



2020 Site F Landfill Annual Inspection Report

Texas Municipal Power Agency
Gibbons Creek Steam Electric Station
Anderson, Texas
Project # 6706190003.70

Prepared for:

Texas Municipal Power Agency
12824 FM244 Road, Anderson, TX 77830

26 February 2020



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26 February 2020

2020 CCR Landfill Annual Inspection Report
Site F Landfill
Texas Municipal Power Agency
Gibbons Creek Steam Electric Station
Anderson, Texas

Dear Mr. York,

As requested by the Texas Municipal Power Agency (TMPA), Wood Environment and Infrastructure Solutions, Inc. (Wood) is submitting this Annual Coal Combustion Residuals (CCR) Landfill Inspection Report to summarize observations of the Site F CCR Landfill (Site F Landfill or SFL) located at the Gibbons Creek station and performed on January 9, 2020. The inspection was performed in accordance with 40 CFR 257.84(b) Annual Inspections by a licensed engineer.

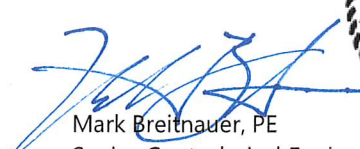

Wood values our long-standing partnership with TMPA and we thank you for this opportunity. Please contact us at your convenience with questions.

Sincerely,

**Wood Environment & Infrastructure
Solutions, Inc.**

Reviewed by:

Erik Friede, PE
Geotechnical Engineer


Mark J. Breitnauer, PE
Senior Geotechnical Engineer

2-26-2020

Attachments: 2020 Annual Inspection Report
Appendix 1 – Figures
Appendix 2 – Photographic Log





2020 Site F Landfill Annual Inspection Report

Texas Municipal Power Agency
Project Location
Project # 6706190003.70

Prepared for:

Mr. Craig York

Texas Municipal Power Agency
Gibbons Creek Steam Electric Station
12824 FM244 Road, Anderson, TX 77830

Prepared by:

Mr. Erik Friede

Mr. Mark Breitnauer

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Executive summary

This document represents the detailed inspection report summarizing observations made including site photographs taken during the annual inspection of the Site F Landfill (SFL), located at the Gibbons Creek Steam Electric Station (GCSES or plant), operated by the Texas Municipal Power Agency (TMPA). The inspection was conducted in accordance with the requirements of 40 CFR 257.84(b) Annual inspections, by a professional engineer. The inspection included a review of available information and a visual inspection to identify signs of distress, or malfunction of the Coal Combustion Residuals (CCR) landfill. We understand that the last documented placement of material into the SFL occurred sometime around January 2019, after GCSES was mothballed following the 2018 summer production season.

A professional engineer from Wood Environment & Infrastructure Solutions, Inc. (Wood) and TMPA staff performed the 2020 annual inspection on January 9, 2020. Our review and observations resulted in comments for minor maintenance (comments). These comments were communicated to TMPA personnel verbally during the inspection visit. Our inspection of the SFL did not identify areas of settlement, depressions, movement, bulges, change in geometry, significant slope failures, or other conditions that would adversely affect the integrity of the landfill.

Annual Inspection Requirements

The SFL is subject to annual inspection by a qualified engineer, pursuant to 40 CFR §257.84(b)(1), "...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 components are, as follows:

- *40 CFR §257.84 (b)(1)(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).*
- *40 CFR §257.84 (b)(1)(ii) - A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.*

The results of the inspection must be documented pursuant to the inspection reporting requirements of 40 CFR §257.84 (b)(2):

(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.

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

The frequency of inspections at the SFL is pursuant to 40 CFR §257.84 (b)(4), as follows:

- *The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(9).*

40 CFR §257.84 (b)(1)(i) Review of Available Information

Wood reviewed the published information available on the TMPA website and weekly inspection reports to promote understanding of the SFL history and existing conditions to support this reporting effort. We understand that the SFL was constructed by TMPA in 1990 and expanded in 1995 to increase the capacity for the disposal of CCR solid wastes generated by the GCSSES. We understand the majority of the SFL was capped in 1996 after the plant was converted from locally mined lignite to Wyoming's PRB coal, and PRB combustion by-products have been placed in the uncapped portion (Active Area) through January of 2019.

