



SOUTHEAST REGION

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June 9, 2017
Project No. 17-5796

Mr. Ronnie Miller
Manager of Production
Crisp County Power Commission
961 Power Dam Road
Warwick, GA 31796

via e-mail: rmiller@crispcountypower.com

**DAM SAFETY INSPECTION REPORT
PLANT CRISP CCW IMPOUNDMENT
CRISP COUNTY POWER COMMISSION**

Dear Mr. Miller:

This Letter Report summarizes the observations and resulting recommendations from our dam safety inspection of the Plant Crisp Coal Combustion Waste (CCW) Impoundment performed on Friday, May 19, 2017. RIZZO Associates (RIZZO) services for this Project were performed in accordance with our May 1, 2017, Proposal submitted to Crisp County Power Commission (CCPC).

1.0 PROJECT UNDERSTANDING

Plant Crisp is a combined cycle coal and gas power plant located adjacent to Lake Blackshear Dam and Reservoir. The site is located in Worth County, Georgia, near the border of Lee and Crisp Counties. The plant historically has been operated infrequently and typically used natural gas rather than coal when in operation. When operating as a coal-fired plant, Plant Crisp discharged wastewater containing CCW materials into a small impoundment west of the plant. This CCW Impoundment and the discharge from the pond are subject to Environmental Protection Division (EPD) regulation by permit. The permit requires that the impoundment be inspected by a Georgia registered professional engineer and an associated report be submitted to EPD annually. Since the last report, the plant expended the on-site supply of coal in preparation for closing the CCW impoundment in the near future.

In 2014, RIZZO performed a similar inspection as part of a comprehensive evaluation of the CCW Impoundment which included a site survey and drawings, hydraulics and hydrology analyses, and stability analyses in support of CCPC's responses to the Environmental Protection Agency (EPA).

2.0 GENERAL INFORMATION

The inspection of the CCW Impoundment was performed by Mr. Grady Adkins from RIZZO, a licensed professional engineer in the state of Georgia accompanied by Mr. Ronnie Miller of CCPC. The inspection included a review of the weekly Ash Pond Inspection Reports and a walk down inspection of the ash pond. The inspection was performed starting from the East Embankment and proceeding in a counter clockwise direction to the North, West, and South Embankments, respectively. The weather was clear with temperatures in the mid to high 70's. The pool elevation was approximately elevation (EL) 239 feet (ft) (about five ft below the spillway riser) at the time of inspection.

The CCW Impoundment at Plant Crisp is located west of the plant and southwest of the Lake Blackshear Hydroelectric Project. The trapezoidal impoundment consists of built-up earthen embankments on all sides, ranging from 2 ft to 5 ft high (East and South Embankments) to approximately 22 ft high (West and North Embankments). The bottom of the impoundment generally slopes down from east to west. The West Embankment runs against the CCPC property line, with a sand-clay road along its toe on the adjacent property. *Table 2-1* summarizes the general details of the CCW Impoundment.

**TABLE 2-1
CCW IMPOUNDMENT DETAILS**

ITEM	INFORMATION
Geographical Location:	Worth County, GA Latitude: 31° 50' 40.81" N Longitude: 83° 56' 28.74" W
GA Safe Dams Program Size Classification:	Small
EPA-Recommended Hazard Classification:	Low Hazard
Drainage Area:	6.5 Acres
Dam Type:	Earthen Embankment
Maximum Dam Height:	22 ft
Dam Length (Approximate):	Total Embankment: 2,222 ft North Embankment: 720 ft East Embankment: 570 ft South Embankment: 448 ft West Embankment: 484 ft
Design Slopes: (Upstream and Downstream)	2H:1V



**TABLE 2-1
CCW IMPOUNDMENT DETAILS
(CONTINUED)**

ITEM	INFORMATION
Crest Elevation:	245 ft
Normal Pool Elevation:	< 240.95 ft
Reservoir Area:	6.5 Acres
Normal Storage Capacity:	29 ac-ft
Primary Spillway Type	Corrugated metal pipe drop inlet
Primary Spillway Diameter	12" inlet with 24" diameter screen 12" discharge
Primary Spillway Inlet Elevation	240.95 ft
Required Spillway Design Flood (SDF)	0.25 PMP (Based on Georgia Safe Dams Program Criteria)
Primary Spillway Capacity	> 3.2 cfs
Auxiliary Spillway Type	Earth chute at NE corner
Auxiliary Spillway Dimensions	Approximately 6' deep by 80' long

Two discharge lines empty into the CCW Impoundment: a ductile iron pipe that carries water and CCW byproducts from the fossil plant during plant operations and a Polyvinyl chloride (PVC) line that carries miscellaneous runoff and process water from the bag house sump. Plant Crisp burned the remaining on-site coal in the past year resulting in a small additional deposition of CCW materials in the pond. Measurements of the pond were not taken, but the additional material added to the pond was not readily apparent. Photos from our inspection of the pond and surrounding area are attached in *Appendix A*.

