

available, reliable, cost-effective, nonpolluting, and acceptable to the public. Using wood fuel as a generation source could produce important benefits: putting money back into the Vermont economy, improving the condition of the state's forests, and providing jobs for Vermonters.

The pulp and paper industry had proven for years that bark and wood chips could be burned efficiently and with good environmental controls. The real unknown was the availability of a fuel delivery network that could reliably supply wood fuel at a reasonable price. In 1977, Unit 1 at Moran Station was modified for wood chip cofiring. Based on the success with Unit 1, a second unit was converted to wood in 1979. In 1983 the Moran plant used more than 100,000 t of wood chips for fuel in addition to 30,670 tons of coal, 146 million ft³ of natural gas, and 121,011 gal of No. 2 fuel oil. Economic and technical studies verified that expanded wood firing was viable.

A bond issue was passed by the voters of the City of Burlington in 1978 to finance the construction of the McNeil Generating Station. In 1979, C.T. Main was hired to design the plant and to help with the permitting requirements and construction management. The station was sited on a parcel of land known as the Intervale on the north side of Burlington. In September 1981, permits were received and site preparation began.

By October 1983 the ESP and steel building structure were essentially completed. Construction of the main power boiler began in August 1982; the boiler was hydrotested in April 1983. The turbine-generator set, manufactured in Switzerland, arrived in May 1983 and was first operated in January 1984. On June 1, 1984, the McNeil Generating Station began commercial operation, producing power as dispatched by New England Power Exchange.

The final cost of constructing McNeil was \$67 million (1984 dollars)—\$13 million below the budget estimate of \$80 million. The McNeil Station is jointly owned by BED (50%), Central Vermont Public Service Authority (20%), Vermont Public Power Supply Authority (19%), and Green Mountain Power Corporation (11%).

Advanced Renewable Technology Development

Vermont Gasification Project

In August 1994 the U.S. Department of Energy (DOE) entered into a cooperative agreement with Future Energy Resources Corp. and an industrial and utility consortium to design, construct, and validate large-scale integrated gasifier and gas turbine combined cycle technology at the McNeil Station. The "Vermont Gasification Project" is testing and operating an indirect biomass gasifier developed by Battelle Columbus Laboratories. During the initial operating phase (ongoing), the gas produced by the gasifier is burned in one of the natural gas burners of the McNeil boiler. Upon successful demonstration of the gasifier, a hot gas cleanup system and a commercial-scale (15-20 MW_e) gas turbine will be incorporated into the system.

The Battelle gasification process is an indirectly heated CFB system that has more than 20,000 successful hours of operation at Battelle Columbus at the 10 t/d pilot plant scale. Wood or other biomass is gasified with a mixture of steam and hot sand. Hot medium-Btu gas leaves the gasifier with the sand and a small amount of charred wood. The sand is captured and recycled, while the charred wood is combusted in an FBC that provides heat