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This Media Guide is intended to serve as a reference for Duke Energy’s nuclear facilities. Additionally, this guide provides an overview of nuclear generation, the benefits of nuclear power, safety and security, emergency planning, nuclear operations, used nuclear fuel, radiation and other related topics.

Duke Energy is committed to the safe operation of its nuclear fleet. Our goal is to protect the health and safety of our neighbors, employees and the environment as well as provide accurate information to the news media and public.

You can reach Duke Energy 24 hours a day through our Media Line: 800.559.3853 (DUKE).

This Media Guide provides information that can help you when covering Duke Energy’s nuclear fleet or the nuclear industry. We recognize the challenges of covering news related to nuclear energy, and we appreciate your important role in providing timely and accurate information to the public.

Should an actual emergency occur at any of our nuclear stations, you can reach Duke Energy for information by calling 800.559.3853 (DUKE). If needed, a media center would be opened based on the location of the affected station.

Thank you for taking time to review the Duke Energy Nuclear Media Guide. If you have any questions about Duke Energy’s nuclear fleet or the nuclear industry, please contact us.

Overview

Duke Energy, a Fortune 150 company headquartered in Charlotte, N.C., is one of the largest energy holding companies in the U.S., supplying and delivering energy to approximately 7.7 million retail electric customers and more than 1.6 million gas-distribution customers.

Duke Energy operates 11 nuclear units at six sites in the Carolinas. The combined generating capacity of these facilities is nearly 11,000 megawatts. Duke Energy’s nuclear fleet generates approximately half of the electricity provided to its customers in the Carolinas, with production costs among the lowest in the nation.

The mission of Duke Energy’s Nuclear Generation organization is to generate clean, life-essential electricity around-the-clock to power the lives of our communities. Our stations are designed, built and operated for safety and security, with multiple barriers and redundant safety systems to protect the public, station workers and the environment.

Nuclear energy has been a part of Duke Energy’s diverse fuel mix for nearly 50 years, setting industry benchmarks for safety, reliability and efficiency. Harris Nuclear Plant, McGuire Nuclear Station and Oconee Nuclear Station feature energy education centers, which serve as strong links between the stations and neighboring communities.
Duke Energy Nuclear Facilities:

Additional information about each nuclear facility can be viewed by visiting duke-energy.com or by selecting the plant below.

**Brunswick Nuclear Plant**
Capacity: 1,870 megawatts  
Location: Southport, N.C.  
Number of Units: 2  
Commercial Date: 1975

**Catawba Nuclear Station**
Capacity: 2,310 megawatts  
Location: York, S.C.  
Number of Units: 2  
Commercial Date: 1985

**Harris Nuclear Plant**
Capacity: 964 megawatts  
Location: New Hill, N.C.  
Number of Units: 1  
Commercial Date: 1987

**McGuire Nuclear Station**
Capacity: 2,316 megawatts  
Location: Huntersville, N.C.  
Number of Units: 2  
Commercial Date: 1981

**Oconee Nuclear Station**
Capacity: 2,554 megawatts  
Location: Seneca, S.C.  
Number of Units: 3  
Commercial Date: 1973

**Robinson Nuclear Plant**
Capacity: 759 megawatts  
Location: Hartsville, S.C.  
Number of Units: 1  
Commercial Date: 1971
Visiting a Duke Energy Nuclear Facility

To request a nuclear site visit, call Duke Energy’s 24-hour media line at 800.559.3853 (DUKE). The appropriate media contact will call you for more details regarding the business purpose for the visit and will submit a request to the site staff for consideration. Requests for visits to nuclear stations must go through a stringent review and approval process and generally cannot be approved on short notice. Upon request, video (B-roll) or a photo opportunity at a Duke Energy facility may be available.

Duke Energy Education Centers

Duke Energy provides energy education centers at three of its nuclear facilities. The Energy and Environmental Center at Harris, the EnergyExplorium at McGuire and the World of Energy at Oconee serve as strong links between the sites and their communities. Each year, thousands of people visit these education centers to learn more about nuclear power and Duke Energy.

The three centers feature hands-on educational exhibits and resources for anyone interested in learning more about electricity and the benefits of nuclear power. In addition to educational opportunities, the EnergyExplorium and World of Energy each feature a nature trail, picnic facility and butterfly garden. These stations also regularly host free, family-friendly events.

Energy and Environmental Center

Phone: 984.229.6261
Email: Harris.Plant@duke-energy.com
Address: 3932 New Hill Holleman Road
New Hill, N.C. 27562
Hours: Individual and group visits are arranged by appointment only and are scheduled Tuesday through Friday, 9 a.m. to 3 p.m.

