

Coal Combustion Product Type

Class F Fly Ash

Project Name

Lake Williams Dam Rehabilitation

Project Location

York, Pennsylvania

Project Participants

Eco Material Technologies, Kinsley Construction, Gannett Fleming, York Water Company

Project Completion Date

2023

Project Summary

Lake Williams Dam has been in operation for over a century and provides water and recreational opportunities for 200,000 residents of York and Adams County, Pennsylvania. Operated by the York Water Company—the nation’s oldest water utility—the original dam was built with a soil face on its back that, it was feared, could wash away during an extreme flood. To comply with Pennsylvania Department of Environmental Protection (DEP) Division of Dam Safety requirements and regulations, the dam is undergoing a major overhaul to give it adequate spillway capacity to safely pass a Spillway Design Flood equivalent to 100 percent of the Probable Maximum Flood.

Project Description

To bring the dam up to DEP specifications, plans called for replacing the existing gated concrete spillway with a new labyrinth spillway structure and armoring the dam embankment with roller compacted concrete (RCC) to provide an auxiliary spillway that could be activated during extreme flood events. The design also included construction of a new non-overflow gravity dam, outlet works, and an RCC concrete stream crossing.

Given the requirement for high-strength concrete, and the potential for excessive heat of hydration in the mass placement, use of a fly ash-heavy mix was an obvious choice. But with fresh fly ash temporarily unavailable locally, Kinsley Construction officials looked further afield for their supply—to Eco Material’s Montour County monofill—which has been harvesting approximately 100,000 tons of previously disposed fly ash annually for several years now for sale into the concrete construction market.

Placement of the first 5,500 CY of RCC at Lake Williams was carried out in October thru December of 2022 utilizing 620 tons of fly ash at 50 percent substitution for cement (225 lbs. fly ash/CY) before operations went on hiatus for the winter. Thus far in 2023, approximately 1,040 tons of fly ash has been used to place a further 9,200 CY of RCC. On completion of the dam construction—expected in late 2023—a total of 46,000 CY of RCC is expected to have been placed incorporating 5,200 tons of fly ash.

Fly ash is also being used (at a rate of 125 lbs./CY) in the placement of 1,500 CY of various other concrete elements, including a bedding mix (placed on the grade prior to RCC mix placement) and self-compacting concrete and Class D concrete mixes used for miscellaneous structures and

equipment-anchoring concrete. Project officials anticipated that concrete placement would again pause in the spring, as higher temperatures increase the risk of thermal cracking, with operations recommencing in the fall.

“This is a great opportunity for us to showcase the reliable, high-quality ash supply that we have at our Montour facility,” says Terry Peterson, Eco Material’s Vice President, East Region. “Montour holds roughly two million tons of low-moisture, low-LOI fly ash that we expect there to be great demand for as fresh production ash supplies continue to decline in the future.”

