

# Submerged Grind Conveyor Helps Plant Eliminate Ash Pond

PROJECT CASE HISTORY

## Plant Description

Platte River Power Authority's Rawhide Energy Station, northwest of Wellington, Colorado, is among the most efficient plants in the western U.S., averaging an equivalent availability factor of more than 90 percent and an average capacity factor of nearly 90 percent. The plant generates and transmits power to homes and businesses throughout its owner-communities in Estes Park, Fort Collins, Longmont and Loveland, Colorado.

The plant features a 280 MW boiler originally supplied in 1984 and fueled by nearby Powder River Basin coal reserves.

## Project Challenge

To comply with the U.S. EPA's Coal Combustion Residual (CCR) rule and other pending legislation aimed at mitigating environmental risks associated with long-term storage of ash in impoundments, plant operators sought to remove its aging sluicing system and close down its bottom ash pond.

In addition to environmental compliance, the solution needed to take into account:

- Site-specific logistics for space
- Condition of existing equipment
- Outage plans
- Ongoing maintenance requirements
- Operational simplicity, flexibility and redundancy

The Platte River team performed a detailed review of available technologies. Some involved sluicing the ash with transport water, then recirculating and reusing the water. This carried the risk of an unintentional discharge of a zero-discharge stream, as well as the high cost and complexity of recirculating millions of gallons of water a day. Other technologies eliminated these risks associated with the sluiced water stream, but required more work and space around the boiler area that didn't exist.

The team then considered the newly developed Allen-Sherman-Hoff® Submerged Grind Conveyor (SGC) from Babcock & Wilcox (B&W), which was designed to address and eliminate these very issues.



B&W's SGC transfers ash to a bottom ash bunker.

## Solution

Platte River selected B&W's SGC. The SGC is a bottom-carry conveyor, with both the conveying and return sections housed in a common water-impounded, water-tight housing. It did not require removal or demolition of the ash hopper or replacement of the boiler seal plates as do traditional submerged chain conveyors, thus reducing conversion costs. The SGC also:

- Avoided the use of transport water and zero-discharge requirements
- Has a compact and flexible design that maximized use of existing space and equipment
- Offered redundancy for uninterrupted power
- Reduced maintenance typically associated with a dry ash return section

## B&W Scope

- Engineer and supply of two Submerged Grind Conveyors, each 108 ft (32.9 m) long and 2.6 ft (800 mm) wide
- Four double roll clinker grinders
- Two centrifugal pumps, four hydro-ejector jet pumps, associated piping, valves and nozzles for mill reject conveyance
- Two dry economizer chain conveyors, 39 ft (11.9 m) and 66 ft (20.1 m) respectively
- Local control panels, push-button stations and variable frequency drives (VFDs)



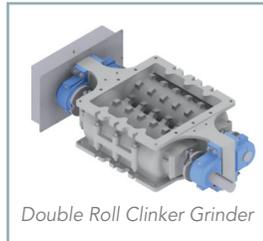
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## System Description

B&W's low-profile SGC technology allowed the plant's existing ash hopper to be retained in place. To fit the conveyors below this existing structure, B&W integrated its proprietary low-profile double roll clinker grinder into the design.

The use of clinker grinders to reduce particle size below about 3 in (7.6 cm) permits the conveyor housings to be small, which enables it to fit beneath and around existing structures.



The SGC chain tensioning design is fully submerged, which allows it to be tightly packaged in the conveyor housing. This avoids the conventional tall take-up towers to elevate above the water level in the hopper.

Because the existing ash hopper was kept in tact, little construction scope was required.

Also, the SGC provided 100 percent redundancy, something other under-boiler technologies could not provide.

## Results



- Performance guarantees and targets for the ash's final moisture content and all other criteria were met
- The conveyor's chain has not shown any visible wear in its first year of service
- Substantial cost savings were realized in capital (equipment and installation) and operating expenses in converting from a high-pressure sluicing system to B&W's SGC

## The Babcock & Wilcox Company

1200 E Market Street, Suite 650  
Akron, Ohio, U.S.A. 44305  
Phone: +1 330.753.4511

[www.babcock.com](http://www.babcock.com)    

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