

JOSEPH M. FARLEY

# Nuclear Plant



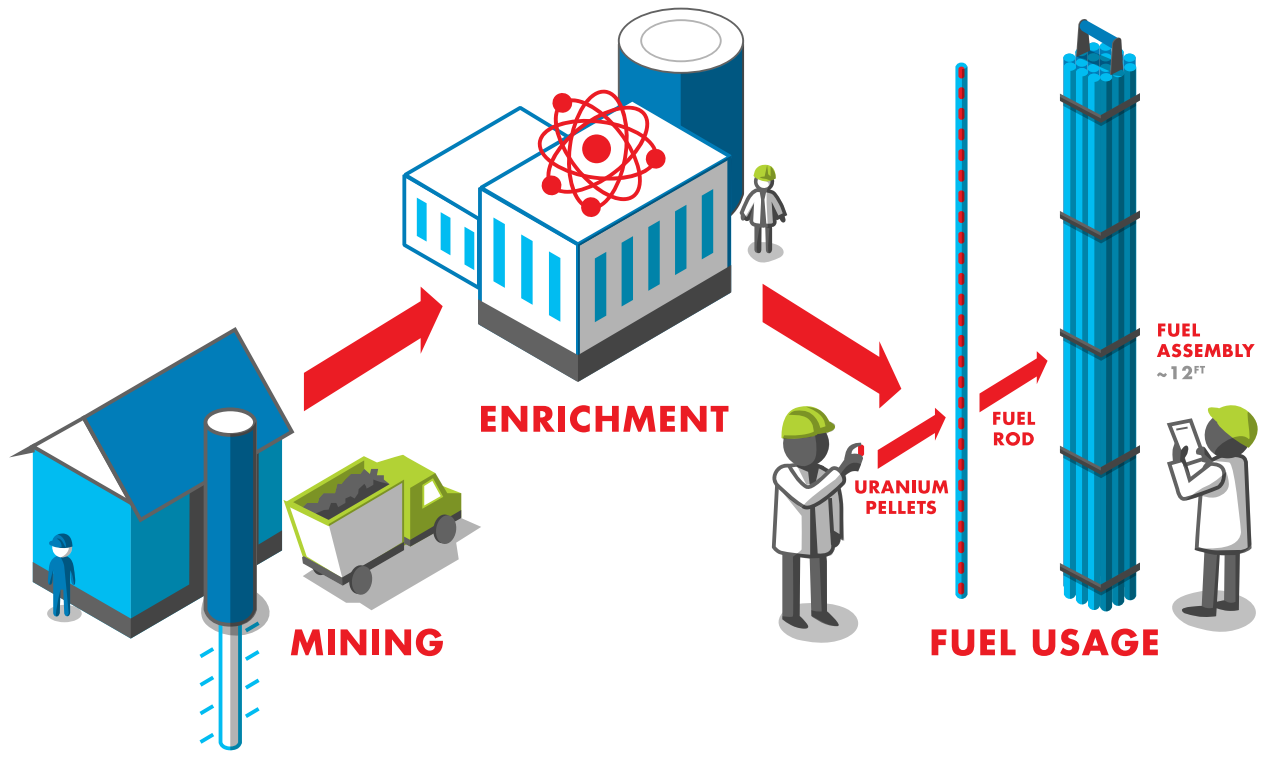
## ABOUT PLANT FARLEY

The Joseph M. Farley Nuclear Plant is located along the Chattahoochee River near Columbia, Alabama. The plant is owned by Alabama Power, operated by Southern Nuclear, and is one of three nuclear facilities in the Southern Company system.

- Southern Company serves 9 million customers with approximately 44,000 megawatts (MW) of generating capacity.
- Construction of Plant Farley started in 1970.
- Unit 1 began commercial operation in December 1977.
- Unit 2 began commercial operation in July 1981.
- Plant Farley is powered by two pressurized water reactors and has a total generating capacity of approximately 1,800 MW.
- Plant Farley produces roughly 19 percent of Alabama Power's electricity.

Approximately 900 people – including engineers, mechanics, control room operators, chemists, electricians, security officers and others – oversee the plant's operation 24 hours a day, seven days a week, 365 days a year.

