

2019 Annual Inspection of CCR Landfill Cells

**W. A. Parish Electric Generating Station
Thompsons, Texas**

January 2020

Prepared For

NRG Texas Power LLC

CERTIFICATION

Annual Inspection of CCR Units

W. A. Parish Generating Station

I, the undersigned Texas Professional Engineer, hereby certify that I am familiar with the technical requirements of Title 40 Code of Federal Regulations Part 257 Subpart D (§257). I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the information in this demonstration is in accordance with current good and accepted engineering practice(s) and standard(s), and meets the requirements of §257.60 through §257.64. I certify that this Report was prepared by me and that I am a registered professional engineer under the laws of the State of Texas.

For the purpose of this document, "certify" and "certification" shall be interpreted and construed to be a "statement of professional opinion". The certification is understood and intended to be an expression of my professional opinion as a Texas Licensed Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the analysis herein.

Richard D. Varnell, P.E.



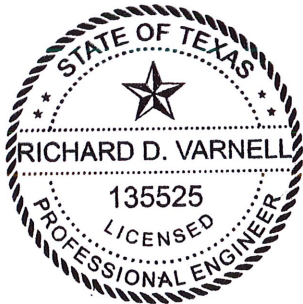
Signature of Professional Engineer

135525

Texas License Number

1/14/2020

Date



FIRM # 3775

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1. EXECUTIVE SUMMARY

On December 3, 2019, a representative of TRC Environmental Corporation (TRC) performed an inspection of the CCR landfill at the W. A. Parish Generating Station, located at 2500 Y U Jones Road near Thompsons, Texas. This work was performed to satisfy the requirement for an Annual Inspection by a qualified professional engineer, as required by 40 CFR Part 257, the US Environmental Protection Agency rule on Disposal of Coal Combustion Residuals (CCR) From Electric Utilities, which is referred to herein as the Federal CCR Rule.

The applicable CCR landfill cells were visually inspected by Mr. Richard Varnell, P.E. (Licensed in Texas). The inspection included performing a visual inspection of the applicable landfill cells to identify areas requiring maintenance and showing signs of distress or malfunction. TRC also reviewed the available documentation related to the CCR landfill cells at the W. A. Parish Generating Station.

This inspection evaluated:

- Landfill Cell 3,
- Landfill Cell 2A,
- Landfill Cell 1C, and
- Landfill Cell 2B.

Considering the good to excellent condition the landfill facilities were found, it is evident that the ongoing inspection and maintenance activities at the W. A. Parish Generating Station are very effective.

TRC did not observe any evidence of ongoing or imminent failure of these landfill cells. There were no structural deficiencies noted based on TRC's observations.

Since the Federal CCR Rule does not apply to landfills that no longer receive CCR materials after October 19, 2015, closed landfill cells (Cells 1, 1A, 1B, and 2, which are not shown on Figure 1 for clarity) were not inspected during this work.

No maintenance items were identified in this annual inspection. Ongoing maintenance efforts to promote grass vegetation, stabilize roads and slopes, and mitigate damage from feral hogs should continue.

Based on a review of available documents and the visual inspection, it is TRC's opinion that Landfill Cells 3, 2A, 1C and 2B have been designed, constructed, are currently operated, and are maintained in a manner that is consistent with and in accordance with recognized and generally accepted good engineering practice.

2. INTRODUCTION

This document presents the observations and findings of the 2019 annual inspection at the W. A. Parish Generating Station. The W. A. Parish Generating Station is located near Thompsons, Texas, in Fort Bend County. The power station is owned and operated by NRG Texas Power LLC.

The station includes four coal fired generating units with a total gross rated capacity of 2667 megawatts (MW) from the coal fired units. The station is fueled by coal imported from the Powder River Basin in Wyoming.

The general arrangement of the station and active landfill cells are depicted in Figure 1.

