Bringing new life

to ANDRITZ legacy equipment

Old Hickory, USA – U.S. Army Corps of Engineers' (USACE) Nashville District has awarded ANDRITZ a contract for rehabilitation of the turbines and generators at the 162 MW Old Hickory hydroelectric power plant.

The contract scope is to re-equip the turbines and generators for Unit 1 through Unit 3, with an option to re-equip the turbine for Unit 4 as well. The generator for Unit 4 was recently rehabilitated under a separate contract. This new contract includes the design, manufacture, transport, erection, testing, and commissioning of three Kaplan turbine generator units with a capacity of 40.5 MW each, along with associated auxiliaries and ancillary equipment.

The Old Hickory power plant is a run-of-river generating station with a 91 km² reservoir. Located on the Cumberland River in Central Tennessee, the Old Hickory Lock and Dam is located about 25 miles upstream from the city of Nashville. The dam and reservoir are named after US President Andrew Jackson whose nickname was "Old Hickory" and who had lived in the nearby area. This is the second major contract ANDRITZ has been awarded by USACE's Nashville District, the first being the contract to re-equip the four turbine-generator units at Barkley hydropower plant in September 2020, further establishing the ANDRITZ-USACE-Nashville partnership.

Commissioned between 1955 and 1957, the original units are vertical-axis, five-bladed Kaplan turbines with diameters of 6,705 mm (264 inches) and a synchronous speed of 75 rpm. The turbines/generators were manufactured by the ANDRITZ legacy OEMs Baldwin-Lima-Hamilton Corporation (BLH) and General Electric Company (GE). Their original nameplate ratings are 31,250 kVA, 25,000 kW, 13.8 kV, and 0.8 pf.

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ANDRITZ will replace the five-bladed Kaplan turbines with seven-bladed machines to accomplish the 45% uprating required and meet the cavitation requirements as set out in the contract. The replacement units will have nameplate ratings of 45,000 kVA, 40,500 kW, 13.8 kV and 0.90 pf. ANDRITZ' proposed turbine design also includes increases of the rated efficiency, which results in a significant net present value saving for Nashville District USACE.

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The modernization of Old Hickory is executed by an international ANDRITZ team. Five ANDRITZ locations will participate in the project. The leading company is ANDRITZ Hydro Corp. in Charlotte, North Carolina, USA. They will be supported by ANDRITZ locations in Peterborough, Canada, for generator design and manufacturing of the multi-turn coils; in Pointe Claire, Canada, for the hydraulic layout and turbine design, whereas final machining, assembly and testing of the runners will take place at the ANDRITZ workshop in Morelia, Mexico, and the

Powerhouse of Old Hickory on the Cumberland River

TECHNICAL DETAILS

Total output: 162 MW
Scope output: 4 × 40.5 MW
Head: 13.72 m (45 ft.)
Voltage: 13.8 kV
Speed: 75 rpm
Runner diameter: 6,705 mm (264 inches)
Av. Annual production: 565 GWh

model test will be performed in the high-performance test lab in Linz, Austria.

One of the many challenges to overcome during the execution of the project is to return the units to concentricity. The stationary and rotating components of Old Hickory Units 1-3 are out of concentricity by as much as 6.5 mm due to historical powerhouse movement.

Once fully commissioned, power generation of Old Hickory hydropower plant is estimated to be about 565 GWh per year. Commissioning of the first unit is expected in August 2026.

By securing this prestigious contract, ANDRITZ has further consolidated its position as a leading player in the United States' hydropower market.

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