EnergyExplorium at McGuire Nuclear Station

Phone: 800.777.0003
Email: EnergyExplorium@duke-energy.com
Address: 13339 McGuire Station Road
Huntersville, N.C. 28078
Hours: Individual and group visits are arranged by appointment only and are scheduled Tuesday through Friday, 9 a.m. to 3 p.m.

World of Energy at Oconee Nuclear Station

Phone: 800.777.1004
Email: WorldOfEnergy@duke-energy.com
Address: 7812 Rochester Highway
Seneca, S.C. 29672
Hours: Monday through Friday, 9 a.m. to 5 p.m. Reservations are recommended for group visits. Closed: Saturday, Sunday and some holidays.

All activities are free at the education centers.
Nuclear Information Center (NIC)
Please take a moment to visit the NIC, Duke Energy’s nuclear blog. The NIC features stories about nuclear plant operations, industry news, environmental stewardship, nuclear energy careers, community volunteerism, emergency planning and more.

News Media Contacts

Duke Energy and Nuclear Site Media Relations Contact Information

Duke Energy 24-hour Media Line: 800.559.3853 (DUKE)

Media Centers – Activated to Support Events:

Brunswick Media Center
1623 Village Road NE
Leland, N.C. 28451

Catawba Media Center
526 S. Church St.
Charlotte, N.C. 28202-1904

McGuire Media Center
526 S. Church St.
Charlotte, N.C. 28202-1904

Harris Media Center
411 Fayetteville St.
Raleigh, N.C. 27603

Oconee Media Center
664 Issaqueena Trail
Central, S.C. 29630-4434

Robinson Media Center
1755 Mechanicsville Rd.
Florence, S.C. 29501

Media outlets will be informed if these facilities are activated following an emergency declaration at a Duke Energy nuclear station.

Federal, State and Local Agencies

Federal Agencies:

Nuclear Regulatory Commission
Public Affairs, Region II, Atlanta, GA
404.997.4000 or 800.577.8510 (business hours)
301.816.5100 (after hours, call the Operations Center in Rockville, MD)

Federal Emergency Management Agency (FEMA)
770.220.5226 (news media)
770.220.5200 (24 hours)

State Agencies:

North Carolina Division of Emergency Management
919.733.3300 or 800.858.0368

North Carolina Department of Health and Human Services
919.855.4800 or 800.662.7030

South Carolina Emergency Management Division
803.737.8500

South Carolina Department of Health and Environmental Control
803.898.3432

Local Emergency Management Agencies:

Brunswick Nuclear Plant
Brunswick County Emergency Management
910.253.5383

New Hanover County Emergency Management
910.798.6800

Catawba Nuclear Station
York County Emergency Management
803.326.2300 (24 hours)
803.818.5212 (Clover, Lake Wylie and Bethel)

Charlotte-Mecklenburg County Emergency Management
704.336.2412 (business hours)
704.336.2441 (after hours)

Gaston County Emergency Management
704.866.3350 (business hours)
704.866.3300 (after hours)
Emergency Planning

Duke Energy is committed to the safe, secure operation of its nuclear stations. A combination of well-trained personnel, physical barriers, advanced surveillance equipment, diverse and redundant safety systems and many other features ensures the safe operation of these stations. Beyond these safeguards, each station has detailed plans for handling emergencies, no matter how unlikely. These plans are closely coordinated and practiced with county, state and federal officials on a regular basis.

Neighbors living within the 10-mile emergency planning zone (EPZ) around nuclear stations receive emergency planning information annually in the form of a booklet or other documents mailed to their homes. In addition, nuclear informational booklets are shared with local schools and businesses/organizations such as hotels, motels, marinas and post offices that encounter transient populations. Media outlets around our nuclear stations receive information regarding our operations. Additional emergency planning information can be found on Duke Energy’s website.

Duke Energy is responsible for managing any problem at its nuclear stations and would immediately notify federal, state and local authorities per its plan and procedures. These officials would then notify the public if any action is necessary.
Key Emergency Planning Terms

Public Protective Actions
In the unlikely event of a nuclear station incident, the public may be instructed to shelter (i.e., stay indoors), evacuate or take potassium iodide (KI). County and state emergency management officials are responsible for making public protective action decisions and providing information to the public, no matter the type of emergency.

Outdoor Warning Sirens
Emergency outdoor warning sirens are located throughout each nuclear station’s EPZ. Duke Energy installed the sirens after consultation with county emergency management officials. To ensure the sirens operate properly, they are tested in various ways on a weekly and quarterly basis. Testing is part of a formal maintenance program and requires no public action. Quarterly, full-volume test dates are noted in annual emergency planning information provided to EPZ residents.