Nuclear power plants – with their huge, carbon-free output, low operating costs, minimal impact on the environment and inexpensive uranium fuel – are an important and strategic energy resource for the United States.



## OUR FUEL

Plant Farley generates heat with the use of ceramic pellets made of uranium. The uranium ore is mined, processed, enriched and formed into cylindrical fuel pellets.

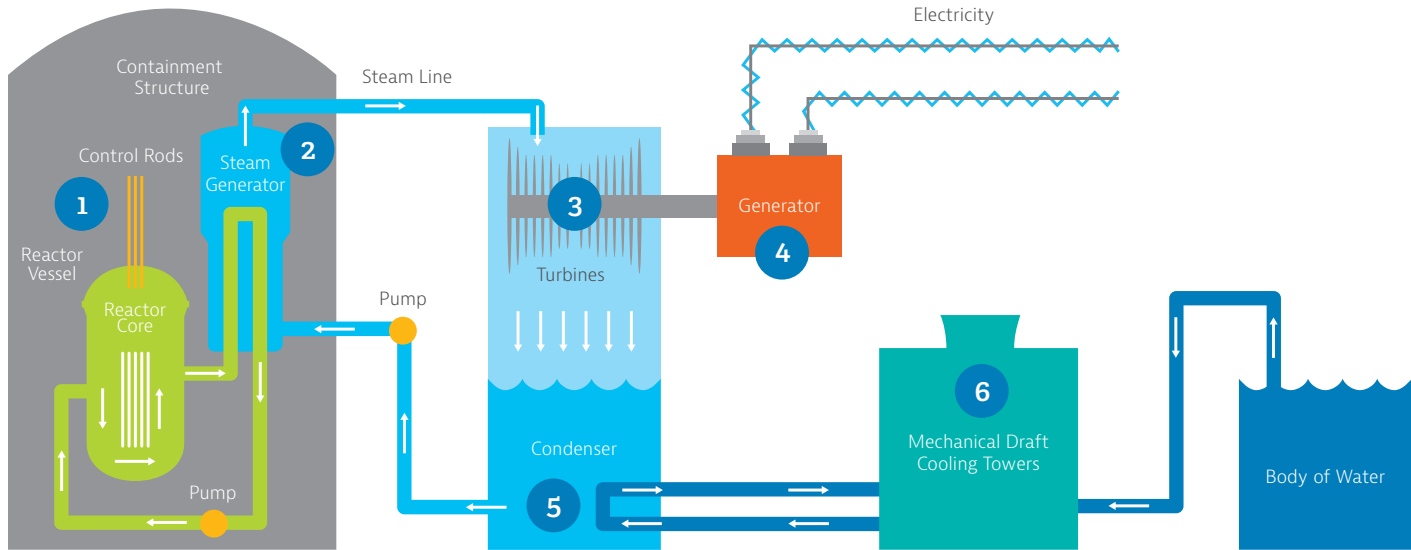
The pellets, each about the size of a pencil eraser, are arranged in long vertical tubes bundled together to form one fuel assembly. There are 157 individual fuel assemblies that make up each reactor core at Plant Farley.

Our uranium fuel does not burn chemically. The heat needed to create steam comes from the splitting of atoms, a process called fission, inside each pellet. Fission occurs when a uranium atom absorbs a neutron and the atom splits to create heat. Additional neutrons are also released, and they go on to split more atoms, creating a sustainable chain reaction.

# HOW PLANT FARLEY WORKS

- 1 Water is pumped through the reactor core, heated by the fission process, pumped through thousands of tubes in the steam generators and back to the reactor in a closed loop.
- 2 Cooler water in the steam generator comes in contact with the hot tubes and turns to steam.
- 3 The steam goes to the turbine and spins the turbine blades.
- 4 The turbine spins the electric generator to produce electricity.
- 5 The steam goes to the condenser where it turns to liquid again to continue the cycle.
- 6 The water that circulates through the condenser is cooled by large cooling towers.

Note: The three water systems used to generate electricity are separate and don't mix with each other.





# SAFETY

Safety is the top priority at Plant Farley. We take very seriously our obligation to protect the health and safety of our employees, the public and the environment.

