

## AWARD OF MERIT

WATER STRUCTURES CATEGORY

# Innovative Repairs Restore Northern Spillway Pier

MANITOBA, CANADA

SUBMITTED BY VECTOR CONSTRUCTION LTD.—WINNIPEG, MANITOBA, CANADA



The Slave Falls Generating Station is located on the Winnipeg River, about 35 km (22 miles) east of Lac du Bonnet, Manitoba. The first unit went into service in 1931, 3 years after initial construction began on the \$8.3 million facility. By the time construction was completed in 1948, eight vertical propeller type turbine generators were in service with a combined capacity of 68 MW. Today, the generating station has an average annual generation of 499 million kWh.

After 87 years of service in an aggressive northern environment, the structure needed some maintenance. Yearly safety inspections between 2008 and 2017 showed an escalation in deterioration and spalling at the base of the pier, suggesting freeze-thaw damage and corrosion of



the reinforcing steel. Of primary concern was the increasing risk of structural failure, which could result in an uncontrolled flow of water.

To fully assess the integrity of the existing concrete, a combination of destructive (concrete cores) and non-destructive testing (hammer sounding and sonic/ultrasonic testing) was conducted. The results of the evaluation indicated that one of the piers (Pier 1) had concrete defects beyond the original scope of the project, requiring far more work than concrete “chip-and-patch” repairs. The results prompted an immediate project shut-down to develop a new scope of work to address safety concerns. A concrete containment wall—or “jacket”—was devised as a temporary stabilization solution which would allow the spillway to operate normally, along with containing the pier in the event of a failure.

After safe access to the work area was established and water control measures had been completed, heating and hoarding on Pier 1 was necessary to allow it to warm above freezing to ensure the existing concrete sluiceway was safe to construct the concrete containment wall.

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OWNER

**Manitoba Hydro**

Winnipeg, Manitoba, Canada

REPAIR CONTRACTOR

**Vector Construction Ltd.**

Winnipeg, Manitoba, Canada

MATERIALS SUPPLIER/MANUFACTURER

**NDT Corporation**

Sterling, MA