Gibbons Creek Environmental Redevelopment Group, LLC

2022 GIBBONS CREEK ANNUAL CCR UNIT INSPECTION

Gibbons Creek Steam Electric Station

Anderson, Texas

January 28, 2022

Table of Contents

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SUMMARY OF FINDINGS

An annual inspection of the Coal Combustion Residual units was completed at the Gibbons Creek Steam Electric Station in Grimes County, Texas, on January 19, 2022. The following is a summary list of Critical and Moderate Items observed during the inspection:

Site F Landfill

- Erosion gullies
- Animal burrows
- Trees and bushes growing on embankment

BACKGROUND

40 CFR Subpart D § 257.83(b) and 257.84(b) requires that coal combustion residual units (CCR Units) be inspected annually by a qualified professional engineer. The GCERG, a subsidiary of Charah Solutions, Inc., as the owner of the Gibbons Creek Steam Electric Station (GCSES), has retained HDR to inspect the CCR Units at their facility and prepare a written report.

The CCR units at the GCSES consist of the Scrubber Pond, Ash Ponds, and Site F Landfill. They were visually inspected on January 19, 2022 for features which could undermine the integrity of the containment systems. Items which could potentially affect the integrity of the structure have been documented and recommendations are given for corrective action in this report.

The Texas Commission of Environmental Quality has published guidelines for the safe operation and maintenance of impoundments entitled "Guidelines for Operation and Maintenance of Dams in Texas". The general guidance given in this manual was used as a basis for inspecting the impoundments and in the development of action items. The inspections observed and documented conditions of the upstream embankment, crest and downstream embankment of each impoundment as applicable.

This report provides action items to GCERG based on their relative priority for implementation and communicates that priority by assigning it either a "Critical Item", "Moderate Item" or "Minor Item" classification to each action item identified.

"Critical Items" are items that are critical to the integrity of the impoundment and require immediate attention such as:

- An impoundment about to be overtopped or is overtopping
- An impoundment about to be breached (by progressive erosion, slope failure or other circumstance)
- An impoundment showing signs of piping or internal erosion indicated by cloudy seepage
- Evidence of excessive seepage such as a saturated embankment or seepage on the downstream face of the impoundment
- New embankment slides, structural cracking or sinkholes

"Moderate Items" are items that should be addressed at the earliest opportunity and before the next inspection. Moderate items include:

- Remove all underbrush and trees from the impoundment and establish good grass cover
- Fill animal burrows
- Restore and reseed eroded areas and gullies on impoundment
- Repair defective valves, pipes, walkways, structural foundations and other appurtenant features

"Minor Items" are items which will require continual maintenance by GCERG personnel on a routine basis or require additional inspections and monitoring throughout the year to determine if the item needs to be addressed before it becomes a more serious problem. "Minor Items" include:

- Transmission pipe seepage
- Minor erosion rills
- Mowing of grass/vegetation on embankments
- Moist soils at downstream toe of embankment during dry periods
- Vehicle rutting on crest

Inspections of the GCSES CCR Units occurred on January 19, 2022. The inspections were performed by:

- Stephen Dugger, GCERG Environmental Scientist
- Thomas J. O'Brien, P.E., HDR Engineering, Inc.
- Dave Vogt, P.E., HDR Engineering, Inc.

The last formal inspection of Gibbons Creek's CCR Units occurred on December 9, 2020.

The CCR Units at Gibbons Creek contain liquids, sludges, slurries and/or solid process and waste materials resulting from the combustion of coal. The impoundments inspected at this steam electric station were (Figure 1):

- Site F Landfill
- Ash Ponds A, B, and C
- Scrubber Sludge Pond

Figure 1: Gibbons Creek CCR Unit Locations

The last recorded rainfall event prior to this inspection occurred on January 12, 2022. The site received 0.1 inches of rainfall that day. On the date of inspection, the ground was moist and there were areas of standing water present.

SITE F LANDFILL

The Site F Landfill is located approximately 1.5 miles northeast of the GCSES administration buildings. The landfill area is approximately 95 acres. It was originally constructed with a 3-foot thick compacted clay liner. Approximately 65 acres of the landfill is currently covered with a temporary clay cover which ranges in thickness from 3 to 5 feet. Approximately 25 acres of the facility is open and currently receiving CCR material excavated and hauled from the Ash Ponds and the Scrubber Sludge Pond. The Site F Landfill is registered with the TCEQ as Unit Number 1 with Solid Waste Registration Number 32271.