3.0 OWNER'S PERIODIC MONITORING

The Owner conducts weekly walk-down Inspections of the Ash Pond and surrounding areas. Fugitive dust issues were added to the weekly inspection check sheet during this year. Weekly Reports are available on the Crisp County Power Commission website. In addition, four monitoring wells were added to study groundwater elevations around the Ash Pond in preparation for executing the closure plan. These wells have been monitored monthly since February 2017.

4.0 FINDINGS

Based on the visual safety inspection and review of available documents the Plant Crisp CCW Impoundment with a suggested hazard classification of "Low Hazard," was found in fair to good overall condition. No signs of slope instability or embankment distress such as sloughs, tension cracks, bulges at the toe of slopes, or excessive crest settlement were noted.



The *Dam Safety Inspection Check List* included in **Appendix B** provides comprehensive listing of the items checked and photograph references. The following findings are of high importance **if the closure plan is not executed**:

1. The slopes of the West Embankment were somewhat overgrown at the time of inspection. In general the growth consists of low ground cover vines and grasses, but an occasional small tree 1 inch to 2 inch in diameter was noted.
2. The exterior slopes of the West Embankment are irregular, with hummocky areas and some vertical surfaces near the crest. Minor surface erosion was noted at several locations. The condition of the West Embankment should continue to be monitored especially if the pond water level is raised.
3. The downstream discharge basin of the spillway appeared to be in good condition. The flared end section and small stilling basin appear to be operating properly. At the time of inspection, no flow was occurring and a small pool of stagnant water was observed at the low point of the stilling basin. Vegetation and woody debris should be removed from the stilling basin and outlet channel in order to not impede flow.
4. The vertical riser of the primary spillway was completely exposed at the time of inspection and appeared to be in good condition. No signs of excessive corrosion or deflection were noted.

5.0 RECOMMENDATIONS

We understand that a CCW Closure Plan has been developed for this site. We offer the following recommendations and comments to assist CCPC in maintaining safe long- term performance of the dam structure and its appurtenant works if the closure plan is not executed.

- **Recommendation 1** – The exterior slopes of the West Embankment should be stripped and restored to a consistent section with compacted engineered fill. After the section is restored, the area should be seeded or sodded as appropriate to prevent further erosion in the area.
- **Recommendation 2** – Visual inspection of the spillway outlet is included in the existing weekly inspection performed by plant personnel. The results of the weekly inspection are documented on a form which is archived at the site. Changes to the volume and turbidity of the discharge should be recorded to provide a record of performance of the spillway over time. Such changes may be indicative of deterioration of the corrugated metal pipe spillway and may make additional activities such as camera inspection with a remotely operated vehicle necessary.
- **Recommendation 3** – The slopes of the North and West Embankments are overgrown and should be mowed or cleared. In particular, small trees should be removed from the slope to prevent negative impacts on the embankments caused by extending root systems.

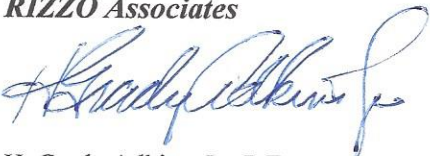


6.0 CONCLUSION

Overall, the CCW Impoundment is in fair to good condition, with adequate vegetal cover and no signs of active slope instability nor other conditions that require immediate action so that the impoundment can continue to operate safely. Spillway capacity has been determined in a previous study to be adequate for the design flood event, and the spillway outlet has been maintained to ensure that flow will not be obstructed when needed. All work performed in connection with this Report conforms to generally accepted engineering practices. All conclusions and recommendations in this Report have been made independent of the Owner, its Employees, and its Representatives.

If you have any questions or require any additional information, please contact me at (803) 673-1861 or via email at grady.adkins@rizzoassoc.com.

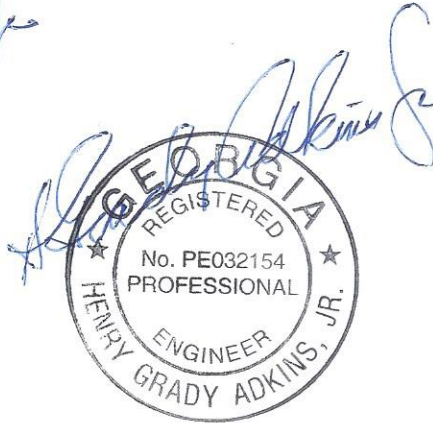
Sincerely yours,
RIZZO Associates



H. Grady Adkins, Jr., P.E.
Engineering Director
Georgia P.E. No 032154

HGA/lk

APPENDICES



6-14-17



APPENDIX A
INSPECTION CHECKLIST



**DAM SAFETY INSPECTION CHECKLIST
PLANT CRISP CCW IMPOUNDMENT**

RESERVOIR AREA			
ITEMS	YES	NO	REMARKS
1. Signs of shoreline instability?		X	
2. Sedimentation?	X		<p>Due to operation of the impoundment as a CCW Impoundment the rate of sedimentation is very slow due to very limited operation of fossil plant. An automatic level control device pumps all runoff, wash and process water, etc. from a sump at the plant. Under current operating conditions, the majority of discharge is stormwater runoff delivered via an 8-inch diameter PVC pipe on the northern side of the East Embankment of the impoundment.</p> <p>CCW is sluiced into the impoundment via an 8-inch ductile iron pipe on the southern side of the East Embankment. CCW solids (bottom ash, other larger granular waste products) are periodically deposited in the impoundment from the east side.</p>
3. Debris?		X	
4. Ice related problems?		X	
5. Operating constraints?		X	
6. Environmental concerns?		X	
7. Rim stability?		X	No issues. Some limited areas of poor vegetal cover.
8. Other?	X		Scrub vegetation grows in impoundment. Inside slopes generally free of brush or tree growth.