## Multiple layers of protection

Plant Farley is designed with redundant safety systems and multiple layers of protection – including structural strength, highly trained operators and proven emergency plans – to ensure safe operation. A reactor operating at full power can be shut down in less than three seconds by inserting control rods into the reactor core to stop the fission process.

## Regulatory oversight

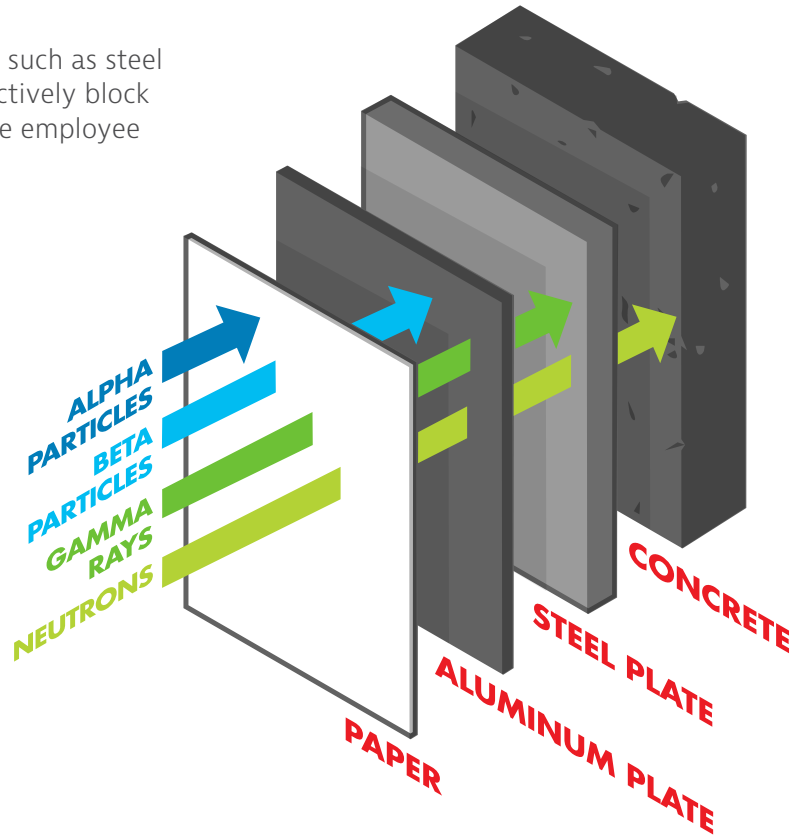
Full-time, on-site inspectors from the U.S. Nuclear Regulatory Commission (NRC) monitor the plant to ensure it is maintained and operated safely and in accordance with established nuclear operating procedures. The NRC holds nuclear plants to the highest security standards of any American industry.

## Emergency preparedness

In the unlikely event of an emergency, Plant Farley has comprehensive plans that define and assign responsibilities and outline an effective course of action for safeguarding personnel, property and the general public. These plans are updated regularly and maintained at all times. Drills and exercises are conducted frequently to test these plans and train plant personnel.



Building materials such as steel and concrete effectively block radiation to ensure employee and public safety.



# RADIATION

The combined effect of the structural, mechanical and human safety systems built into our nuclear plants means that a person living within a few miles of a plant receives less radiation from its presence than from watching television.

Radiation absorbed by the human body is measured in millirem. The average background radiation from our natural environment (sunlight, rocks, soil, food) and man-made sources of low-level radiation adds up to approximately 300 millirem a year.

## Exposure to Radiation

A typical chest X-ray is about 10 millirem of radiation. A round trip flight from New York to California adds 5 millirem. Those living within a five-mile radius of a nuclear plant will receive less than one millirem of radiation exposure per year. Federal regulatory agencies carefully set and enforce dose limits to protect the public, the environment and plant employees.