3. PURPOSE/OBJECTIVE

This document is prepared to provide compliance with the annual inspection requirements for CCR units as required by 40 CFR Part 257, the US Environmental Protection Agency rule on Disposal of Coal Combustion Residuals (CCR) From Electric Utilities (Reference 1). Specifically, Section 257.84(b) of the Federal CCR Rule pertains to the annual inspection requirements for CCR landfills.

This document reports the annual inspection by a qualified professional engineer for the currently active landfills (landfills that receive CCR material after October 19, 2015).

The tasks included with this annual report are:

- Inspection of CCR units by a qualified professional engineer to evaluate if the design, construction, operation, and maintenance of the units are consistent with recognized and generally accepted good engineering practice.
- A review of available operational records and information concerning the status and condition of the CCR unit, including, but not limited to, files available in the operating record, and the results of weekly inspections by a qualified person;
- A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures.
- Preparation of this inspection report, as required by the CCR Rule, addresses the following:
 - Any changes in geometry of the CCR units since the previous annual inspection;
 - The approximate volume of CCR contained in the units at the time of inspection;
 - Any appearances of actual or potential structural weaknesses of the CCR units, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR units and appurtenant structures; and
 - Any other change(s) which may have affected the stability or operation of the CCR units since the previous annual inspection.

NRG provided prior reports and design drawings as inputs to this inspection.

4. CCR LANDFILL DESIGN & BACKGROUND

The following CCR units are considered in this annual inspection:

- Landfill Cell 3,
- Landfill Cell 2A,

- Landfill Cell 1C, and
- Landfill Cell 2B.

The following paragraphs summarize the design and construction of these CCR units and evaluate the applicability of the Federal CCR Rule to each CCR unit.

4.1. LANDFILL CELL 3

Landfill Cell 3 receives bottom ash, which is trucked from the plant. The bottom ash is staged and stored in Landfill Cell 3. Bottom ash can be reused on-site or sold to third parties for use as road base material and other, similar uses. The landfill is constructed over a significant deposit of in situ clay soils. Storm water is directed to an incised storm water collection pond in the western portion of Cell 3. The storm water outlet from this pond is pumped on an as-needed basis to provide cooling and other water for the plant. Generally, the cell is constructed of berms with the exterior slope vegetated and the inside slope and crest surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 3 is designed as a Class 2 non-hazardous landfill under criteria of the Texas Commission on Environmental Quality (TCEQ) (Reference 2).

Since Landfill Cell 3 is an active landfill, an annual inspection is required as documented in subsequent sections of this document.

4.2. LANDFILL CELL 2A

Landfill Cell 2A is a small active portion of Cell 2, which has been closed. This open portion of Cell 2A is a pugmill operation for mixing and stabilizing CCR material for disposal in other landfill cells or for beneficial use outside the landfill cells. The landfill is constructed over a significant deposit of in situ clay soils. Storm water is directed to the southwestern portion of Cell 2A, where it enters a sump and is used on an as-needed basis to provide cooling and other water for the plant. Generally, the cell is constructed of berms with the exterior slope vegetated and the inside slope and crest either vegetated or surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 2A is designed as a Class 2 non-hazardous landfill under criteria of the TCEQ.

Since Landfill Cell 2A is an active landfill, an annual inspection is required as documented in subsequent sections of this document.

4.3. LANDFILL CELL 1C

Landfill Cell 1C receives nonmarketable CCR materials and Class 2 wastes, which are trucked from the plant. The landfill is constructed over a significant deposit of in situ clay soils. Storm water is directed to an incised storm water collection pond in the western portion of Cell 1C. The storm water outlet from this pond is pumped on an as-needed basis to provide cooling and other water for the plant. Generally, the cell is constructed of berms with the exterior slope vegetated and the inside slope and crest either vegetated or surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 1C is designed as a Class 2 non-hazardous landfill under criteria of the TCEQ.

Since Landfill Cell 1C is an active landfill, an annual inspection is required as documented in subsequent sections of this document.

