



**SEMINOLE ELECTRIC COOPERATIVE
GENERATING STATION**

SEMINOLE HEADQUARTERS

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SEMINOLE GENERATING STATION

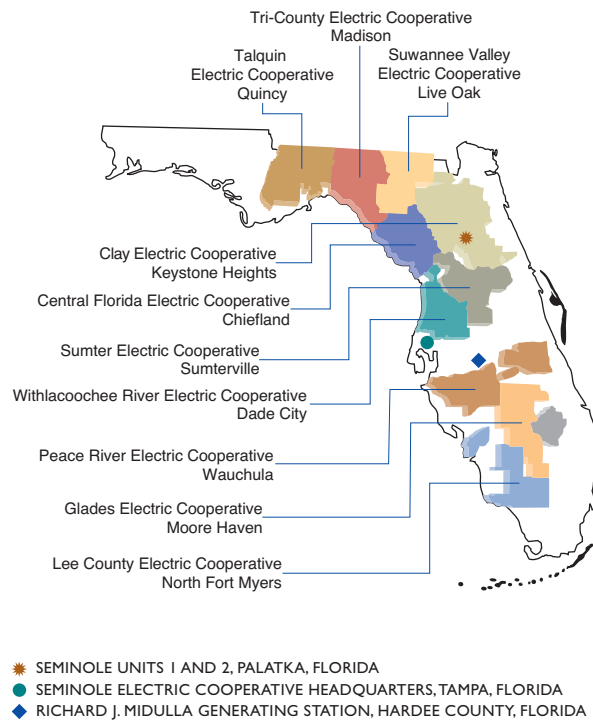
890 Highway 17 North
Palatka, FL 32177

FOR MORE INFORMATION ON SEMINOLE

Check Seminole's Internet web site at
www.seminole-electric.com



SEMINOLE'S 10 MEMBER SYSTEMS



OUR MISSION

To be the preferred provider of wholesale energy services for our members.

OUR VISION

To be a leading competitor in the emerging energy market, trusted and respected by our customers, employees, and community. Through devotion to customer satisfaction and continually striving to exceed expectations, we will provide the best value in wholesale energy service. We will provide employees a challenging and rewarding work environment, where pride and commitment are the hallmark of our operations.

OUR VALUES

We uphold the highest ethical and professional standards.

We believe that cooperative ownership and principles are the cornerstone of our success.

We affirm that quality, innovation, communication and teamwork are essential ingredients to achieve customer satisfaction.

We improve the quality of life in our communities.

We believe in prudent and cost-effective policies to protect our environment.

SEMINOLE UNITS 1 AND 2

SITE: Located on 2,000 acres near the St. Johns River in Putnam County, about six miles north of Palatka on U.S. Highway 17.

INSTALLED COST: \$801 per kilowatt

GENERAL DATA FOR EACH UNIT:

NORMAL RATING (NET):

626 megawatts (summer), 637 megawatts (winter)

BOILER: Drum type, 4,904,000 pounds per hour steam flow

TURBINE GENERATOR: 4-flow tandem compound type

FUEL: Washed coal – 8.5 % ash, 3% sulfur, delivered primarily from mines in western Kentucky and southern Illinois 11,700 BTU per pound

STACK: 675 feet tall, 115 foot diameter at base, common to both units with two interior flues

COOLING TOWERS: Hyperbolic natural draft design, 450 feet tall, 400 foot diameter at base, one per unit

POLLUTION CONTROL EQUIPMENT:

ELECTROSTATIC PRECIPITATORS: Two per unit Fly ash removal efficiency – 99.7 %

FLUE GAS DESULFURIZATION SYSTEM: Wet limestone scrubber, sulfur dioxide (SO₂) removal efficiency – greater than 95%

SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM: Nitrous oxide (NO_x) removal efficiency – 90%

HYDRATED LIME INJECTION SYSTEM: For reduction of sulfuric acid mist emissions (SO₃)

TOTAL COST OF ENVIRONMENTAL EQUIPMENT AND CONTROLS (INCLUDING UPGRADES): \$533 million

DESIGN OPERATING DATA:

UNIT AVAILABILITY: 85% (actual hourly capability/maximum capability)

OVERALL ANNUAL CAPACITY FACTOR: 68% (actual generation/maximum capability)

HEAT RATE: 9,600; 9,800 BTU per kilowatt hour (average)

FUEL SUPPLY:

To supply the 11,600 tons of coal needed daily to operate the Seminole Generating Station, most of the coal comes from mines in southern Illinois and western Kentucky. The remainder is purchased from mines east of the Mississippi River.

Unit trains transport coal from the mines to the power plant via CSX Transportation, Inc. The trip from the mines to the plant spans more than 1,000 miles and takes seven to eight days. A stockpile of coal, sufficient for 45 to 65 days of operation, is stored at the plant.

