Cooper Nuclear Station Facts

Generating Capacity:
810 megawatts (net)

Type: Boiling water nuclear reactor

Generator manufacturer:
Westinghouse

Reactor manufacturer:
General Electric

Construction cost: $313 million

Milestones:
June 4, 1968 - Construction permit granted
May 10, 1974 - Plant sychronized to grid
July 1, 1974 - Commercial operation began
Nov. 29, 2010 - NRC extends Cooper's original license through 2034.
Cubic yards of concrete: 90,000

Tons of steel: 10,000

Piping: More than 50 systems

Electrical cable: 1,100 miles

Location size:
1,351 acres (1,121 acres in Nebraska and 230 on the opposite bank of the Missouri River in Missouri).

Station personnel:
Approximately 730 full-time

Environmental Protection

Nuclear energy is environmentally friendly. Nuclear energy is America's largest source of clean-air, carbon-free electricity, producing no greenhouse gases or air pollutants. The industry's commitment to the environment extends to protecting wildlife and their habitats.

After nuclear fuel has been used for about five years, it loses much of its heat-generating capacity. It is removed from the reactor and placed into a deep pool of water in the used fuel pool at the plant site where the residual decay heat is continuously removed and where the water acts as a barrier to stop radiation from leaving the used fuel pool.

The Federal government is responsible for the long-term storage of all used nuclear fuel. Efforts to develop a central Federal repository located at Yucca Mountain in Nevada have not been successful. Until a federal storage repository is available, Cooper is also using dry casks to store used fuel on-site.

CNS has an extensive radiation monitoring program that continually measures radiation levels in the atmosphere around the facility, the soil, vegetation, milk, water wells, wildlife and the river. To date, no adverse environmental effects due to operation of the plant have been reported.

Commitment to Safety

Safety shall always come first: There is no condition that requires any of us to work in an unsafe manner.

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A *Closer* Look at...

Cooper Nuclear STATION

The name...

GUY L. COOPER, SR.

GUY L. COOPER, JR.

Cooper Nuclear Station is named in honor of Guy L. Cooper Sr., and the Cooper family of Humboldt, Nebraska. The family had been active in the Nebraska electric industry and civic affairs since 1868 when pioneer Henry Cooper arrived in Nebraska at the then-bustling river port at Brownville.

O.A. Cooper built the first electrical plant in Humboldt in 1890. In 1947, Gov. Val Peterson named Guy Cooper Sr., then president of O.A. Cooper Company, to the Board of Directors of Consumers Public Power District, a predecessor of Nebraska Public Power District.

For 27 years, the Cooper family had continuous representation on the Consumers Public Power District and NPPD boards of directors. After Guy Cooper, Sr., retired in 1957, his son, Guy Cooper Jr., became a board member. Like his father, Guy Jr. twice served as president of the board of directors. He served continuously on the board until his resignation in 1975.

The location...

Cooper Nuclear Station is located in southeast Nebraska on the west bank of the Missouri River near the towns of Nemaha and Brownville. With a generating capacity of 810 megawatts. Cooper is the largest single unit generating facility in the state.

The plant...

Cooper uses enriched uranium fuel to produce heat to boil water and make steam. The uranium atoms in power plants tend to come apart or "fission" when they are struck by neutrons. The disintegrating atom releases heat, and two or three neutrons. These neutrons, in turn, strike other uranium atoms, and cause them to fission as well, in a chain-reaction sequence.

The station consumes just six pounds of uranium oxide in a day—about the size of a pack of playing cards. That's equivalent to 20 million pounds of coal, or 165 million cubic feet of natural gas, or one million gallons of oil. The uranium fuel comes in the form of ceramic pellets about the size of a miniature marshmallow. Each pellet packs as much energy as 1,780 pounds of coal, 17,000 cubic feet of natural gas, or 149 gallons of oil. Just five pellets would meet the electricity needs of an average household for an entire year.

The pellets are encased in zirconium tubes. About 50,000 of these fuel rods, assembled into 548 fuel bundles, are contained in the reactor.

Every 24 months, about 30 percent of the fuel bundles are replaced with fresh fuel. Reactor power is regulated by 137 control rods, which absorb neutrons. If neutrons cannot freely travel between fuel bundles, the uranium atoms are less likely to be struck by neutrons, and this slows or stops the fission process.

Cooper operates under a license from the Nuclear Regulatory Commission, and at least one NRC resident inspector is stationed full-time at Cooper. The reactor

operators are licensed by the NRC and must undergo rigorous testing to update their licenses. The Institute of Nuclear Power Operation's National Academy for Nuclear Training evaluates Cooper training programs every four years to ensure they meet the high standards set by the nuclear industry.

Cooper's power supply primarily serves customers in Nebraska, but excess power is also sold for use in Kansas, Missouri, the Dakotas and elsewhere. Its production of approximately 6 million megawatt-hours of electricity flows to customers via a vast system of extra-high-voltage transmission lines.

Approximately 30 percent of NPPD's total generation in 2013 was produced by carbon-free, nuclear energy.

In November 2010, the NRC approved extending the license of this safe, clean and reliable source of electricity another 20 years, through Jan. 18, 2034. During the summer of 2014, the plant reached a milestone in operation – 40 years of safe operation.

Over the past 15 years, NPPD has invested more than $500 million in upgrades to the station's operations and safety systems. By comparison, the original construction cost of CNS was $313 million. In addition to investments in physical equipment, there have been investments in the employees who work at Cooper Nuclear Station.

Training, for example, has transitioned from lectures, blackboards, and textbooks used by the first class of operators to tools such as a control room simulator, a flow-loop simulator, containment structure mock-ups, and hands-on training. The station's fire brigade conducts special training for other firefighters in the area, and Cooper employs both a security force and an Emergency Response Organization to assist the plant in preparing for and performing exercises that address various emergency situations. Station personnel work with emergency management organizations from Nebraska, Missouri, Iowa, and Kansas to ensure NPPD lives up to its responsibilities as a nuclear power plant owner and operator to protect the health and safety of the public, the plant, and its employees.

The NRC and other federal agencies regulate and test Cooper's emergency plan, as well as the plant's security systems. The high training standards, well-qualified staff, and rigorous regulatory oversight are all part of a nuclear safety culture that is unequaled in any other industry or organization and ensure the health and safety of Nebraska and the surrounding states.