40 CFR §257.84 (b)(1)(ii) Visual Inspection

Wood performed the SFL Annual Inspection in conjunction with Mr. Daniel Meadows, TMPA Compliance Specialist. The goal of the inspection was to evaluate if the design, construction, operation, and maintenance of the Site F Landfill is consistent with recognized and generally accepted good engineering standards and practices.

This inspection was performed on Thursday, January 9, 2020. The inspection consisted of visual observations of the SFL to identify signs of distress or malfunction including appearances of actual or potential structural weaknesses and other

conditions which are disrupting or have the potential to disrupt the operation or safety of the SFL. The inspection consisted of a walking reconnaissance including the configuration/layout of the stormwater management systems and general operations. The landfill area covered by this annual inspection is shown in Figure 1 in Appendix 1. Photographs representing typical conditions of observations were taken as part of the inspection. These photographs are included in Appendix 2, and the approximate locations of each photograph are shown in Figure 1.

The SFL has two main areas: The Cover Area and the Active Area. The Cover Area consists of a vegetated clay cap and covers approximately 80 acres as measured using Google Earth. The Cover Area is irregular in shape generally running in an east to west orientation with the western portion extending further to the south than the eastern portion (refer to Figure 1). We understand that CCR has not been placed in this area since the cap was installed in 1996.

The Active Area of the SFL is adjacent to the Cover Area on the southeast side and encompasses approximately 15 acres, as measured using Google Earth. The Active Area has a general southwest to northeast orientation with the southwest portion containing gypsum, bottom ash, economizer ash and fly ash. The northeast portion was retaining rain-on water at the time of the inspection (SFL, Pond 3). GCSES is not currently in operation and we understand no new material has been placed in the Active Area since January 2019.

Stormwater is controlled with a series of vegetated and fabric formed concrete-lined channels that convey surface run-off from the Cover Area to stormwater retention ponds located on the west and northeast (SFL Pond 1) sides of the landfill and intercept surface water run-on from areas outside the Active Area. SFL Pond 1 has a principal spillway consisting of a concrete riser equipped with a trash rack, and a concrete outlet pipe emptying onto a concrete outlet apron. Stormwater run-off directed to the south from the Cover Area is diverted by a swale and diversion berm that borders the northwest portion of the Active Area, which prevents runoff from entering the Active Area. Water that falls directly on CCR materials inside the Active Area appears to be contained within the Active Area. No evidence of CCR materials outside the Active Area embankments was observed at the time of our inspection.

Based on our field inspection, the operation and maintenance of the SFL appeared to be in accordance with generally good engineering standards and practices. The Active Area and the access roads surrounding the SFL were adequately watered for dust control. Our field inspection did identify 6 typical maintenance items (e.g., minor erosional areas, minor vegetation growth, small animal burrows, etc.) which were communicated verbally to TMPA personnel. Additional discussion pertaining to the visual observations, with recommendations where applicable, is provided, as follows:

Vegetation

Overall, the SFL's vegetative ground cover appeared to be adequately maintained as evidenced by the established vegetation on the slopes and the covered portion of the landfill. Minor vegetation was observed in the Active Area and appears to be properly maintained. Woody vegetation should continue to be removed from the interior slopes during regular maintenance operations.

Erosion

No areas of major erosion were observed at the time of inspection. Evidence of minor erosion was observed at various locations on the embankment slopes of the Cover Area and the Active Area. These areas and other areas with exposed soil should be regraded and seeded to allow vegetation growth and prevent further progression of erosion in these areas.

Storm Water Management

The stormwater management systems of the SFL appears to be in good working order. Stormwater management around the SFL consists of run-off ditches and concrete-lined spillways directing water from the Cover Area and diverting water from entering the Active Area. Stormwater is directed to SFL Pond 1 and an unnamed stormwater retention pond via concrete-lined spillways and drainage ditches. The ditch bordering the northern side of the Active Area directs storm water to the small stormwater detention pond. Vegetation growing in portions of the concrete-lined spillways should continue to be removed as part of TMPA's routine maintenance operations.

Animal Activity

Three types of minor animal activity (possible otter and gopher burrows and cow paths) were observed at various locations along the landfill. The existing burrows should be addressed in accordance with the existing TMPA management plan as part of the routine maintenance. Future burrows should be addressed in a timely fashion as they are observed. With regard to cow paths, current efforts are in place to force the cows to change paths periodically to avoid deterioration of the vegetation along these paths. Remedial efforts were observed in the form of tires, and barbed wire across existing paths. These efforts appear to be an effective method to redirect cows. In addition to the current fixes, we recommend that the areas of previous cow paths be re-graded and seeded to promote soil growth and prevent erosion in areas with exposed soil.