4.4. LANDFILL CELL 2B

Landfill Cell 2B receives marketable CCR materials, which are trucked from the plant. Landfill 2B receives CCR material from the Flue Gas Desulfurization (FGD) system on Unit 8 of the generating station. This material is currently stored on the north side of this cell. While there are markets for this type of material, it is currently not being sold. Landfill 2B also receives fly ash. This material is stored in the central portion of the cell. Fly ash is used on-site to stabilize roads and slopes and is sold as a concrete additive to third parties. Essentially all the fly ash generated at the facility is either sold or used on-site.

Landfill Cell 2B is constructed over a significant deposit of in situ clay soils. Storm water is directed to an incised storm water collection pond in the southern portion of Cell 2B. The storm water outlet from this pond is pumped on an as-needed basis to provide cooling and other water for the plant. Generally, the cell is constructed of berms with the exterior slope vegetated and the inside slope and crest surfaced with stabilized CCR material to control vegetation and act as an erosion protection layer.

Landfill Cell 2B is designed as a Class 2 non-hazardous landfill under criteria of the TCEQ.

Since Landfill Cell 2B is an active landfill, an annual inspection is required as documented in subsequent sections of this document.

5. CCR LANDFILL INSPECTION OBSERVATIONS & FINDINGS

On December 3, 2019, Mr. Richard Varnell, PE (TX) along with Bob Been and Ricky Brown of NRG, visually inspected the CCR landfill cells (CCR units) at the W. A. Parish Generating Station. This visual inspection was performed to evaluate if the design, construction, operation, and maintenance of each applicable CCR unit is consistent with recognized and generally accepted good engineering practice.

No changes in geometry were observed at any of the CCR units. As a general note, each was observed to be in good to excellent condition, with no significant issues noted.

5.1. LANDFILL CELL 3

The location and general arrangement of Landfill Cell 3 is depicted on Figure 1 and Photographs P-1, P-2, and P-3.

Landfill Cell 3 consists of an active marketable bottom ash storage area and an incised storm water detention pond (approximately 5 acres), located within the perimeter berm in the western portion of the landfill cell.

At the time of the inspection, the water level in the storm water pond was lower than the ground surface outside the western and southern berms of the landfill. Thus, lateral pressure from the retained water on the landfill berms was minimal.

In general, the exterior slopes of the berms are well vegetated and demonstrate good alignment and slope grade. The interior slopes of the berms and the berm crest are surfaced with stabilized CCR material that resists erosion.

The crest of the berms around Cell 3 are free of rutting and misalignment.

Landfill Cell 3 was found to be in excellent condition without indications of risk of catastrophic or operational failure. The landfill containment dikes and berms were observed to be in excellent condition.

5.2. LANDFILL CELL 2A

The location and general arrangement of Landfill Cell 2A are depicted on Figure 1 and Photographs P-4, P-5, and P-6. As previously mentioned, Cell 2A is a pugmill operation. It is an active area located in the southeast corner of closed Cell 2. There is also a small (approximately 0.5 acre) contact water pond included in Cell 2A that is located in the southwest corner of closed Cell 2.

At the time of the inspection, Landfill Cell 2A was not used to store or dispose of significant quantities of CCR material. Mixing ash products for stabilization was not in progress during the inspection, but TRC observed ash products stockpiled in Cell 2A. Based on the location of the stockpiles and the nature of the material stored there, the lateral loads on the perimeter berms are considered to be minimal.

The Cell 2A contact water pond is an incised storm water detention pond located inside a bermed area. At the time of the inspection, the water level in the storm water pond was lower than the ground surface outside the western berm of the landfill. Thus, lateral pressure from the retained water on the landfill berms was minimal.

In general, the exterior slopes of the berms are well vegetated and demonstrate good alignment and slope grade. Portions of the interior slopes were well vegetated and other areas of the interior slopes of the berms and the berm crest are surfaced with stabilized CCR material that resists erosion.

Landfill Cell 2A was found to be in excellent condition without indications of risk of catastrophic or operational failure.