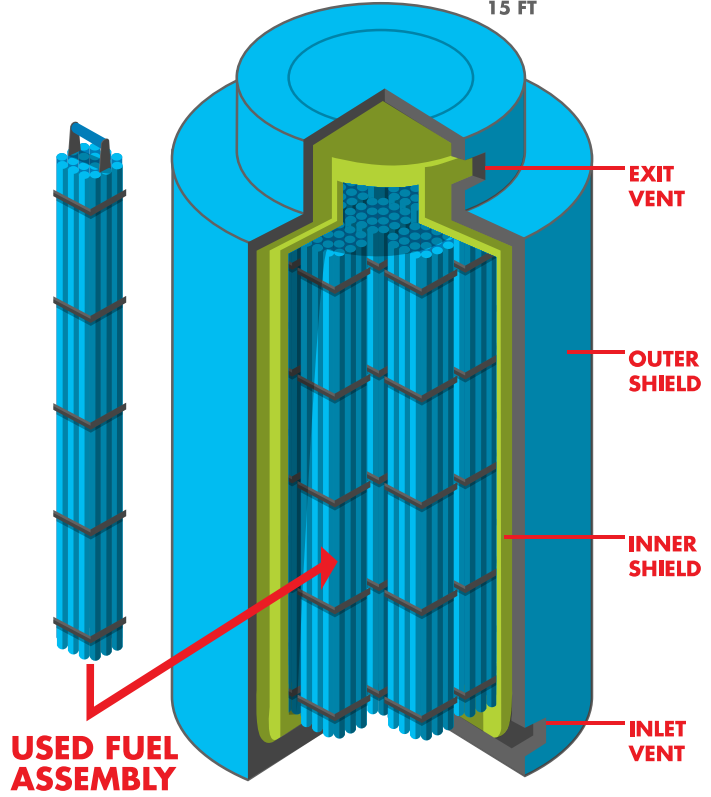


## Sources of Radiation

- 1% Nuclear industry
- 11% Food/Drinking water
- 14% Cosmic
- 14% Medicine
- 18% Buildings/Soil
- 42% Radon

# DRY CASK STORAGE

15 FT



# USED FUEL STORAGE

Every nuclear plant in the U.S. safely stores used nuclear fuel assemblies on-site in indoor concrete pools or in storage canisters.

## Spent Fuel Pool

When much of the uranium has been used in the fission process, the fuel assemblies are removed and replaced with new fuel assemblies. The used fuel is stored in spent fuel pools – steel-lined concrete pools filled with water. Water and concrete are excellent radiation shields, and in the spent fuel pools, water prevents radiation from emanating outside the pools. The water also keeps the fuel cool while the fuel becomes less radioactive over time.

## Dry Storage

Plant Farley also uses dry canister storage to safely store used fuel on the plant site. Dry storage canisters are cylindrical containers constructed of steel-reinforced concrete, which serve as proven radiation shields. These canisters effectively shield the radiation as the used fuel continues its cooling process.

The NRC requires dry storage canisters to be constantly monitored and relicensed every 20 years. The naturally cooled and ventilated containers are designed and tested to prevent the release of radiation under the most extreme conditions – earthquakes, tornadoes, hurricanes and floods.

These storage areas are protected by a combination of sturdy plant construction, state-of-the-art surveillance and detection equipment, and armed security forces.



## COMMUNITY PARTNERSHIP

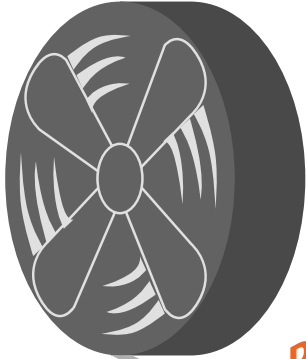
Plant Farley strives to be a good neighbor.

Our employees spend hundreds of hours each year volunteering and contributing to the communities we're fortunate to serve to help our neighbors grow and thrive. Participating in service projects, fundraising for United Way campaigns and supporting nonprofit agencies and schools, Plant Farley is committed to improving lives and communities in areas around the plant.