Corrugated Plastic Pipes

Plastic pipes were observed at various locations on the embankment slopes of the Cover Area. The pipes appeared to be outlet pipes; however, inlet locations for these pipes were not observed. We understand from conversations with plant personnel that the length of these pipes is at least 10-11 feet, and soil infilling was observed in

several of the pipes. Currently, the purpose of these pipes is not known. We recommend that purpose of these pipes be determined, and documentation should be reviewed to assess the nature of these pipes. We understand TMPA is working to find documentation related to the installation and purpose of these corrugated plastic pipes.

Representative photos of the maintenance items are provided in Appendix 2. Approximate photo locations are presented in Figure 1 in Appendix 1.

Conclusions

The results of the annual inspection of the SFL, as described herein, is provided in the following table:

Regulatory Citations	SFL
<i>40 CFR §257.84 (b)(2) (i) - Any changes in geometry of the structure since the previous annual inspection.</i>	No changes in the CCR unit geometry were noted.
<i>40 CFR §257.84 (b)(2) (ii) - (ii) - The approximate volume of CCR contained in the unit at the time of the inspection</i>	In 2016, the approximate volume of ash material located at the SFL at the time of the inspection was 7,370,000 cubic yards. Since that time, an additional estimated 28,346 tons have been placed into the Active Area.
<i>40 CFR §257.84 (b)(2)(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.</i>	No such conditions were identified.
<i>40 CFR §257.84 (b)(2)(iv) - Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.</i>	No such conditions were noted.

