

Rev. January 22, 2018
(Original Date January 30, 2017)
BBA Project No. 16244

Mr. Robert Stevens, P.E.
Plant Manager
Coletto Creek Power, LP
P.O. Box 8
Fannin, TX 77960

RE: Coletto Creek Power – December 2016 Primary Ash Pond and Secondary Pond Dike Inspection

Dear Mr. Stevens:

Bullock, Bennett, and Associates, LLC (BBA) performed a visual inspection of the Coletto Creek Primary and Secondary Ponds dike systems on December 14, 2016¹. The Primary Ash Pond is approximately 190 acres and the Secondary Pond is approximately 10 acres (the Primary Ash Pond and Secondary Pond are hereafter referred to collectively as the Ponds). The Ponds were constructed in the late 1970s and include a perimeter dike system approximately 2.5 miles in total length. The crest width of the Ponds is approximately 15 feet, and side slopes (interior and exterior) of the Primary Ash Pond were reportedly constructed to 2.5(H):1(V) and the Secondary Pond to 3(H):1(V). The Ponds were reportedly constructed in accordance with Texas Department of Water Resources technical guidelines. Ash material is sluiced to the Primary Ash Pond where most settlement takes place, and water is decanted from the Primary Ash Pond through a weir located within the shared dike between the Ponds to the Secondary Pond. The system is designed such that water can be pumped from the Secondary Pond back to the plant for reuse, or discharged in accordance with the site TPDES permit. However; it's been years since water has been pumped back to the plant for reuse and the pumps are currently not operational. It is also seldom that water is discharged, rather water is typically simply maintained within the Ponds and evaporates.

BBA completed a stability analysis of the Primary Ash Pond in October 2016 as documented in the *Coal Combustion Residuals Surface Impoundment History of Construction and Initial Hazard Potential Assessment, Structural Integrity Assessment, and Safety Factor Assessment – rev. January 24, 2018* report (hereafter referred to as the Structural Integrity Report) prepared for Coletto Creek Power, LP (Coletto Creek Power). The report findings indicate the Primary Ash Pond has adequate factor of safety against structural failure under the steady-state, flood, rapid drawdown, and seismic conditions modeled, and has adequate factor of safety against liquefaction. The dikes of the Ponds range in height from approximately 4 to 56 feet, and have an estimated maximum storage capacity of 3,700 ac-ft as discussed in the Structural Integrity Report, thus making the Ponds intermediate in size. Based on field instrument and LIDAR surveys conducted by AECOM in 2012, AECOM reportedly determined that the Pond dikes, weir structure, and staff gauge had settled uniformly approximately 0.75 feet since original construction in 1977. The AECOM and BBA reports also evaluated the hazard level of the dike system and determined it to be Low Hazard. BBA also completed the *Coal Combustion Residuals Surface Impoundment Inflow Design Flood Control System Plan – Coletto Creek Power Plant – rev. January 24, 2018* (hereafter referred to as the Inflow Design Flood Report). The Inflow Design Flood Report findings indicate the

¹This revised 2016 Inspection Report reflects reclassification and the change in nomenclature for the Secondary Pond and replaces the originally prepared report dated January 30, 2017.

Ponds have sufficient freeboard to meet the hydraulic requirements associated with the 100 yr-24 hr design storm (11.4 inches of rainfall) to prevent overtopping of the dikes.

For the last several years very little ash has reportedly been placed in the Primary Ash Pond, as Boral Materials Technologies (Boral) has been recycling almost all fly ash generated, with the exception of small quantities of off-spec ash which is sluiced to the Primary Ash Pond. Bottom ash is excavated from the Primary Ash Pond by Boral and hauled off site for beneficial reuse, thus creating additional storage capacity in the Primary Ash Pond. Based on topographic and bathymetric survey data obtained by BBA in 2016, it appears there is approximately 1,700 ac-ft of capacity below the top of dike elevation (139.7 ft NAVD88). Required storm water storage capacity was estimated to be approximately 203 ac-ft as reported in the Inflow Design Flood Report, leaving approximately 1,500 ac-ft remaining for use as storage of sluiced CCR materials.