The Site F Landfill is scheduled to initiate closure operations in the 4th quarter of 2022 when its landfill cap will begin to be installed. The landfill cap will consist of a compacted clay barrier overlain with a geomembrane and geocomposite. The cap liner will than be covered with an 18-inch-thick infiltration layer and 6-inch-thick erosion layer.

In general, the Site F Landfill appeared to be in good condition and well vegetated.

MODERATE ITEM: Animal burrows were found on the outside embankment of the landfill (Figure 2).

Figure 2: Typical Animal Burrow

Recommendation 1: Backfill burrows with compacted cohesive soil and reestablish vegetation. Lightly loosen uppermost soil during reseeding.

Recommendation 2: Continue to monitor restored areas for burrow damage or erosion.

MODERATE ITEM: A small tree and some bushes were found growing on the cap of the Site F Landfill. The root systems of these plants could undermine the integrity of the cover and clay cap (Figure 3).

Figure 3: Typical Tree/Bush on Embankment

Recommendation 1: Remove bushes and trees on cap and repair areas disturbed during removal.

MODERATE ITEM: Erosion areas were forming along the outer embankment (Figure 4).

Figure 4: Side Slope Erosion

Recommendation 1: Backfill bare erosion gullies with compacted cohesive soil and reestablish vegetation.

Recommendation 2: Place riprap or stone in areas of concentrated flow.

Recommendation 3: Continue to monitor areas after repairs for additional erosion.

Recommendation 4: If erosion continues to be a problem at these areas after repair, construct down chutes at these areas to convey water off the closed area.

MINOR ITEM: Vegetation and sediment on concrete drop structures (Figure 5).

Figure 5: Vegetation and Sediment on Concrete Revetment

Recommendation 1: Remove vegetation and sediment as part of routine maintenance.

Site F Landfill Regulatory Conclusion

§ 257.84 (b) (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(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); and

David Vogt, P.E. and Tom O'Brien, P.E, reviewed the 2021 weekly Site F Landfill inspection reports prior to inspecting the Site F Landfill.

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.

David Vogt, P.E. and Tom O'Brien, P.E.,, performed a visual inspection of the Site F Landfill on January 19, 2022 to identify signs of distress or malfunction.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the structure since the previous annual inspection;

No changes in geometry of the structure since the previous annual inspection were observed during the January 19, 2022 inspection.

(ii) The approximate volume of CCR contained in the unit at the time of the inspection;

Approximately 7,370,000 cy of CCR material was contained in the Site F Landfill at the time of 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; and

No appearances of actual or potential structural weakness of the Stie F Landfill, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the Site F Landfill, were observed.

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

No other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection were observed.

ASH PONDS

The Ash Ponds are three adjoining and connected CCR surface impoundments separated by earthen dikes and hydraulic gates. The three ponds (A, B, and C) are located approximately 3,000 feet southeast of the GCSES administration buildings. Each pond is approximately 1,820 feet long and 245 feet wide at the dike crest interior top of bank and approximately 20 feet deep. The total interior area of the three ponds combined is approximately 30.7 acres. The bottom of the Ash Ponds is at elevation 250.0 ft-msl and the crest is at elevation 270 ft msl.

The Gibbons Creek Steam Electric Station was retired and shut down in October 2019. At that time, the Ash Ponds were taken out of service and stopped receiving CCR material. Since the retirement of the facility, site personnel have continued to perform inspections and maintenance on this surface impoundment.

The Ash Ponds are currently being closed through the "closure by removal" process. The CCR material is being excavated from each pond and hauled to the Site F Landfill for disposal (see Figures 6, 7, and 8). The material is being placed in the active area of the Site F Landfill. After the CCR material has been removed, a final visual inspection will be performed on the ponds to confirm the material has been removed and a closure certification will be issued. The Ash Ponds are currently scheduled for closure completion in March 2022.

In general, the perimeter containment dike exterior and crest of the Ash Ponds appeared to be in good condition. No leaks or seepages were noted around the exterior of the ponds.