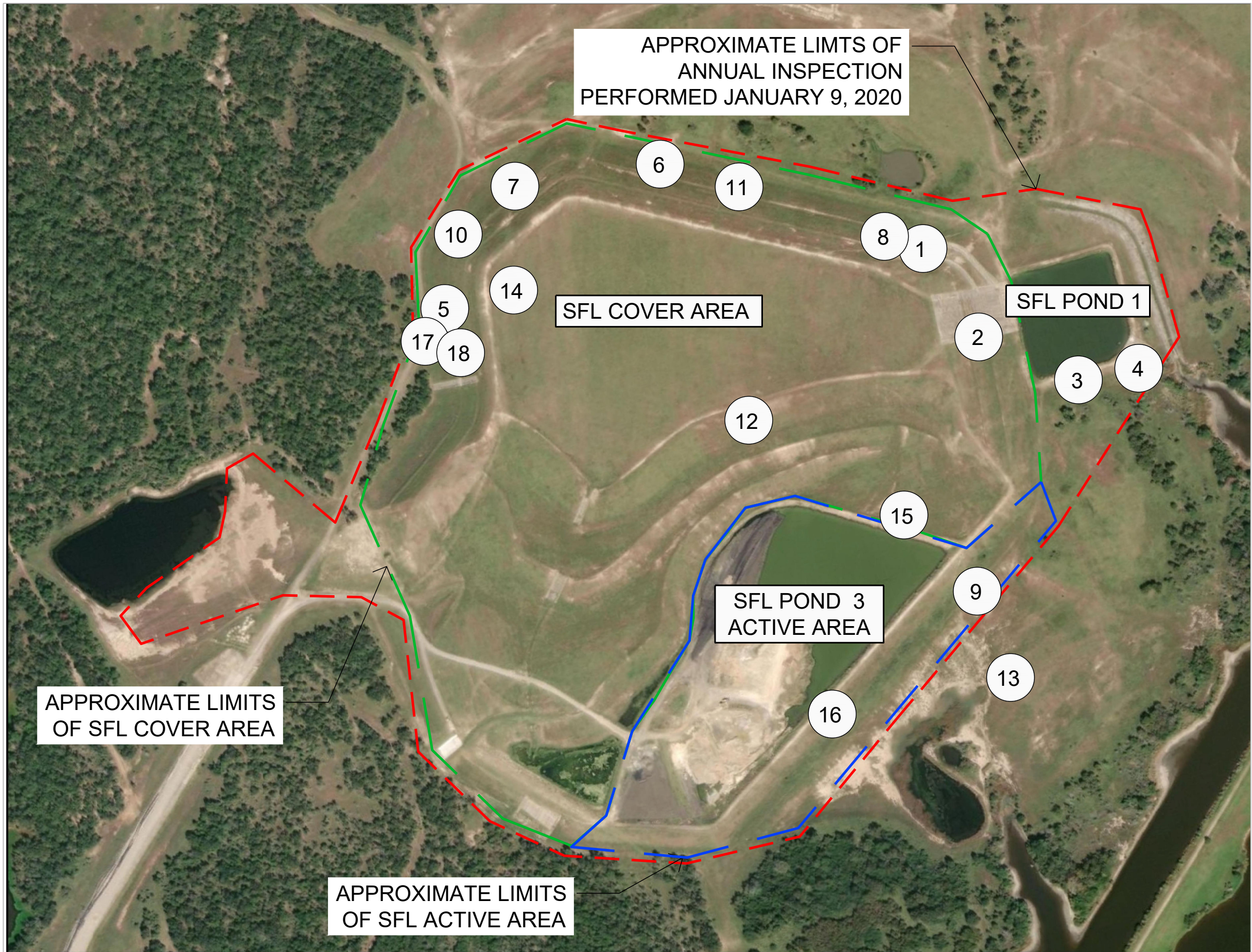


Our inspection of the SFL indicates the operation and maintenance of the SFL is consistent with recognized and generally accepted good engineering standards and practices. Areas of settlement, depressions, movement, bulges, change in geometry, or significant slope failures were not observed during our field inspection.







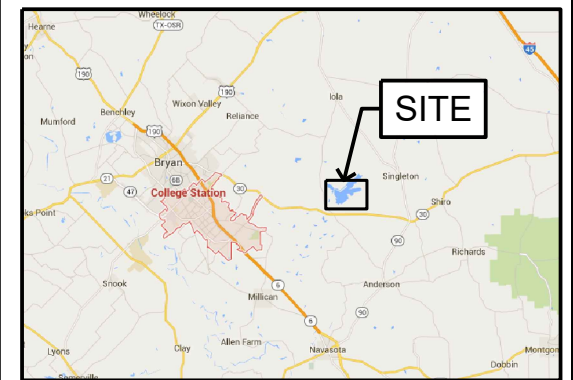
APPENDIX 1 – FIGURES

Plot Date: 02/26/20 - 11:20am. Plotted by: erik.friede
Drawing Path: I:\Geotechnical\Projects\2020.01.08 TMDPA Site F Landfill\FIGURES\ Drawing Name: SFL_Figures.dwg




LEGEND

-  Approximate Location of Photograph (See Appendix 2)
-  Approximate Inspection Limits
-  Approximate Limits of Cover Area
-  Approximate Limits of Active Area



SOURCE:
BASE MAP, ERM
GOOGLE EARTH PRO

 Environment & Infrastructure Solutions, Inc.	SITE F LANDFILL Annual Inspection Site Map and Observations January 2020 Texas Municipal Power Agency Gibbons Creek Steam Electric Station Grimes County, Texas	
	Proj. No. 6706190003.70 Date 2/26/2020	Figure 1

APPENDIX 2 – OBSERVATIONS AND PHOTOGRAPHIC LOG

Landfill Component		Observed	Comment No.
Liner		No	---
Temporary or Permanent Soil Cover		Yes	4
Storm Water Control	Concrete Lined Stormwater Drainage	Yes	1,4
	Drainage Swales	Yes	---
	SFL Pond 1	Yes	2
Cover Area Slopes	Landfill Slopes	Yes	3,4,5,6
Active Area	Interior Slopes	Yes	4
	Exterior Slopes	Yes	3,4
	Impounded CCR Material	Yes	---
Roads, Culverts		Yes	---

Comment No.	Description	Photo No.
1	Vegetation growing through the fabric formed concrete lining in drainage channels and stormwater spillways.	1, 2, 4
2	Minor erosion observed on the interior slopes of the SFL Stormwater Ponds.	3
3	Indicators of animal activity observed at various locations on the embankments of the Cover and Active Areas.	5, 6, 7, 8, 9
4	Erosional features observed at various locations on the exterior and interior embankments of the Cover and Active Areas.	10, 11, 12, 13, 14, 15
5	Minor woody vegetation growth on embankment slopes	16
6	Corrugated plastic pipes (approximately 18" diameter) observed at various locations at the toe of the bench slopes in the Cover Area. Soil and vegetation infilling observed at several locations.	7, 17, 18

Facility:
SFL Pond 1 Concrete
Drainage Channel

Photo No.: 1 **Date:** 01/09/2020

Photo Direction:
SE

Description:
Typical vegetation and
sediment observed in the
fabric-formed concrete
drainage ditch.