No changes in geometry of the Pond dike systems have occurred since their construction. Records of water level minimum and maximum elevations were not available, however the water level is reportedly typically maintained below elevation 136.1 ft NAVD88 (corresponding to approximately 135.7 feet on the staff plate).

Mr. Dan Bullock, P.E. and Ms. Peggy Hairston, P.E. of BBA performed the site inspection. Rain had reportedly passed through the area approximately four days prior to the inspection, but site conditions allowed access to the entire dike system. Inspection began near Sta No. 105+00 and generally proceeded in a counterclockwise direction (Figure 1). The completed inspection forms are included in Attachment A. Inspection photographs (photos) and the site figure with stationing are included in Attachment B.

PRIMARY ASH POND

Figures 2 through 4 include December 2016 inspection photographs of the Primary Ash Pond dikes.

Interior (upstream) Dike Inspection

Along the perimeter of the Primary Ash Pond, traveling clockwise from approximately Sta 98+00 to Sta 38+00, ash material was observed to an elevation that appeared generally to be 3-5 feet below the top of dike crest elevation (based on visual observation), and the remaining perimeter of the Primary Ash Pond impounds water. Based on staff plate readings it appeared the water surface was approximately 7 feet below the top of perimeter dike, therefore most of the interior dike was covered by ash or was under water and not visible for inspection. The portions of interior dike in areas filled with ash were vegetated and appeared in generally good condition. The interior dike sections in areas impounding water are armored with rock riprap material and appeared in generally good condition. During the 2015 inspection completed by BBA, sporadic small trees were observed in areas along the interior dikes, but these trees appear to have since been removed.

Photos 2159, 2221 and 2304 show inside slope rock armor in areas impounded with water. Photo 2334 shows the inside of the ash pond with a drainage channel cut within the ash to convey sluice material.

Dike Crest Inspection

The dike crest appeared in generally good condition with only minor rutting observed in localized areas. The crest included a perimeter access road comprised of a coarse aggregate base material

with grassed shoulders and grass intruding through the aggregate in the center of the access road (between tire paths).

Exterior (downstream) Dike Inspection

Wet areas were identified near the toe of slope in the approximate area of Sta 84+00 to Sta 90+00, with moist areas, and indications of apparent historic wet areas extending to approximately Sta 95+00. This area has been identified in previous inspections conducted in the 1980s and 1990s, and more recently during the 2015 inspection. The wet areas and associated erosional features are shown in photos 2133, 2144, 2145, 2146, 2147, and 2148. As shown in the photos, some of these areas are wet, ponding and appear associated with recent rain events and possible accumulation of seepage water. The ponded water appeared to have a surface film associated with decomposition of plant (organic) matter, had no appearance of flow, and did not contain suspended sediments. The wet areas have historically been observed with no suspended sediments. There was no discernible subsidence or settlement observed along the interior dike slope, dike crest, or upgradient portions of the external dike slope in these areas. BBA is currently designing a seepage collection system and toe of dike grading plan for implementation to remedy these areas.

The existing seepage collection system sumps located near the pump house in the vicinity east of Sta 70+00 were visually inspected to verify they were operational. The sump located northwest of the pump station (photos 2179, 2180 and 2186) appears to have substantial silt accumulation in the incoming drain pipe. Silt should be removed to facilitate flow. Both pumps systems cycled on and appeared to work properly during the inspection.

Other than the wet areas discussed above, the exterior slope of the dike appeared in good condition. Grass, although in good condition and with good coverage was tall, restricting visibility of the levee exterior side slopes. The grass was reportedly scheduled to be mowed soon.