Figure 6: Ash Pond A

Figure 7: Ash Pond B

Figure 8: Ash Pond C

Ash Ponds Regulatory Conclusion

§ 257.83 (b) (1) If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under § 257.73(d) or § 257.74(d), the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(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., 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);

David Vogt, P.E. reviewed the files available in the operating record, the 2016 structural stability assessment, the 2021 weekly Ash Ponds inspection reports, and the 2020 annual inspection report.

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures; and

David Vogt, P.E. and Tom O'Brien, P.E., performed a visual inspection of the Ash Ponds and appurtenant structures on January 19, 2022 to identify signs of distress or malfunction.

(iii) A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

David Vogt, P.E. and Tom O'Brien, P.E., performed a visual inspection of the hydraulic structures underlying the base of the Ash Ponds or passing through the Ash Ponds for structural integrity and continued safe and reliable operation on January 19, 2022.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(i) Any changes in geometry of the impounding structure since the previous annual inspection;

No changes in geometry of the structure since the previous annual inspection were observed during the January 19, 2022 inspection.

(ii) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;

Instrumentation consists of a level gage at the south end of the Ash Ponds.

(iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;

	Minimum Depth	*Minimum Elevation*	*Maximum Depth*	*Maximum Elevation*	*Present Depth*	*Present Elevation*
Ash Pond A	*1'*	*251.0' msl*	*17.3'*	*267.3'*	*1'*	*251.0'*
Ash Pond B	*0'*	*250.0' msl*	*17.3'*	*267.3'*	*0'*	*250.0'*
Ash Pond C	*0'*	*250.0' msl*	*17.3'*	*267.3'*	*0'*	*250.0'*

(iv) The storage capacity of the impounding structure at the time of the inspection;

The combined storage capacity of the Ash Ponds is 456-acre feet (approximately 152-acre feet per pond).

(v) The approximate volume of the impounded water and CCR at the time of the inspection;

	Water Volume (acre-feet)	*CCR Volume (CY)*
Ash Pond A	*10.2*	*59,810*
Ash Pond B	*1.5*	*28,950*
Ash Pond C	*0.8*	*56,776*

(vi) 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 and appurtenant structures; and

There were no 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 and appurtenant structures observed on January 19, 2022.

(vii) Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

The Ash Ponds are currently being excavated and permanently closed as a CCR Unit. The excavation activities are affecting the ability of the structure to operate as a CCR Unit. Once the excavation is complete and all the CCR has been removed, the Ash Ponds will no longer function as a CCR Unit. After closure is complete, it is recommended that an inspection and engineering analysis of the Ash Ponds be performed if the Ash Ponds are ever returned to service as a CCR Unit.

SCRUBBER SLUDGE POND

The Scrubber Sludge Pond is located approximately 3,300 feet southeast of the GCSES administration buildings. The pond is approximately 750 feet long and 380 feet wide at the north end and 470 feet wide at the south end of the at the dike crest interior top of bank. The pond is approximately 20 feet deep. The total interior area of the pond, as measured from the interior top of crest, is approximately 7.3 acres. The bottom of the Ash Ponds is at elevation 260.0 ft-msl and the crest is at elevation 279.0 ft-msl.

The Gibbons Creek Steam Electric Station was retired and shut down in October 2019. At that time, the Scrubber Sludge Pond was taken out of service and stopped receiving CCR material. Since the retirement of the facility, site personnel have continued to perform inspections and maintenance on this surface impoundment.

The Scrubber Sludge Pond is currently being closed through the "closure by removal" process (see Figures 9 and 10). The CCR material is being excavated from the pond and hauled to the Site F Landfill for disposal. The material is being placed in the active area of the Site F Landfill. After the CCR material has been removed, a final visual inspection will be performed on the pond to confirm the material has been removed and a closure certification will be issued. The Scrubber Sludge Pond is currently scheduled for closure completion in March 2022.

In general, the perimeter containment dike exterior and crest of the Scrubber Sludge Pond appeared to be in good condition (see Figure 11). No leaks or seepages were noted around the exterior of the ponds.

Figure 9: Scrubber Sludge Pond CCR Removal

Figure 10: Scrubber Sludge Pond CCR Removal

Figure 11: Scrubber Sludge Pond Containment Dike Status (typical)

Scrubber Sludge Pond Regulatory Conclusion

§ 257.83 (b) (1) If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under § 257.73(d) or § 257.74(d), the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:

(iv) 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., 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);

David Vogt, P.E. reviewed the files available in the operating record, the 2016 structural stability assessment, the 2021 weekly Scrubber Sludge inspection reports, and the 2020 annual inspection report.

