

# McGuire Nuclear Station



## McGuire Quick Facts

**Groundbreaking:** 1971

**Commercial operation:**

Unit 1 – 1981

Unit 2 – 1984

**Number of units:** 2

**Reactor type:** Pressurized water reactor (PWR)

**Station capacity:** 2,316 megawatts, enough to power more than 1.7 million homes\*

**Employs:** more than 500 people with additional contingent workers during refueling outages

**Nuclear fleet taxes:** More than \$240.6 million in 2020 (property and payroll taxes)

\*According to the Nuclear Energy Institute, 1 MW of electricity produced by nuclear energy would supply electricity to power more than 750 homes.

## General Information

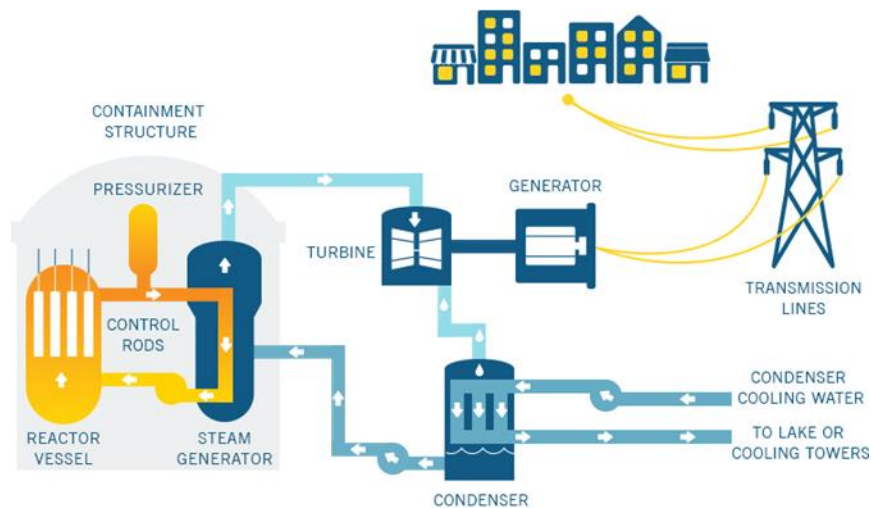
McGuire Nuclear Station is located on Lake Norman in Mecklenburg County.

McGuire Nuclear Station personnel remain committed to operating the units safely and reliably and being a good neighbor.

- Lake Norman is the state's largest manmade lake, built by Duke Energy in 1963 by damming the Catawba River with Cowans Ford Hydroelectric Station.
- Issued a 20-year extension on its license by the Nuclear Regulatory Commission or NRC (all U.S. reactors were initially licensed for 40 years).
- McGuire has upgraded plant equipment, including the generator stator and transformer in the past few years, ensuring safe and efficient operation of its two units.

## Conserving Resources

Because nuclear power plants do not burn fuel, they produce no greenhouse gas emissions while generating electricity. In fact, more than half of America's carbon-free electricity comes from nuclear energy. In 2020, operation of McGuire Nuclear Station avoided the release of nearly 12.8 million tons of carbon dioxide (if that same generation was produced with coal, oil and natural gas).



## Nuclear Fundamentals

McGuire Nuclear Station uses uranium as its fuel. Each uranium pellet, less than one inch long, is enclosed in metal rods 12 feet tall. There are 230 pellets per rod, 264 fuel rods in a fuel assembly and 193 fuel assemblies in each of the two reactor cores.

In a process called nuclear fission, a source emitting free neutrons is inserted into the uranium fuel core. The uranium fuel absorbs these free neutrons, becomes less stable and releases additional free neutrons. This movement of free neutrons creates heat that is used to generate electricity. Here is how it works:

- Water circulates through the nuclear core reaching 600 degrees F by removing heat from the fission process. (Neutron absorbing control rods are lowered into the fuel core to slow or stop this process.)
- This heated water travels to large steam generators or “heat exchangers.”
- This 600-degree F water flows through thousands of tubes inside the steam generators while cooler water circulates on the outside of these tubes and becomes steam.
- The steam flows to a turbine and spins large blades attached to a shaft and generator, producing electricity.
- This steam then flows across a set of metal tubes containing cool lake water which condenses the steam for reuse in the steam generators.
- This lake water flows down a cooling system before discharging back into Lake Norman.

## EnergyExplorium

The EnergyExplorium is McGuire Nuclear Station’s education center, offering fun experiences for everyone. While it is currently closed to the public, we are still offering virtual presentations and events. For more information, visit [duke-energy.com/energyexplorium](http://duke-energy.com/energyexplorium).

## Nuclear Safety

- Nuclear stations have multiple, robust safety barriers in place.
- Each containment building housing the nuclear fuel core is made of concrete 3 feet thick with a 3/4-inch-thick steel liner.
- The reactor vessels containing the nuclear fuel are 44 feet tall and 14 feet in diameter and constructed of 8 1/2-inch-thick steel.
- Each unit has redundant safety systems including multiple pumps and backup electrical supply systems.
- Nuclear stations are built to withstand a variety of external forces, including hurricanes, tornadoes, fires, floods and earthquakes.
- Duke Energy works closely with the NRC, various federal agencies, state agencies and local governments to maintain emergency response plans that ensure close coordination with these groups.

## Nuclear Security

- Nuclear stations have numerous security features, seen and unseen.
- Armed, highly trained security professionals provide 24-hour protection.
- Physical barriers and electronic surveillance systems surround McGuire.
- Access is tightly controlled, and nuclear employees must pass strict background, psychological and drug/alcohol screenings.

## Radiation

- Radiation is a natural part of our environment.
- We receive radiation from the sun, minerals in the earth, food, etc.
- The amount of annual radiation at a nuclear plant site boundary is less than a passenger receives during a round-trip, coast-to-coast airplane flight.