A small diameter steel pipe was observed on the east dike exterior side slope near Sta 70+00, and appears to penetrate the crest of the dike approximately 2 feet below grade. This pipe appears crushed where exposed on the side slope and is not in use. Photo 2208 shows the approximate dike location of the pipe penetration. A steel pipe was also observed on the west dike shared with the Evaporation Pond, near Sta 29+00 as shown in photo 2329. This pipe appeared to be approximately 18 inches in diameter and discharges into the Evaporation Pond. The pipe appeared to penetrate through the upper portion of dike and was not in use during the inspection. The approximate 6-inch diameter pipe observed at the toe of slope near Station 37+00 during the 2015 inspection was not observed during the 2016 inspection likely due to the tall, thick vegetation restricting visibility.

As shown in photo 2349, pipes penetrate through the upper portion of the dike within approximately 2-3 feet of the crest elevation – this is located along the south end of the Primary Ash Pond where the pond is filled with dry ash material to within a few feet of the dike crest elevation.

Outlet Works

The outlet works from the Primary Ash Pond includes a weir and access walkway as shown in photos 2228, 2237, 2230, 2241 and 2243. Stoplogs were not in place at the time of inspection (photo 2241). The staff plate reading as shown in photo 2237 indicated a water surface elevation of approximately 133.0 ft (approximately 7 feet below top of dike elevation).

Minor cracks were observed in the outlet concrete walkway structure and some expansion joints appear to have larger than average gaps, indicating possible (appeared likely historic) movement. Additionally, when viewed from the side the concrete walkway decking appears to have a slight sag in areas between bents. The railings for the walkway structure are loose and walkway rail bolts are rusted. Cracks, a joint in the concrete decking, and rusted handrail bolts are shown in photos 2230 and 2243.

SECONDARY POND

Secondary Pond dike inspection photographs from December 2016 are provided in Figure 5.

Interior (upstream) Dike Inspection

As indicated in the 2015 inspection report, the Secondary Pond interior side slopes appeared to exhibit minor to moderate and generally uniform bank cut likely due to wave action. This erosion feature appears to have occurred a long time ago given the slope is currently heavily vegetated. At the time of inspection, the water level was low enough to enable access to the interior slope as indicated in the photos. The cut does not appear to be problematic from a dike stability standpoint and no immediate action is required. Maintaining the water level as low as observed during the inspection will prevent future progression of erosion. Alternatively, armoring the slope to reduce future bank cut may be considered to reduce potential future erosion. Other than the bank cut observed, the interior slopes appear well vegetated and in generally good condition. Bank cut erosion is shown in photo 2300.

An approximate 6-inch diameter steel pipeline appears to penetrate the exterior side slope of the Secondary Pond within approximately 2-3 feet of the dike crest near Sta 128+00, and then runs along the Secondary Pond interior side slope of the shared dike as shown in photos 2218 and 2223. During this inspection the pipeline was conveying water from the existing seepage collection system into the Secondary Pond and was discharging into the Secondary Pond near the Primary Ash Pond-to-Secondary Pond outlet works. The pipeline also extends west past this discharge location (through a valve), and appears to penetrate the Secondary Pond west dike (shared with the Evaporation Pond) near Sta 111+00. The penetration appears to occur in the upper 3 feet of the dike crest and transitions into a 12-inch diameter steel pipe along the Evaporation Pond interior side slope. The 12-inch diameter pipe discharges into the Evaporation Pond. A concrete splash pad is located below the discharge pipe invert, at the toe of the Evaporation Pond dike interior side slope as shown in photo 2276. The pipe was not in operation during this inspection.

Exterior (downstream) Dike Inspection

The exterior slope of the Secondary Pond appeared in generally good condition. A section of the exterior slope from approximately Sta 114+00 to Sta 125+00 was enclosed within barbed wire fencing, and including an upper strand of electrical wire that has been added since completion of the 2015 dike inspection. The exterior slope within the fenced area appeared to have been recently grazed, but well vegetated. Vegetation generally appeared to be in good condition with some minor to moderate erosion observed at approximately Sta 115+00 along the intersection of the Evaporation Pond access ramp with the Secondary Pond, as shown in photo 2284. All exterior slopes appeared well vegetated, but with some areas of tall grass limiting visual inspection.

