

### Coal Combustion Product Type

Fly Ash

### Project Name

Metolong Dam

### Project Location

Maseru, Lesotho

### Project Participants

Lafarge South Africa, Ash Resources, Sinohydro, Arcus GIBB, CDM Smith

### Project Completion Date

2014

### Project Summary

The region surrounding Maseru, capital of the land-locked country of Lesotho in southern Africa, has traditionally suffered from water shortages. That situation has been greatly alleviated with the construction of a 272-foot-high roller compacted concrete dam on the Phuthiatsana River. The Metolong Dam, which reached its full capacity of 51,000 acre feet in 2018, now supplies water for roughly two-thirds of the country's 2 million people—as well as the country's textile industry, an important source of employment.

### Project Description

The project design called for construction of a 919-foot-long dam estimated to require 431,623 cubic yards of roller compacted concrete (RCC) and 52,300 cubic yards of conventional vibrated concrete (CVC). As with any project involving

mass concrete placement, heat of hydration was a potential concern.

Lafarge South Africa proposed usage of its Powercrete Plus CEM II, a low-heat cement that incorporates 15 percent siliceous fly ash and has the ability to be extended further onsite with additional fly ash. After laboratory testing, a mix of Powercrete Plus and DuraPozz siliceous fly ash, from Ash Resources' Lethabo facility, were used as binder material in both the RCC and CVC mixes. The final formulations used were a 66 percent fly ash blend for the RCC mix and a 52 percent fly ash blend for the CVC mix.

Contractor Sinohydro required Lafarge to maintain an eight-day supply of materials onsite to avoid the possibility of shortages that could interrupt project work. Sinohydro built an onsite batch facility and, over the course of the dam's construction, routinely oversaw the placement of over 1,000 cubic yards of concrete in a 12-hour shift. In addition to reducing the heat of hydration, use of the high-volume fly ash mixes allowed the company to reduce the cement content from the initial design levels.

The total amount of fly ash incorporated into the construction of the dam is estimated to have been 33,000 tons. Ash Resources delivered a further 4,000 tons of fly ash to ready-mix concrete producers and other contractors for use in the construction of the Metolong Dam and Water Supply Programme's (MDWSP's) water treatment works, a raw water reservoir, and segments of several water pipelines.

MDWSP was recognized in 2015 by the Construction Management Association of America for excellence in two separate award categories: Infrastructure and International.



Photo: Lafarge South Africa