

# Brunswick Nuclear Plant Fact Sheet



## Brunswick Quick Facts

**Groundbreaking:** 1970

**Commercial operation:**

Unit 1 – 1977

Unit 2 – 1975

**Number of units:** 2

**Reactor type:** Boiling water reactor (BWR)

**Station capacity:** 1,870 megawatts, enough to power more than a million homes

## General Information

Brunswick Nuclear Plant is located two miles north of Southport, N.C.

Brunswick plant personnel remain committed to operating the units safely, reliably and maintaining a good relationship with the community.

- Issued a 20-year extension on its license by the NRC (all U.S. reactors were initially licensed for 40 years).
- The Brunswick site includes 1,200 acres adjacent to the Cape Fear River.
- The Brunswick Plant is a General Electric designed boiling water reactor.

## Nuclear Safety

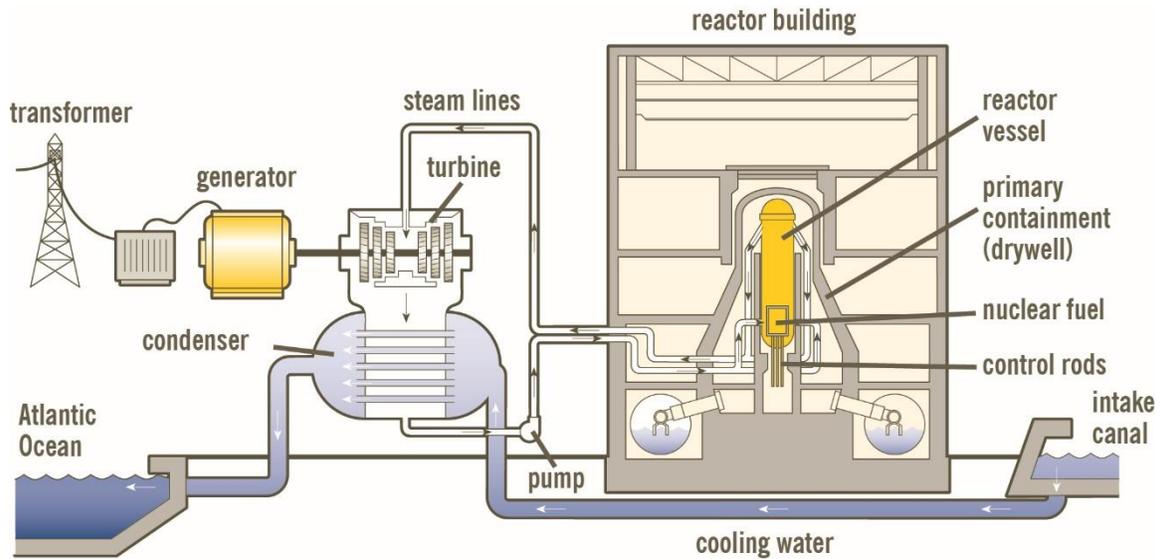
- Nuclear stations have multiple, robust safety barriers in place.
- Each unit has a concrete containment building and a steel chamber (drywell) surrounding the reactor vessel that houses the nuclear fuel core.
- Each unit has redundant safety systems such as multiple pumps and backup electrical supply 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 Nuclear Regulatory Commission (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 Brunswick.
- 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 flight.



## Nuclear Fundamentals

Brunswick Nuclear Plant uses uranium as its fuel. Each uranium pellet, less than one inch long, is enclosed in metal rods 12.5 feet tall. There are approximately 350 pellets per rod, 85 fuel rods in a fuel assembly and 560 fuel bundles in each reactor core.

In a process called nuclear fission, a free neutron strikes a uranium atom in the fuel and breaks the atom into smaller atoms and additional free neutrons. The neutrons sustain the nuclear chain reaction by striking additional uranium atoms. The kinetic energy (movement) of the two smaller atoms creates heat used to generate electricity. Here is how it works:

- Water circulates through the nuclear core reaching 530 degrees F by removing heat from the fission process.
- Neutron absorbing control rods are inserted into the bottom of the fuel core to slow or stop this process.
- This heated water turns to steam in the reactor vessel and travels to a turbine and generator.

- The steam spins the large turbine blades attached to a common shaft and generator, producing electricity.
- This steam then flows across a set of tubes containing cool Cape Fear River water that condenses the steam for reuse in the nuclear reactor cooling system.
- This river water flows down a cooling canal and is discharged into the Atlantic Ocean.
- Since water in the Cape Fear River is brackish (part salt water and part fresh water), sometimes foam can be observed on the surface of the cooling canal. This foam is the same foam that waves make on the beach.

## 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.