Outlet Works

The pump station used to pump water from the Secondary Pond back to the plant was not operational and was not inspected.

Ponds Inspection Action Items

The following is a list of action items BBA recommends. Additional detail for some of these items is included in the attached inspection report.

- Complete the engineering design currently being developed to address the wet areas identified along the exterior toe of the Primary Ash Pond, and implement the remedy.
- Pipe penetrations observed in the dikes appeared to occur within the upper approximate 2-3 feet of the dike crest, and no substantial dike erosion or indications of settlement were observed in these areas. However; one six-inch diameter steel pipe (near Sta 70+00) observed along the exterior dike slope appeared crushed and inoperable. Coletto Creek should review all pipes that penetrate the levee and consider proper removal of any pipes that may be identified as no longer planned for use. Additionally, given the pipes appear old, BBA recommends inspection of pipe sections that penetrate the dike and will not be removed, and that are accessible for inspection via use of a remote camera system.
- Remove silt accumulation from the existing seepage collection system sump inlet pipe identified in photo 2180.
- For safety purposes, replace severely corroded bolts and tighten the handrails located along the Primary Ash Pond outlet works access walkway.
- Continue to mow the exterior dikes on a regular basis to improve ability to visually inspect the dike, encourage good vegetation, and maintain removal of trees and shrubs.
- Evidence of animal rooting/grubbing on the dike was minimal during this inspection. However, if evidence of increased activity is observed, implement rodent control as needed. Evidence of fire ants was minimal; however, continue to inspect for fire ants especially in summer months and implement fire ant control as needed (fire ant colonies can be intrusive into the dike interior potentially resulting in piping or initiation of erosion areas).

BBA appreciates the opportunity to assist Coletto Creek Power with this project. If you have any questions regarding this inspection report, or if we can be of further assistance, please call us at (512) 355-9198.

Sincerely,

Bullock, Bennett & Associates, LLC



Dan Bullock, P.E.
Attachments



1/22/2018

Texas PE No. 82596
Texas Engineering Firm Registration No. F-8542

ATTACHMENT A

Inspection Reports

NAME OF DAM: Coletto Creek Dike System

INSPECTION DATE: December 14, 2016

AREA INSPECTED	EMBANKMENT 1 OF 2			CHECK (X) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST- IGATE	REPAIR
CREST	1	SURFACE CRACKING	Surface generally appears in good condition.	X		
	2	CAVE IN, ANIMAL BURROW	No cave-ins or substantial animal burrows observed.	X		
	3	LOW AREA(S)	None observed.	X		
	4	HORIZONTAL ALIGNMENT	Good.	X		
	5	RUTS AND/OR PUDDLES	Minor ruts observed in some locations.	X		
	6	PRESENCE/COND. OF VEGETATION	Perimeter access road on crest has road base material, with vegetation on shoulders of crest and in center of road between track paths. Shoulder vegetation in good condition.	X		
	7					
INTERIOR SLOPE	8	SLIDE, SLOUGH, SCARP	No substantial slides, sloughs, or scarp observed.	X		
	9	SLOPE PROTECTION	Rock riprap and vegetation (see additional discussion in Item 13). Generally appears in good condition.	X		
	10	CAVE-IN, ANIMAL BURROW	No cave-ins observed. Evidence of minor animal rooting/grubbing observed in sporadic locations.	X		
	11	EMB.-ABUT. CONTACT	Embankment intersections of Primary Ash/Secondary Ponds appear in good condition.	X		
	12	EROSION	No substantial erosion observed on Primary Ash Pond. Previously observed (September 2015) historic, minor to moderate and generally uniform bank cut of Secondary Pond was observed and appears not to have progressed. If future operations require higher water levels than typically maintained, installation of side slope armor for wave protection is recommended.	X		
	13	PRESENCE/COND. OF VEGETATION	Wave protection armor (rock riprap) covers most of Primary Ash Pond slopes impacted by standing water (see photos). Remaining areas of the Primary Ash Pond and of the Secondary Pond appear covered with vegetation.	X		
<p>Dike crest and interior slope appear well maintained and in good condition. Small trees and shrubs observed in 2015 appear to have been removed. Riprap slope protection material generally appears in good condition.</p>						