(v) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures; and

David Vogt, P.E. and Tom O'Brien, P.E., performed a visual inspection of the Scrubber Sludge Pond and appurtenant structures on January 19, 2022 to identify signs of distress or malfunction.

(vi) A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

There are no hydraulic structures underlying the base of the Scrubber Sludge Pond or passing through the dike of the Scrubber Sludge Pond.

(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:

(viii) Any changes in geometry of the impounding structure since the previous annual inspection;

No changes in geometry of the structure since the previous annual inspection were observed during the January 19, 2022 inspection.

(ix) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;

There is no instrumentation at the Scrubber Sludge Pond. GCERG staff visually determines water level.

(x) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;

	Minimum Depth	*Minimum Elevation*	*Maximum Depth*	*Maximum Elevation*	*Present Depth*	*Present Elevation*
Scrubber Sludge Pond	*0'*	*260.0' msl*	*3'*	*263.0'*	*0'*	*260.0'*

(xi) The storage capacity of the impounding structure at the time of the inspection;

The storage capacity of the Scrubber Sludge Pond is 115-acre feet.

(xii) The approximate volume of the impounded water and CCR at the time of the inspection;

	Water Volume (acre-feet)	*CCR Volume (CY)*

Scrubber Sludge Pond	*0.1*	*52,551*

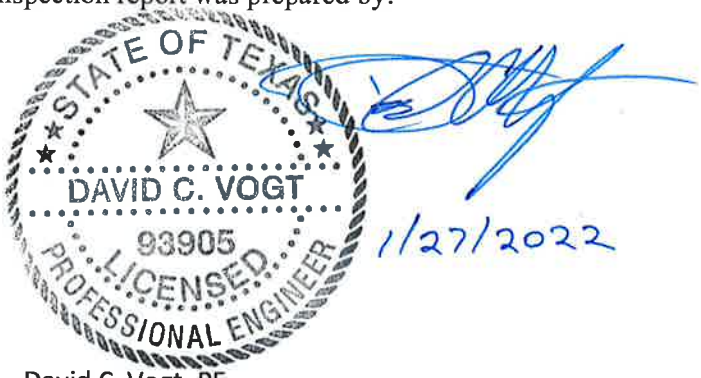
(xiii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures; and

There were no 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 and appurtenant structures observed on January 19, 2022.

(xiv) Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

The Scrubber Sludge Pond is currently being excavated and permanently closed as a CCR Unit. The excavation activities are affecting the ability of the structure to operate as a CCR Unit. Once the excavation is complete and all the CCR has been removed, the Scrubber Sludge Pond will no longer function as a CCR Unit. After closure is complete, it is recommended that an inspection and engineering analysis of the Scrubber Sludge Pond be performed if it is ever put back in service as a CCR Unit.

This inspection report was prepared by:



David C. Vogt, PE

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ATTACHMENT 1 – INSPECTION CHECKLISTS

CCR UNIT INSPECTION CHECKLIST

CCR Unit: Site F Landfill			Inspection Date: 1/19/22	Weather: Overcast and misty										
Inspected By: Stephen Duggar, Tom O'Brien, and Dave Vogt			Last Inspection Date: 12/9/2020											
				Change From Last Inspection					Action					
Element	Item	Component	Current Observations	Similar	Improved	Deteriorated	Unknown		OK	Critical	Moderate	Minor	Monitor
Crest	1	Surface Cracking		X					X				
	2	Animal Burrows		X					X				
	3	Crest Sinks		X					X				
	4	Horizontal Alignment		X					X				
	5	Ruts/Puddles		X					X				
	6	Vegetation		X					X				
	7	Trees		X					X				
	8	Piezometer Readings					X						
	9	Piezometer Condition					X						
Upstream Embankment and Cap Area	10	Cap Erosion		X					X				
	11	Cap Vegetation/Trees		X					X				
	12	Berm Slide, Slough		X					X				
	13	Slope Protection		X					X				
	14	Berm Sinks		X					X				
	15	Animal Burrows		X					X				
	16	Abutment Contact		X					X				
	17	Erosion		X					X				
	18	Vegetation		X					X				
	19	Trees		X					X				
	20	Drains		X					X				
	21	Berm Bulges		X					X				
Downstream Embankment	22	Wet Areas/Seepage		X					X				
	23	Estimated Seepage Rate		X					X				
	24	Seepage Description		X					X				
	25	Toe Drain Status		X					X				
	26	Berm Slide/Slough		X					X				
	27	Abutment Contact		X					X				
	28	Animal Burrows		X							X		
	29	Erosion		X							X		
	30	Unusual Movement		X					X				
	31	Vegetation		X							X		
	32	Trees/Bushes		X					X				
	33	Piezometer Reading					X						
	34	Piezometer Condition					X						