The Seminole Generating Station is permitted to burn up to 30% of its fuel as petroleum coke (petcoke). Actual amounts burned depend on the price and availability of petcoke, and plant conditions. Petcoke is a byproduct of petroleum refining. It is a high carbon content fuel, with appearance and handling properties similar to coal.

WELCOME TO THE SEMINOLE GENERATING STATION



SEMINOLE GENERATING STATION IN PUTNAM COUNTY REPRESENTS AN IMPORTANT MILESTONE IN THE HISTORY OF FLORIDA ELECTRIC COOPERATIVES... THE FIRST COOPERATIVE-OWNED GENERATING PLANT IN THE STATE.

SEMINOLE IS KNOWN AS A G&T because the Cooperative generates and transmits bulk supplies of electricity. Electricity is distributed to consumers through the member distribution cooperatives that jointly own Seminole. Seminole and its 10 member cooperatives represent the third largest segment of electric consumers in Florida, serving more than 1.7 million residential and business consumers in portions of 46 counties.

Consisting of two 650 megawatt coal-fired generating units, Seminole Generating Station began commercial operation in 1984. Located on 2,000 acres in Putnam County, just north of Palatka and about 60 miles south of Jacksonville, the Seminole Generating Station employs nearly 300 people. It provides the area with an annual payroll of more than \$29 million and nearly \$5 million in annual property and sales tax payments.

The Seminole Generating Station uses modern technology for environmental protection. More than 99.7 percent of all fly ash produced from burning coal is removed by electrostatic precipitators. About 95 percent of the sulfur dioxide is removed from the exiting flue gas by wet limestone scrubbers. The plant has a network of groundwater monitoring wells and continuous emission flue gas monitors. The environmental protection systems on Seminole Units 1 and 2 originally cost more than \$233 million, about a quarter of total construction cost.

SEMINOLE RECENTLY ADDED ENVIRONMENTALLY BENEFICIAL UPGRADES to both Units 1 and 2, at a cost of about \$300 million. These upgrades include:

- Installation of new low nitrogen oxide (NO_x) burners and selective catalytic reduction (SCR) systems for additional NO_x removal
- Improvements to the existing flue gas desulfurization system for improved sulfur dioxide (SO₂) control
- Improvements to the existing steam turbines to increase the efficient use of the existing steam for producing electricity, which means that more megawatts can be produced with the same amount of heat input to Units 1 and 2 (Completed in 2010)

Aerial view of Seminole Generating Station



WELCOME TO THE SEMINOLE GENERATING STATION



COAL STORAGE: The coal pile storage area is located on 53 acres of land adjacent to the west side of the plant. During construction, this area was covered by a durable hypalon liner to prevent coal pile runoff from potential groundwater incursion. The storage area can easily handle more than 600,000 tons of coal.



ROTARY DUMPER: Within the plant's enclosed coal handling facility, a rotary dumper unloads coal into a large receiving hopper by turning one rail car at a time in a 120-degree arc. The car is emptied and then returned to its original position, without uncoupling the car from the unit train.



COAL STACKER-RECLAIMER: Coal is stored and retrieved by a bucket-wheel, stacker-reclaimer, which moves within the coal yard on a set of railroad tracks.



COAL CONVEYORS: After retrieval from the storage area by the stacker-reclaimer, coal is transported into the boiler building on a coal conveyor system that's enclosed to control dust.



BALL MILLS: Coal is prepared for burning by large ball mills, which contain thousands of steel balls ranging in size from $\frac{3}{4}$ of an inch to 2 inches in diameter. As the mills rotate, the coal is pulverized into a fine powder.



FURNACE: Pulverized coal is blown into the furnace where it is ignited and burned. Purified water flows through boiler tubes inside the furnace. This water is heated and becomes steam, leaving the boiler at a temperature of about 1,000 degrees Fahrenheit.



TURBINE GENERATOR: Boiler steam drives the high, intermediate and low pressure stages of a turbine generator. Steam enters and drives the high pressure section of the turbine where it is routed back to the boiler for reheating before entering the intermediate pressure section. Steam then passes through two low pressure turbine sections. All four turbine sections are connected in a series to form a common shaft. Electricity is produced as the directly coupled generator rotor, located on the end of the shaft, spins inside a stator at exactly 3,600 revolutions per minute. When operating at full load, each generator produces the same amount of electricity in one minute that the average home uses in one year.



ELECTROSTATIC PRECIPITATORS: From the furnace, the exiting flue gas is fed into electrostatic precipitators which remove 99.7% of all fly ash produced from burning coal. Electrically charged metal plates attract the fly ash, which is deposited in large collection hoppers at the base of the precipitators. Fly ash is sent to the effluent processing area.