5.3. LANDFILL CELL 1C

The location and general arrangement of Landfill Cell 1C are depicted on Figure 1 and Photographs P-7, P-8, and P-9. There is also a contact water pond located in the southwest corner of this cell.

At the time of the inspection, Landfill Cell 1C was used to store or dispose nonmarketable CCR material and other Class 2 waste. Given the volume of CCR material stored in the cell, the only area where inside berms were observable was in the vicinity of the incised storm water pond (approximately 2.6 acres in size) in the southwest portion of the cell.

The Cell 1C contact water pond is an incised storm water detention pond located inside the landfill berms. At the time of the inspection, the water level in the storm water pond was lower than the ground surface outside the western berm of the landfill. Thus, lateral pressure from the retained water on the landfill berms was minimal.

The interior slopes of Cell 1C typically exhibited good alignment, grades and vegetation or erosion resistant stabilized CCR material. No adverse conditions were identified for the inside slopes of the perimeter berms.

The exterior slopes typically exhibited good alignment and grades. No significant adverse conditions were identified for the outside slopes of the perimeter berm.

The crest of the berms around Cell 1C are generally free of rutting and misalignment as shown in Photos P-7 and P-9.

Landfill Cell 1C was found to be in good condition without indications of risk of catastrophic or operational failure.

5.4. LANDFILL CELL 2B

The location and general arrangement of the Landfill Cell 2B are depicted on Figure 1 and Photographs P-10, P-11, and P-12.

An incised storm water pond located within the bermed area is located in the southern portion of the cell. The pond is approximately 5.6 acres in size. At the time of the inspection, the water level in the storm water pond was lower than the ground surface outside the western, southern, and eastern berms of the landfill. Thus, lateral pressure from the retained water on the landfill berms was minimal.

The outside slopes of the perimeter berms typically exhibited good alignment, grades and vegetation. There were no observed indications of instability of the outside slopes of the perimeter berms and dikes.

The crest of the berms and dikes around Cell 2B are generally free of rutting and misalignment. The berm crest and roadway surface are well maintained and considered to be in good to excellent condition.

The inside slopes of the perimeter dikes and berms around Cell 2B as well as the berm crest are surfaced with stabilized CCR material to prevent erosion. In general, these slopes were well graded and uniform in slope.

Landfill Cell 2B was found to be in good condition as observed, without indications of risk of imminent catastrophic or operational failure.

6. REVIEW OF WEEKLY INSPECTIONS

The weekly inspections by a qualified person (by NRG) have been performed and TRC has reviewed the reports. The inspections appear to be thorough and appropriately executed. Maintenance items were identified, resolved and documented in subsequent inspections.

7. REVIEW OF CCR INVENTORY

As required by the Federal CCR Rule, the approximate volume of stored CCR in the landfill, as provided by NRG, is:

- Cell 1C: Approximately 377,600 cubic yards (cy).
- Cell 2A: Approximately 200 cy. This material is just staged in this location prior to its imminent sale, use, or disposal.
- Cell 2B: Approximately 498,800 cy.
- Cell 3: Approximately 525,800 cy.

8. MAINTENANCE RECOMMENDATIONS

At the time of this inspection, there are no repairs needed that pose immediate operational or safety concerns for the CCR units inspected. Based on the observations made by TRC on December 3, 2019, TRC recommends that the current maintenance practices be continued. These practices include control of vegetation and feral hogs, and repair of minor erosion areas before they become significant.

9. CRITERIA

This inspection been performed in accordance with the inspection requirements of the Federal CCR Rule (Reference 1) and generally accepted engineering practice. The TCEQ Guidelines for Operation and Maintenance of Dams in Texas (Reference 2) is considered to represent generally accepted practices and is considered to be an applicable criterion.

10. LIMITATIONS

Given the visual nature of this inspection, it must be recognized that latent conditions may be present that are not visually evident.

TRC reviewed operation and maintenance records provided by the facility. TRC is not responsible for the content, accuracy or comprehensiveness of the records provided. Records were reviewed for completeness and compliance with the regulations and permit conditions.