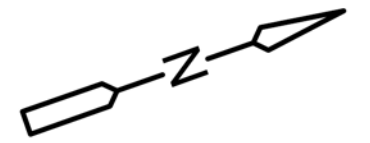
AREA INSPECTED	EMBANKMENT 2 OF 2			CHECK (X) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST-IGATE	REPAIR
EXTERIOR SLOPE	14	WET AREA(S)	Moist and wet areas were observed at toe of slope in approximate area of Sta 84+00 to 95+00. Appears to be a combination of possible seep water and ponding from recent rainfall events.	X		
	15	SEEPAGE	Moist and wet areas observed between Sta 84+00 to 95+00. No flow observed, but surficial erosion was noted. An engineering design remedy is currently being prepared to address this area.	X	X	X
	16	SLIDE, SLOUGH, SCARP	None observed.	X		
	17	EMB.-ABUT. CONTACT	Embankment intersections of Primary Ash/Secondary Ponds appear in good condition. Minor erosion observed at intersection of Evaporation Pond and Secondary Pond along access ramp (near Sta 115+00).	X		
	18	CAVE IN, ANIMAL BURROW	No cave-ins observed. Evidence of minor animal rooting/grubbing observed in sporadic locations.	X		
	19	EROSION	Erosion associated with wet areas (see Items 14/15, above) as shown in photos. Minor erosion observed at intersection of Evaporation Pond and Secondary Pond along access ramp (near Sta 115+00).	X		
	20	UNUSUAL MOVEMENT	No indication of unusual movement observed.	X		
	21	PRESENCE/COND. OF VEGETATION	Grass generally in good condition, but tall in some areas at time of inspection - should be mowed to enhance ability to visually inspect the dikes.	X		
INSTRUMENTATION	22	PIEZOMETERS/OBSERV. WELLS	Not inspected. Piezos and wells observed and inspected during routine groundwater monitoring.	X		
	23	STAFF GAUGE AND RECORDER	Staff plate appeared in good condition. Water surface elevation observed at approximately 133.0 ft (approximately 7.0 feet below top of dike)	X		
	24	SURVEY MONUMENTS	Not observed.	X		
	25	DRAINS	There are no internal chimney drains within dike system. An existing seepage collection system, including 2 sumps and pumps, is located east of Sta 70+00. The sumps were visually inspected to verify they were operational. System appeared to operate properly; however, an inlet line to the west sump was observed with excessive silt accumulation (see photos). Silt should be removed.	X	X	X
	26	FREQUENCY OF READINGS	NA.			
	27	LOCATION OF RECORDS	NA.			
<p>Exterior dike slopes generally appear in good condition; however, wet to moist areas in the proximity of Stat 84+00 to 95+00 were observed. Seepage flow was not detected; however ponding water was observed – likely associated with a combination of seepage accumulation and collection of recent rainfall. An engineering design remedy for this area is currently being developed.</p> <p>Tall grass should be mowed on the side slopes. Some evidence of minor animal rooting/grubbing observed – control of rodents should be implemented as needed.</p>						

AREA INSPECTED	DOWNSTREAM AREA AND MISC. 1 OF 1			CHECK (X) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST-IGATE	REPAIR
MISCELLANEOUS	28	ACCESS ROADS	The dike access road is in good condition and includes a granular wearing surface	X		
	29	SECURITY DEVICES	Site includes manned guard gate and combination of perimeter site fence and natural barriers.	-		