FGD SCRUBBERS: Sulfur dioxide is removed from the flue gas using a flue gas desulfurization (FGD) system known as a wet scrubber. A mixture of 30% limestone and 70% water is sprayed into the upper part of the scrubber. Flue gas from the precipitator enters near the bottom and comes into contact with the spray as it rises through the tower. The sulfur dioxide in the gas reacts with the calcium in the limestone and is converted into calcium sulfates and sulfites which are removed from the system and used for gypsum production.



STACK: Flue gas leaving the scrubbers exits through the 675-foot tall stack. The outer concrete shell is constructed to protect the two inner flues from high winds. Each of the flues is made of more than one million bricks.



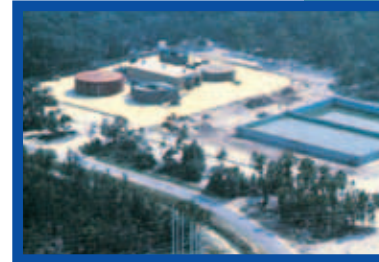
CONDENSER: Steam exiting the turbine is converted back into water inside the condenser as the vapor comes into contact with tubes carrying cool water from the cooling towers. Heat is transferred from the steam to circulating water which is pumped back to the cooling towers. The condensed water from the turbine is pumped back to the boiler for reuse.



COOLING TOWERS: When hot condenser water is distributed inside the cooling tower, a draft is produced as the air inside warms and rises out the top of the tower. This air flow, in conjunction with the hyperbolic shape of the tower, causes cooler air to be drawn in from the base of the tower and cools the falling water. Depending on air temperature and humidity, the water temperature drops about 17 degrees. The cooled water is returned to the condenser to be used in a continuous cycle. Each tower is 450 feet tall and 400 feet across at the base. At full capacity, each tower can cool more than 270,000 gallons of water per minute. The plumes seen rising from the top of the towers are clouds of condensed water vapor.



LIMESTONE HANDLING: Up to 12,000 tons of limestone for use in the flue gas desulfurization scrubbers is stored in a large A-frame structure. The limestone is transported by a conveyor system with a maximum capacity of 400 tons per hour. Four scrubber modules are normally operating for each unit. Each unit uses about 12 tons of limestone per hour. A spare module is available to ensure system reliability.



WATER TREATMENT: Waste water collected from floor drains, coal pile run off, bottom ash collection, equipment cleaning and rainfall is treated at Seminole's water treatment facility. Waste water is first placed into equalization basins where oil is skimmed off. The pH is then adjusted and suspended solids are removed. After the water is cleaned it is discharged into the St. Johns River. Water quality is closely monitored to protect the environment. A separate \$2.5 million treatment plant was added in 2000 to treat the gypsum wastewater stream. Continuous monitors ensure this treated water meets all quality requirements for discharge into the St. Johns River.



GYP SUM PRODUCTION: The sulfur dioxide scrubbers produce about 500,000 tons of waste sludge a year. Until 2000, this waste was stabilized with fly ash and stored in a permitted landfill. Now this scrubber waste is converted into synthetic gypsum and sold under contract to Lafarge Corp. for wallboard production in Putnam County. Making gypsum generates income, eliminates waste treatment and processing costs, and benefits the environment.



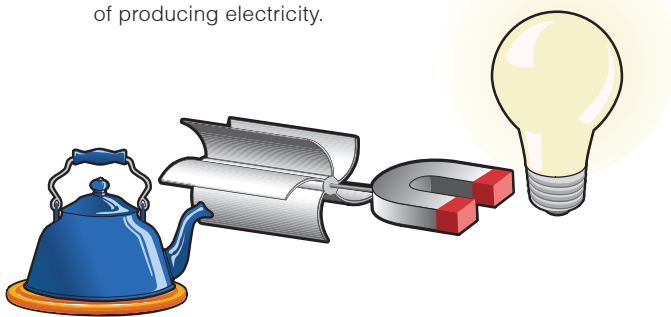
CONTROL ROOM: Power plant operations are monitored in a control center which features computer monitoring and data display equipment.



230,000 VOLT TRANSMISSION LINES: The plant is connected to the Florida Electrical Transmission System, or grid, by seven 230,000 volt transmission lines. One pair of lines travels 51 miles southwest to the Cooperative's Silver Springs North switching station. The second pair of lines terminates eight miles west of the plant at the Rice substation. The third pair of lines tap into the Putnam-Black Creek line about two miles west of the plant. A single line connects the plant to a Clay Electric Cooperative substation at Keystone Heights.

GENERATION OF ELECTRICITY

This simple diagram explains the basics of producing electricity.



Steam can be produced by heating water with a variety of fuels. The steam spins a fan connected to a shaft that rotates a magnet inside a coil of wire. The spinning magnet produces a current on the wire and electricity is produced.