Given the work in progress nature of active pond and landfiling operations, this document only considers the conditions present at the time of the field inspection and information provided by NRG.

11. REFERENCES

1) 40 CFR Part 257, Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule, April 17, 2015.

2) Texas Commission on Environmental Quality, Guidelines for Operation and Maintenance of Dams in Texas, November 2006.

12. CONCLUSIONS

This annual inspection considered the following CCR Units:

- Landfill Cell 3,
- Landfill Cell 2A,
- Landfill Cell 1C, and
- Landfill Cell 2B.

TRC did not identify any evidence of ongoing or imminent failure of the landfill cells. No structural deficiencies were noted during the 2019 inspection.

Based on the review of available documents and the visual inspection, it is TRC's opinion that Landfill Cell 3, Landfill Cell 2A, Landfill Cell 1C and Landfill Cell 2B have been designed, constructed, are currently operated, and are maintained in a manner that is consistent with recognized and generally accepted good engineering practice.

Based on the good to excellent condition the landfill facilities were found, it is evident that the ongoing inspection and maintenance activities at the W. A. Parish Generating Station are effective.

As discussed in Section 8, the ongoing maintenance efforts to promote grass vegetation, stabilize slopes, and mitigate damage from feral hogs should continue.

FIGURES



SOURCE: (12/10/2018) USDA FARM SERVICE, NAIP IMAGERY



1" = 2,500'
1:30,000

0 2,500
FEET



505 East Huntland Drive
Suite #250
Austin, TX 78752
Phone: 512.329.6080

PROJECT:	NRG W. A. PARISH STATION
TITLE:	LOCATION OF CCR LANDFILL CELLS

DRAWN BY:	MJAGOE
CHECKED BY:	RDV
APPROVED BY:	
DATE:	JANUARY 2020
PROJ. NO.:	294645.0001.0000
FILE:	294645.0001_Figure1.mxd
FIGURE 1	

PHOTOGRAPHS

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-1: View looking south of Cell 3 from top of north berm. Bottom ash material is visible to the left; the Cell 3 contact water pond to the right. The interior slopes and crest roads of the berms have been stabilized with a cemented mixture of bottom ash and fly ash. The remainder of the berms are well vegetated.



Photograph P-2: View looking east of Cell 3's south berm. The crest road was well maintained, exterior slopes well vegetated without erosion issues.

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-3: View looking north of Cell 3 Coal Combustion Residual (CCR) waste pile and of location where water from Cell 3's contact water pond is transferred to trucks.



Photograph P-4: View looking north of Cell 2A, the Pugmill Area. Pugmill equipment and mixed CCR material are visible in this photograph.

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-5: View looking north along the west berm of Cell 2A (the Pugmill Area).



Photograph P-6: View looking west across the contact water pond in Cell 2A. Slopes were either stabilized or well vegetated.

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-7: View looking east across the southern berm of Cell 1C. Slopes were either stabilized or well vegetated. Crest road was stabilized with no significant rutting.



Photograph P-8: View looking north of waste CCR material in Cell 1C. Picture was taken from southern berm of Cell 1C.

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-9: View looking northeast of the contact water pond in Cell 1C. Picture was taken from berm at southwest corner of Cell 1C.



Photograph P-10: View looking west of Cell 2B from eastern berm. This photograph shows the fly ash storage area on the left, dried and stabilized Flue Gas Desulfurization (FGD) CCR waste material on the right, and a contact water ditch separating the two.

Photographic Log – 2019 W. A. Parish Annual Inspection of CCR Units



Photograph P-11: View looking west of FGD waste on north side of Cell 2B. A vegetated and stabilized berm is visible on the left (south) side of this photograph. The crest road along the top of the landfill berm is visible on the right side of this photograph.



Photograph P-12: View looking north of Cell 2B from the southern berm. The interior slope of the southern berm is stabilized (foreground). The contact water pond is visible in the center of the photograph. A stockpile of fly ash material and, further away, the FGD CCR material are visible in the background of the photograph.