**DAM SAFETY INSPECTION CHECKLIST
PLANT CRISP CCW IMPOUNDMENT**

SERVICE SPILLWAY			
12-Inch Corrugated Metal Pipe (CMP) Drop Inlet with 24-Inch Mesh and CMP Trash Rack			
ITEMS	YES	NO	REMARKS
1. CMP Drop Inlet	X		
a. Settlements?		X	None apparent, original installation elevation not available.
b. Displacements?		X	Foundation of inlet unknown but appears to be plumb.
c. Cracking?		X	
d. Deterioration?		X	Galvanized CMP and strainer appear to be in good condition with very little corrosion. A valved/gated opening into the reservoir was included in original construction; however the actuator has since been cut off due to corrosion. Condition of the valve/gate is unknown; however there is zero flow through outlet with pool level below riser inlet elevation. Condition of outlet pipe through embankment not observed. Discharge of outlet pipe was found to be in good condition.
e. Exposed Reinforcement?			N/A
f. Boils Downstream?		X	
g. Springs?		X	None noted, existing ponds/swamp to N and W of impoundment
7. Discharge Channel		X	No discharge channel was provided for the outlet pipe, contributing to the discharge being covered and plugged. Discharge channel should be established.
a. Deterioration?		X	
b. Undercutting?		X	
c. Erosion?		X	
d. Obstruction?	X		Very shallow to no free draining outlet channel



**DAM SAFETY INSPECTION CHECKLIST
PLANT CRISP CCW IMPOUNDMENT**

EARTHEN EMBANKMENTS			
ITEMS	YES	NO	REMARKS
1. Alignment			
a. Alignment?		X	Crest and toe alignments appear uniform.
b. Displacement?		X	
c. Settlement?		X	
2. Deterioration			
a. Erosion?			Some minor surface erosion at locations of concentrated runoff or missing vegetal cover.
b. Sloughs or Slumps?	X		West Embankment – 1 to 1.5 ft-high vertical faces along crest on outside slope at several locations. Exterior slopes on W. Embankment are somewhat irregular/hummocky. No circular slip surfaces or cracks observed..
c. Riprap?		X	None
d. Damage from nuisance wildlife?		X	No burrows or undercuts along the bank noted.
3. Seepage		X	2014 inspection noted wet area on toe of North Embankment. This area was dry and unyielding at the time of inspection.
a. Where?			
b. Quantity?			
4. Abutment Contacts			
a. Abutment instability?		X	
b. Erosion?		X	
c. Undercutting?		X	
d. Visible Displacement?		X	
e. Seepage from Contact?		X	
f. Boils Downstream?		X	
g. Springs?		X	
h. Abutment Shoreline Freeboard?			>8 feet at NE and SE corner
e. Seepage from Contact?		X	
5. Instrumentation	X		Four Groundwater monitoring wells have been installed at this dam. Four months of data collected to date.



Other Comments:

- The outside slope of the West Embankment has several short vertical faces near the crest and hummocky areas. While no signs of active slope movement were noted, these slopes should be regraded to even slopes and reseeded or sodded to provide adequate vegetal cover.
- Minor bare areas and a few vertical faces were observed on the outside slope of the North Embankment. Small trees have grown up in a few places and should be removed.



APPENDIX B

PHOTOGRAPHS





PHOTOGRAPH 1
OLD COAL STORAGE AREA LOOKING WEST TOWARD PONDS



PHOTOGRAPH 2
OLD COAL STORAGE AREA LOOKING NORTH TOWARD HYDRO PLANT





**PHOTOGRAPH 3
CCW SLUICE DISCHARGE AT EAST EMBANKMENT (CAST IRON PIPE)**



**PHOTOGRAPH 4
CCW SLUICE DISCHARGE AT EAST EMBANKMENT (PVC PIPE)**





**PHOTOGRAPH 5
PRINCIPAL SPILLWAY INTAKE RISER – WATER LEVEL
APPROXIMATELY 8 FEET BELOW DECK**



**PHOTOGRAPH 6
PRINCIPAL SPILLWAY EXIT BASIN – OPEN EXIT CHANNEL AND
REMOVE TRASH DOWNSTREAM**



**PHOTOGRAPH 7
ASH POND LOOKING WEST**



**PHOTOGRAPH 8
FROM SOUTH LOOKING TOWARD NORTH AND WEST EMBANKMENTS**





PHOTOGRAPH 9
GROUNDWATER MONITORING WELL ON NORTH TOE OF DAM



PHOTOGRAPH 10
GROUNDWATER MONITORING LEVEL UPSTREAM OF ASH POND