Comments and Photo Information:

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CCR UNIT INSPECTION CHECKLIST

CCR Unit: Ash Ponds A, B, and C			Inspection Date: 1/19/22	Weather: Overcast and misty										
Inspected By: Stephen Duggar, Tom O'Brien, and Dave Vogt			Last Inspection Date: 12/9/2020											
Element	Item	Component	Current Observations	Change From Last Inspection					Action					
				Similar	Improved	Deteriorated	Unknown		OK	Critical	Moderate	Minor	Monitor
Crest	1	Surface Cracking		X					X				
	2	Animal Burrows		X					X				
	3	Crest Sinks		X					X				
	4	Horizontal Alignment		X					X				
	5	Ruts/Puddles		X					X				
	6	Vegetation		X					X				
	7	Trees		X					X				
	8	Piezometer Readings					X						
	9	Piezometer Condition					X						
Upstream Embankment and Cap Area	10	Cap Erosion		X					X				
	11	Cap Vegetation/Trees		X					X				
	12	Berm Slide, Slough		X					X				
	13	Slope Protection		X					X				
	14	Berm Sinks		X					X				
	15	Animal Burrows		X					X				
	16	Abutment Contact		X					X				
	17	Erosion		X					X				
	18	Vegetation		X					X				
	19	Trees		X					X				
	20	Drains		X					X				
	21	Berm Bulges		X					X				
Downstream Embankment	22	Wet Areas/Seepage		X					X				
	23	Estimated Seepage Rate		X					X				
	24	Seepage Description		X					X				
	25	Toe Drain Status		X					X				
	26	Berm Slide/Slough		X					X				
	27	Abutment Contact		X					X				
	28	Animal Burrows		X					X				
	29	Erosion		X					X				
	30	Unusual Movement		X					X				
	31	Vegetation		X					X				
	32	Trees/Bushes		X					X				
	33	Piezometer Reading					X						
	34	Piezometer Condition					X						

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CCR UNIT INSPECTION CHECKLIST

CCR Unit: Scrubber Sludge Pond			Inspection Date: 1/19/22	Weather: Overcast and Misty										
Inspected By: Stephen Duggar, Tom O'Brien, and Dave Vogt			Last Inspection Date: 12/9/2020											
				Change From Last Inspection					Action					
Element	Item	Component	Current Observations	Similar	Improved	Deteriorated	Unknown		OK	Critical	Moderate	Minor	Monitor
Crest	1	Surface Cracking		X					X				
	2	Animal Burrows		X					X				
	3	Crest Sinks		X					X				
	4	Horizontal Alignment		X					X				
	5	Ruts/Puddles		X					X				
	6	Vegetation		X					X				
	7	Trees		X					X				
	8	Piezometer Readings					X						
	9	Piezometer Condition					X						
Upstream Embankment and Cap Area	10	Cap Erosion		X					X				
	11	Cap Vegetation/Trees		X					X				
	12	Berm Slide, Slough		X					X				
	13	Slope Protection		X					X				
	14	Berm Sinks		X					X				
	15	Animal Burrows		X					X				
	16	Abutment Contact		X					X				
	17	Erosion		X					X				
	18	Vegetation		X					X				
	19	Trees		X					X				
	20	Drains		X					X				
	21	Berm Bulges		X					X				
Downstream Embankment	22	Wet Areas/Seepage		X					X				
	23	Estimated Seepage Rate		X					X				
	24	Seepage Description		X					X				
	25	Toe Drain Status		X					X				
	26	Berm Slide/Slough		X					X				
	27	Abutment Contact		X					X				
	28	Animal Burrows		X					X				
	29	Erosion		X					X				
	30	Unusual Movement		X					X				
	31	Vegetation		X					X				
	32	Trees/Bushes		X					X				
	33	Piezometer Reading					X						
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