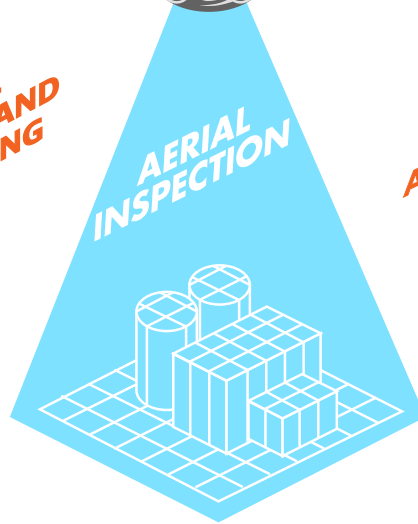
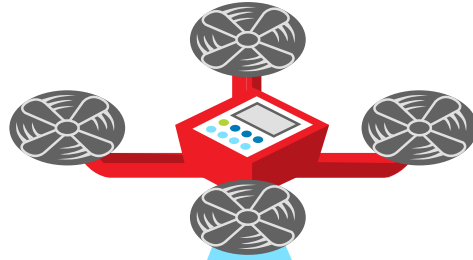
## ENVIRONMENTAL RESPONSIBILITY

Since 1992, Plant Farley has been recognized as a certified wildlife habitat by the Wildlife Habitat Council.

Plant Farley sits on 1,850 acres but uses only about 400 acres to produce electricity. The remaining 1,450 acres fall under a detailed land management plan that outlines strategies for enhancing the habitat for waterfowl, songbirds, deer, gopher tortoises, longleaf pine and plant life.

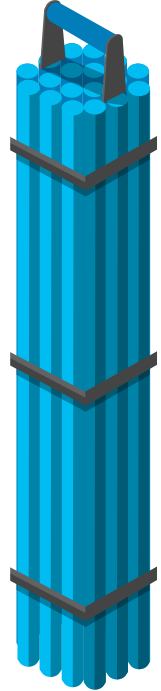


**DIGITAL  
CONTROLS AND  
MONITORING**



**AERIAL  
INSPECTION**

**ADVANCED  
FUELS**



# INNOVATION

Southern Nuclear is a leading innovator in advanced nuclear technologies.

These include the research, development and licensing of advanced reactors, digital turbine control systems to maximize the generation of electricity, advanced fuel for greater fuel stability, cybersecurity protections and the use of remote monitoring tools and programs to perform regular inspections safer and faster than ever before. Our employees and facilities routinely receive industry recognition and awards for their contributions to enhance the safety, efficiency and performance of our operating plants.

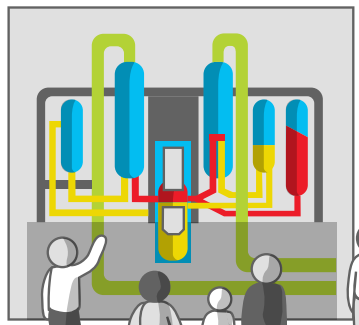
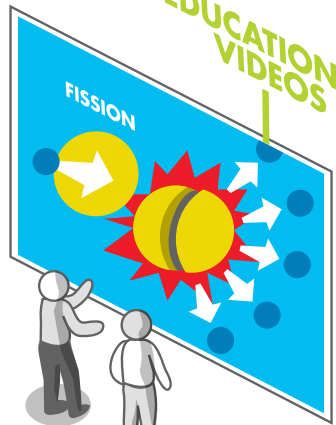


# ENERGY EDUCATION CENTERS

PLANT TOURS



EDUCATIONAL VIDEOS



SIMULATOR DEMONSTRATIONS



MODELS AND DIAGRAMS



## ENERGY EDUCATION CENTER

Visit the Plant Farley Energy Education Center to learn how nuclear energy is powering your community. Call in advance to book your tour at 1-334-661-2861.

For more information about Southern Nuclear visit [southernnuclear.com](https://southernnuclear.com) or follow us on social media [@southernnuclear](https://twitter.com/southernnuclear).

## OPERATORS

Southern Nuclear, headquartered in Birmingham, Ala., operates Southern Company's six operating units at three locations: the Joseph M. Farley Nuclear Plant near Columbia, Ala., the Alvin W. Vogtle Electric Generating Plant near Waynesboro, Ga., and the Edwin I. Hatch Nuclear Plant near Baxley, Ga.

Our corporate culture and hiring practices have been recognized nationally by the U.S. Department of Defense, G.I. Jobs magazine, DiversityInc, Black Enterprise, Forbes and the Women's Choice Award. To learn more, visit [southerncompany.com](https://southerncompany.com).



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