AREA INSPECTED	SPILLWAYS 1 OF 1			CHECK (X) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST-IGATE	REPAIR
INLET	30	Weir	Weir structure intake was submerged and therefore could not be inspected. The walkway access handrails were observed to have corroded bolts and were loose. Handrail bolts should be replaced as needed and handrails tightened.	X		
	31	Trashrack (if applicable)	Not observed.	X		
	32					

ATTACHMENT B

Inspection Site Plan and Photographs



APPROXIMATE SCALE: 1" = 400'



EXPLANATION

- 2276 PHOTO # AND DIRECTION OF PHOTO
- 50+00 PRIMARY ASH POND STATIONING
- 120+00 SECONDARY POND STATIONING



Daniel B. Bullock
1-22-2018

SOURCE: AERIAL PHOTO PROVIDED BY IMAGEPATCH.COM EARTHSTAR GEOGRAPHICS, DATE: MAY-OCT 2011.

Coletto Creek Power, LP

Figure 1

**DIKE INSPECTION
(December 2016)**

PROJECT: 16244 BY: RR DATE: JAN 2018 CHECKED: DBB

Bullock, Bennett & Associates, LLC
Engineering and Geoscience
Texas Registrations: Engineering F-8542, Geoscience 50127

Plot Date: 01/22/18 - 12:09pm, Plotted by: rootjr
Drawing Path: K:\clients\bbba\Coletto CK\ Drawing Name: C-ST-PL131.dwg



2099 - Exterior



2109 - Top of Levee / Exterior



2110 - Top of Levee / Interior Armor



2147 - Exterior Toe (Wet Area)



2148 - Exterior (Wet Area)



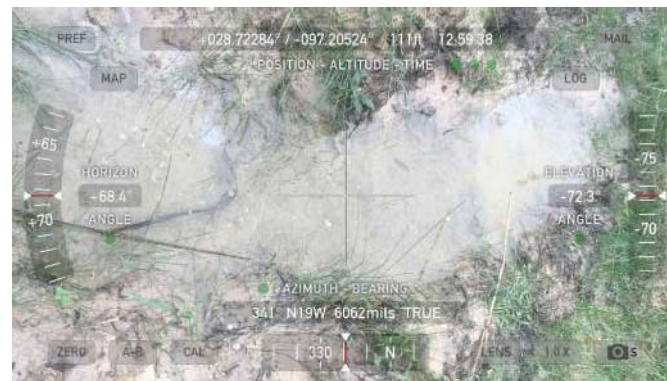
2146 - Exterior - Piezo 9 (Wet Area)



2153 - Exterior Toe (Rodent Grubbing)



2144 - Exterior Toe (Wet/Erosion Area)



2145 - Exterior (Wet Area)



2133 - Exterior - Piezo 20 (Wet Area)



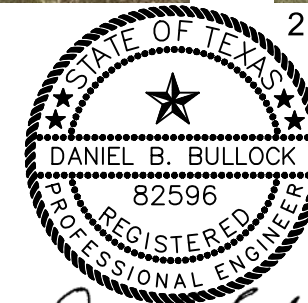
2156 - Exterior



2158 - Exterior

NOMENCLATURE

"Interior" means interior side slope of Primary Ash Pond dike.



Daniel B. Bullock
1-22-2018

Coletto Creek Power, LP			
FIGURE 2 DIKE INSPECTION Primary Ash Pond (December 2016)			
PROJECT: 16244	BY: K2P	DATE: JAN 2018	CHECKED: DDB
Bullock, Bennett & Associates, LLC Engineering and Geoscience Texas Registrations: Engineering F-8542, Geoscience 50127			



2159 - Interior Slope Protection



2208 - Top of Levee / Location of Small Diameter Steel Pipe (shallow - buried)



2221 - Interior Slope Protection



2228 - Outlet Works



2237 - Staff Plate on Outlet Works



2230 - Concrete Decking Joint (at first bent)