Facility:
SFL Pond 1 SW Spillway

Photo No.: 2 **Date:** 01/09/2020

Photo Direction:
N

Description:
Significant vegetation
growing through the
concrete Stormwater
spillway.



Facility: SFL Pond 1	
Photo No.: 3	Date: 01/09/2020
Photo Direction: NW	
Description: Typical erosion on interior slopes of SFL Pond 1 and Pond 3.	



Facility: SFL Pond 1	
Photo No.: 4	Date: 01/09/2020
Photo Direction: N	
Description: Condition of concrete outlet pipe in SFL Pond 1.	



Facility: SFL Cover Area Embankment Slopes	
Photo No.: 5	Date: 01/09/2020
Photo Direction: E	
Description: Typical animal activity, indicative of otter burrows observed on west and north SFL Embankment slopes.	



Facility: SFL Cover Area Embankment Slopes	
Photo No.: 6	Date: 01/09/2020
Photo Direction: S	
Description: Typical animal activity, indicative of otter burrows observed on west and north SFL Embankment slopes.	



Facility: SFL Cover Area Embankment Slopes		
Photo No.: 7		Date: 01/09/2020
Photo Direction: E		
Description: Typical animal activity, indicative of cow paths observed predominantly on the north SFL Embankment slopes. Also shows typical corrugated plastic pipe observed at various locations on the Cover Area embankment slopes.		
Facility: SFL Cover Area Embankment Slopes		
Photo No.: 8		Date: 01/09/2020
Photo Direction: W		
Description: Typical animal activity, indicative of cow paths observed predominantly on the north SFL Embankment slopes. Photo shows system used to redirect cows away from trodden paths.		

Facility: Active Area Southeast Embankment	
Photo No.: 9	Date: 01/09/2020
Photo Direction: SW	
Description: Typical animal activity, indicative of gopher holes observed the downstream side of the southeast embankment bordering the Active Area.	



Facility: SFL Cover Area North Embankment	
Photo No.: 10	Date: 01/09/2020
Photo Direction: SE	
Description: Typical photo of erosional feature observed on the north embankment	



Facility: SFL Cover Area North Embankment	
Photo No.: 11	Date: 01/09/2020
Photo Direction: SE	
Description: Typical photo of erosional feature observed on the north embankment	



Facility: SFL Cover Area Southeast Embankment	
Photo No.: 12	Date: 01/09/2020
Photo Direction: NE	
Description: Typical photo of erosional feature observed on the southeast embankment	





Facility: SFL Active Area Southeast Embankment	
Photo No.: 13	Date: 01/09/2020
Photo Direction: NW	
Description: Typical photo of erosional feature observed below the southeast embankment of the active area.	



Facility: SFL Cover Area Embankment Crest	
Photo No.: 14	Date: 01/09/2020
Photo Direction: NE	
Description: Typical photo of erosional feature observed at various locations along the crest of the SFL Cover Area.	



Facility: SFL Active Area interior Slopes		
Photo No.: 15		Date: 01/09/2020
Photo Direction: N		
Description: Typical photo of erosion observed on the interior embankment at the northeast end of the Active Area.		
Facility: SFL Active Area Interior Slopes		
Photo No.: 16		Date: 01/09/2020
Photo Direction: NE		
Description: Typical photo of woody vegetation growth on interior embankment slopes.		

Facility: SFL Cover Area Embankment Slopes	
Photo No.: 17	Date: 01/09/2020
Photo Direction: E	
Description: Typical photo of corrugated plastic pipe observed on the embankment slopes of the Cover Area.	



Facility: SFL Cover Area Embankment Slopes	
Photo No.: 18	Date: 01/09/2020
Photo Direction: NE	
Description: Typical photo of corrugated plastic tubes exposed at the toe of the benches. Inlets for these structures were not observed.	

