

INDUSTRIAL CATEGORY

# Innovative Repairs Preserve 40-Year-Old Cooling Tower at Coal Creek Power Station

UNDERWOOD, ND

SUBMITTED BY VECTOR CONSTRUCTION INC.

Coal Creek Station operates two late 1970s vintage generators with three mechanical draft cooling towers, each 42 ft (13 m) high and 225 ft (69 m) in diameter. After 40 years of use, cooling tower #91 was showing its age. If the entire cooling tower was demolished and rebuilt, it would be very costly and require a long downtime.

Fall of 2016, the tower was shut down for one week to inspect and pre-plan an efficient shutdown the



following May. A visual inspection and sounding survey was conducted to identify defects, estimate quantities of repair, develop a repair strategy, and to create a detailed project schedule.



Accordingly, an extensive restoration and rebuild of the cooling tower was planned during a 6.5 week shutdown in May 2017. Rebuilding the cooling tower required the following steps: 1) Demolition of the exterior

lumber and sheet metal structure, 2) Concrete rehabilitation, and 3) Installation of the new field-erected exterior fiber-reinforced polymer (FRP) structure.

To preserve the structure, the concrete repair scope of work included:

- Delaminated and spalled concrete removal at beams, columns and walls and replacement with high performance concrete;
- Type 1A alkali-activated embedded galvanic anode installation to mitigate repair accelerated corrosion;
- Precast concrete joint repair and waterproofing;
- Removal of severely deteriorated precast concrete beams and replacement with new beams constructed with high performance concrete;
- Vertical joint repair between the cold-water basin wall and the flume wall;
- Epoxy injection to bond and seal cracks;
- Installation of new reinforced concrete pedestals into the cold-water basin and trench to support the new FRP structure; and
- Installation of epoxy coating on hot water basin and vertical directional fins.

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