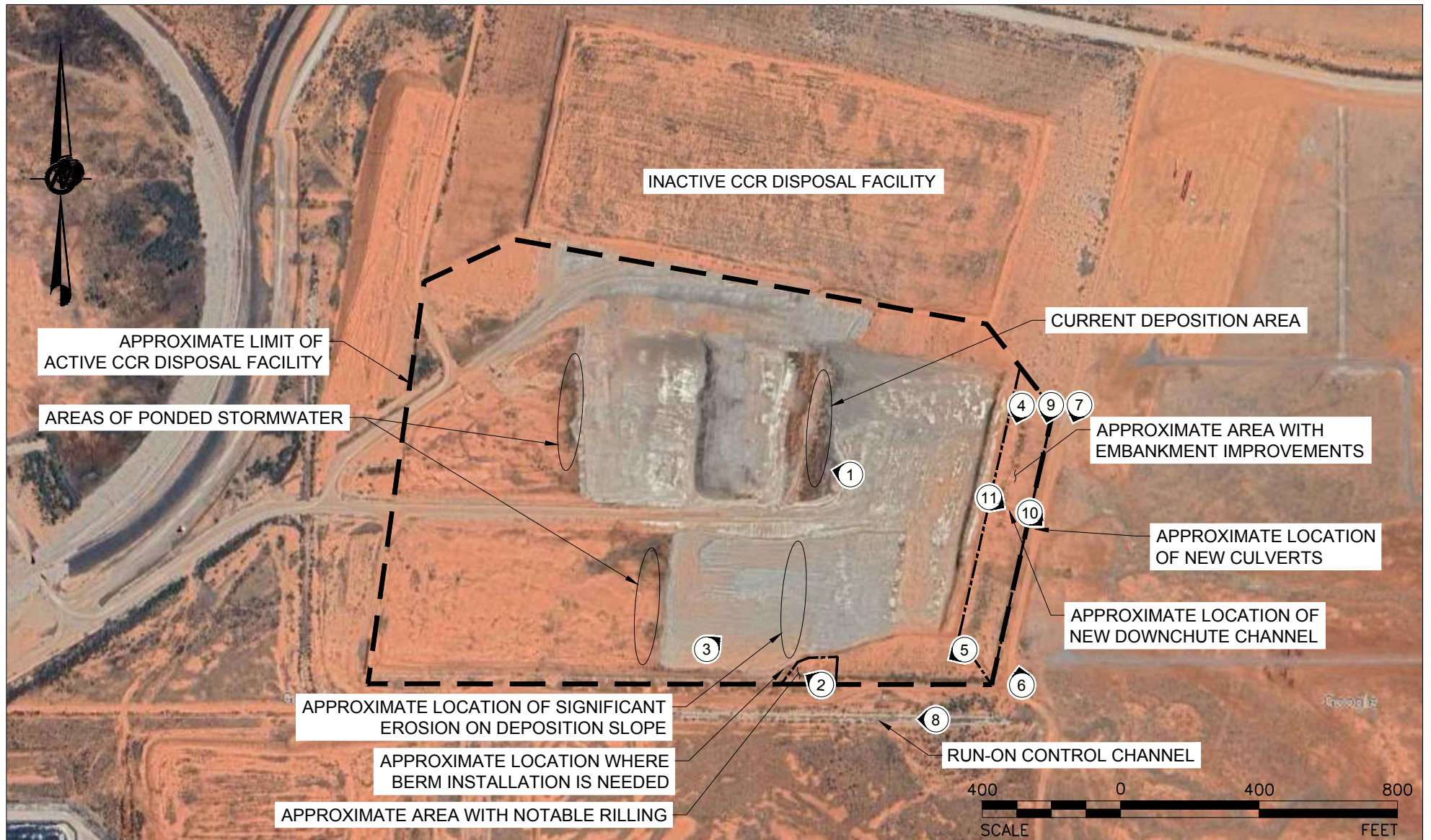
E. Embankment Crest

1. Do you observe cracks along the embankment crest? Y N NI NA RA If Y and/or RA, please elaborate.

2. Do you observe differential settlement (low areas) along the embankment crest? Y N NI NA RA If Y and/or RA, please elaborate.

3. Are the roads around and on the facility in good condition? Y N NI NA RA If N and/or RA, please elaborate.

F. Embankment Slopes						
1. Briefly describe ground conditions (wet, dry, soft, firm). North: N/A East: Dry, firm South: Moist, soft West: N/A						
2. Do you observe signs of movement or instability on the embankment slopes? If Y, circle those that apply: Slough or Slide Cracking Subsidence Bulging	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
3. Do you observe signs of notable erosion or slope deterioration?	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
4. Do you observe inadequate, unwanted, or unusual (thriving or poor) vegetative growth?	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
5. Do you observe notable animal burrows on the embankment slopes?	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
G. Embankment Toe						
1. Do you observe signs of seepage (springs or boggy areas) at the embankment toe?	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
2. Do you observe CCRs outside of the disposal footprint?	Y	N	NI	NA	RA	If Y and/or RA, please elaborate.
H. Storm Water Control Features						
1. Is the run-on control channel in satisfactory condition?	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
2. Are terrace channels in satisfactory condition?	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
3. Is the downchute channel in satisfactory condition?	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
4. Are the perimeter channel and culverts in satisfactory condition?	Y	N	NI	NA	RA	If N and/or RA, please elaborate.
I. Open Items						
1. List unresolved items from previous annual inspections (RA in Section A.) and new items identified during the annual inspection (RA in Sections B. through H.):						
a. Improved controls are needed in one location to prevent CCR contact water from migrating away from the facility.						
b.						
c.						
J. Elaboration						
Identify the specific item number (for instance, F.2.) and elaborate on each deficiency or issue identified during the annual inspection. Attach documentation (photographs or sketches) if practical.						
D.5. In one location along the south end of the facility, a berm should be installed to prevent CCR contact water from migrating away from the facility after major storm events (see page 3).						
F.3. Rilling was observed on the south embankment slope, with severity increasing near the western end (see page 3 for the approximate extents of notable rilling). The severity of the rilling was observed to be slightly increased from the previous annual inspection. The rilling does not currently pose a threat to structural stability and is not disrupting the operation or safety of the facility, so immediate repair is not required. The rilling should be monitored and addressed if it becomes excessive.						



Aerial image: Google Earth, image captured by Airbus on July 14, 2023.

LEGEND

② PHOTOGRAPH LOCATION AND DIRECTION



ANNUAL INSPECTION FORM
TRI-STATE GENERATION AND TRANSMISSION ASSOCIATION
ESCALANTE STATION ACTIVE CCR DISPOSAL FACILITY



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