The Otter Rapids Generating Station is a 40-year-old, hydroelectric generating station with four 46 MVA generators. The station is unique in that the two dual secondary generator step-up (GSU) transformers are both equipped with a high voltage tap-changer allowing the station to transmit power at either 115 or 230 kV.

Challenges
Low voltage bus ties add to the complexity of the station protection scheme.

Solution
The scope of the project included:
• Protection system design, including updates to station one-line diagram
• New elementary and connection wiring diagrams
• Procurement and fabrication of the new relay panels
• Installation and commissioning

Results
Installation was performed in two separate outages, requiring that half of the station remain in operation during the changeout. The Otter Rapids digital protection upgrade comprised the following protection elements:
• Generator A and B multifunction relays (MFRs)
• Generator split-phase differential protection
• Separate field ground detection

Project highlights:
• Turnkey project
• Generator protection
• Bus protection
• Transformer and line protection

Out with the old, in with the new