2241 - Stoplog Slots



2247 - Water Surface



2243 - Rusted Handrail Bolts and Cracked Concrete - Handrail is Loose



2304 - Interior, Slope Protection (Stone) Covered by Grass



2306 - Top of Levee - Minor Ruts

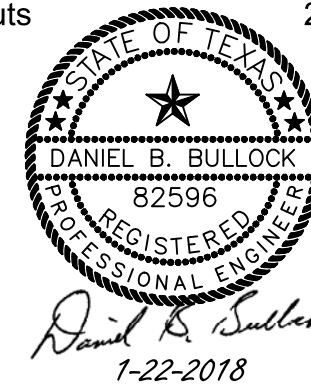


2309 - Exterior

Plot Date: 01/22/18 - 12:03pm; Plotted by: roodjr
Drawing Path: K:\clients\bbba\Coletto CK\ Drawing Name: C-ST-Photos1-2018.dwg

NOMENCLATURE

"Interior" means interior side slope of Primary Ash Pond dike.



Coletto Creek Power, LP			
FIGURE 3 DIKE INSPECTION Primary Ash Pond (December 2016)			
PROJECT: 16244	BY: K2P	DATE: JAN 2018	CHECKED: DBB
Bullock, Bennett & Associates, LLC Engineering and Geoscience Texas Registrations: Engineering F-8542, Geoscience 50127			



2328 - Exterior



2329 - Exterior, Pipe



2334 - Interior (Sluice Discharge Channel)



2336 - Top of Levee



2337 - Exterior



2349 - Exterior / Pipe Corridor



2347 - Exterior



2359 - Top of Levee / Exterior



2161 - Exterior (Ant Bed)



2186 - Seepage Collection System Sump



2179 - Seepage Collection System Sump



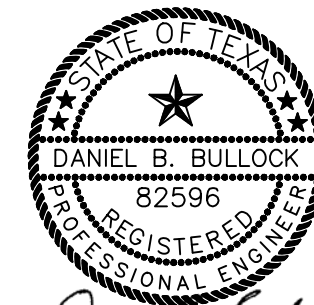
2199 - Seepage Collection System Sump



2180 - Silted Inlet to Sump

NOMENCLATURE

"Interior" means interior side slope of Primary Ash Pond dike.



Daniel B. Bullock
1-22-2018

Coletto Creek Power, LP			
FIGURE 4 DIKE INSPECTION Primary Ash Pond (December 2016)			
PROJECT: 16244	BY: K2P	DATE: JAN 2018	CHECKED: DBB
Bullock, Bennett & Associates, LLC Engineering and Geoscience Texas Registrations: Engineering F-8542, Geoscience 50127			



2209 - Top of Levee, Seep Collection Discharge Pipe (shallow burial)



2210 - Interior



2218 - Interior



2223 - Interior



2276 - Exterior Pipe Outlet



2280 - Exterior



2284 - Exterior, Minor Erosion



2290 - Exterior



2300 - Interior / Bank Erosion

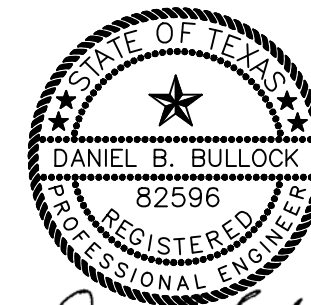


2293 - Exterior, Coletto Creek Reservoir

Plot Date: 01/22/18 - 12:05pm; Plotted by: roodjr
Drawing Path: K:\clients\bba\Coletto CK\ Drawing Name: C-ST-Photos1-2018.dwg

NOMENCLATURE

"Interior" means interior side slope of Secondary Pond dike.



Daniel B. Bullock
1-22-2018

Coletto Creek Power, LP			
FIGURE 5 DIKE INSPECTION Secondary Pond (December 2016)			
PROJECT: 16244	BY: K2P	DATE: JAN 2018	CHECKED: DBB
Bullock, Bennett & Associates, LLC Engineering and Geoscience Texas Registrations: Engineering F-8542, Geoscience 50127			