

## **Nuclear Energy** <sup>[1]</sup>

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by Raymond L. Murray, 2006©Duke Energy--McGuire Nuclear Station, Units 1 and 2.

<sup>[2]</sup>

Nuclear energy first came to North Carolina in 1950 with the construction of a reactor for training and research<sup>[3]</sup> at North Carolina State College (now [North Carolina State University](#)<sup>[4]</sup>) in [Raleigh](#)<sup>[5]</sup>. Faculty members of the physics department designed and built a ten-kilowatt "water boiler," adapted from a design by the laboratory at [Los Alamos, N.M.](#)<sup>[6]</sup> This Raleigh Reactor and its several successors have been used ever since for education in the field of nuclear engineering and for radiation research and services.

In response to the [U.S. Atomic Energy Commission](#)<sup>[7]</sup>'s challenge to American industry to demonstrate the possibility of commercial nuclear power, a consortium of southeastern energy companies was formed in 1956. The Carolinas-Virginia Nuclear Power Associates (CVNPA) included the three electric power companies that served North Carolina--[Carolina Power & Light Company](#)<sup>[8]</sup>, [Duke Power Company](#)<sup>[9]</sup>, and [Virginia Electric & Power Company](#)<sup>[10]</sup>--as well as [South Carolina Electric & Gas Company](#)<sup>[11]</sup>. Between 1963 and 1967 the group built and operated at [Parr, S.C.](#)<sup>[12]</sup>, a 17,000-kilowatt, heavy-water moderated pressure-tube type reactor, similar to those operating in Canada. This prototype provided knowledge and experience on the new energy source for management and for design and operating engineers. Subsequently, CP&L built two large, multimewatt light-water moderated reactors of the boiling-water type (BWR) in [Southport](#)<sup>[13]</sup> (1975 and 1977); Duke Power built two larger reactors of the pressurized-water type (PWR) in [Cornelius](#)<sup>[14]</sup> (1981 and 1983); and CP&L built an additional PWR in [New Hill](#)<sup>[15]</sup> (1987).

Plans for several additional nuclear units were canceled in the 1970s owing to the energy crisis and an unfavorable economic climate. The 1979 accident at the [Three Mile Island](#)<sup>[16]</sup> nuclear plant in Pennsylvania prompted a number of changes in equipment and procedures to enhance safety. The utilities became closely associated with two national organizations, the [Institute of Nuclear Power Operations](#)<sup>[17]</sup> and the [Electric Power Research Institute](#)<sup>[18]</sup>.

By 2006 about one-third of all electric power in North Carolina came from nuclear power plants. One of the major supporting facilities for the state's BWRs was [General Electric's Nuclear Fuels Plant](#)<sup>[19]</sup> near [Wilmington](#)<sup>[20]</sup>. Electric power for 19 cities was provided by [North Carolina Municipal Power Agency No. 1](#)<sup>[21]</sup>, using its part ownership of a reactor.

#### **References:**

Robert F. Durden, *Electrifying the Piedmont Carolinas: The Duke Power Company, 1904-1997*(2001).

Raymond L. Murray, *Nuclear Energy* (1993).

#### **Additional Resources:**

[Institute of Nuclear Power Operations](#)<sup>[17]</sup>

[Electric Power Research Institute](#)<sup>[18]</sup>

North Carolina State University Nuclear Energy Program: <http://www.ne.ncsu.edu> <sup>[22]</sup>

Nuclear State Energy Report, 2010: <http://www.digital.ncdcr.gov/cdm4/document.php?CISOROOT=/p249901coll22&CISOPTR=70679&REC=19> <sup>[23]</sup>

Annual report of the North Carolina Utilities Commission regarding long range needs for expansion of electric generation facilities for service in North Carolina, 2004: <http://www.digital.ncdcr.gov/cdm4/document.php?CISOROOT=/p249901coll22&CISOPTR=426496&REC=14> <sup>[24]</sup>

#### **Image Credit:**

McGuire Nuclear Station, Unites 1 and 2, Huntersville, NC. Courtesy: ©Duke Energy--McGuire Nuclear Station, Units 1 and 2. The nuclear power plant is located in Huntersville, NC (17 MI N of Charlotte, NC) in Region II; Operator: Duke Energy Carolinas, LLC; More information on the NRC facility page link at [www.nrc.gov/info-finder/reactor/mcg1.html](http://www.nrc.gov/info-finder/reactor/mcg1.html) [25] and at [www.nrc.gov/info-finder/reactor/mcg2.html](http://www.nrc.gov/info-finder/reactor/mcg2.html) [26].

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