Warning sirens are for outdoor notification and only sounded at the direction of county/state emergency officials. If a siren sounds repeatedly, the public should listen to a local radio or television station to hear emergency information. Hearing a siren does not mean anyone should evacuate. The emergency information carried on the radio and television will provide what actions, if any, the public should take.

Potassium Iodide (KI)
KI is a non-prescription drug similar to iodized table salt. KI may prevent the thyroid gland from absorbing radioactive iodine and is one protective action that state or county officials may recommend during a nuclear emergency. KI is available to residents living within 10 miles of a nuclear station through county health departments.

KI should only be taken at the direction of state and county public health officials. Emergency information on the radio and television will advise the public when and how long to take KI, if it is needed.

For more KI information, visit:
Centers for Disease Control and Prevention
North Carolina Department of Health and Human Services
South Carolina Department of Health and Environmental Control
About Nuclear Power

Value of Nuclear Energy

Nuclear power is a safe, reliable and clean source of energy – affordably generating approximately 20% of America’s electricity.

Some states, such as South Carolina, generate more than 50% of their electricity from nuclear power. Duke Energy operates 11 nuclear units in two states – Brunswick in Southport, N.C.; Catawba in York, S.C.; Harris in New Hill, N.C.; McGuire in Huntersville, N.C.; Oconee in Seneca, S.C.; and Robinson in Hartsville, S.C.

Safety and security are the highest priorities for Duke Energy’s nuclear fleet, as well as the U.S. nuclear industry. Nuclear stations are designed, built and operated according to extensive safety and security requirements – strictly regulated by the NRC – to protect the public, station workers and the environment.

Nuclear stations can reliably generate large amounts of carbon-free electricity around-the-clock to meet customer energy needs. In fact, nuclear power provides electricity to one in five businesses and homes in the U.S. Nuclear stations are also a low-cost provider of large-scale electricity 24 hours a day (baseload generation).

Nuclear energy is one of the cleanest fuel sources, accounting for more than 55% of all carbon-free electricity generated in the U.S. Nuclear energy produces no carbon dioxide, sulfur dioxide or nitrogen oxide. Nuclear stations are important to a carbon-free energy mix, providing a steady base to back up intermittent renewables like solar, hydro and wind power.

Coal, natural gas, hydroelectric, solar power, geothermal energy, wind power and biomass are important to the nation’s energy mix. However, we are unable to meet our energy needs around-the-clock with renewable energy sources only, making nuclear energy an attractive source of carbon-free baseload generation.

Nuclear energy currently plays a key role in meeting our nation’s electricity needs and will continue to be an important energy source for the world in the years to come.

Safety and Security of Nuclear Stations

Duke Energy, along with the U.S. nuclear industry, is committed to ensuring the safe, secure operation of our nation’s nuclear stations every day.

Nuclear Safety

Nuclear stations are among the safest and most secure facilities in the world. Industry organizations promote safety and excellence in the operation of commercial nuclear power plants. The NRC provides strong safety oversight and regulation of the industry, as well.

Nuclear stations are built to withstand a variety of external forces, including hurricanes, tornadoes, fires, floods and earthquakes. Nuclear stations are constructed to withstand earthquakes of the magnitude equivalent to or greater than the largest known earthquake for its geographic location.

The containment buildings that house the nuclear reactor are made of thick concrete and rebar. Nuclear stations also have numerous and diverse safety systems and physical barriers to prevent the release of radioactive materials and to protect the public, station workers and the environment.

A Containment Building’s Robust Physical Structure

A study conducted by the Electric Power Research Institute (EPRI) shows that reactor and fuel structures at U.S. nuclear stations would protect against a radiation release even if struck by a large commercial jetliner. A nuclear reactor is surrounded by a number of structures that would limit the effects of such an impact.
Nuclear Security

Nuclear stations have numerous security features. Armed, well-trained security forces guard these stations 24 hours a day. Physical intrusion barriers consisting of concrete structures and razor wire fences, to name a few, surround the stations. Advanced surveillance equipment continually monitors areas surrounding the station.

Station access is tightly controlled by both security forces and sophisticated security systems, such as palm recognition screening and weapons and explosives detectors. Nuclear employees must pass stringent background investigations, psychological evaluations and drug and alcohol screenings. Employees and contractors are subject to continual monitoring and screening.

Our nuclear security programs are evaluated for effectiveness on a regular basis by both the company and the NRC. Duke Energy-operated nuclear stations meet all requirements set forth by the NRC and perform well during security drills and tests. The company’s security training programs and facilities are among the best in the industry. We work closely with local, state and federal law enforcement agencies, federal security agencies and the intelligence community.

Nuclear Power Generation

Generation of electricity in a nuclear station is similar to a coal-fired station. The difference is the source of heat. Fissioning (splitting) of uranium atoms replaces the burning of coal as the source of heat. This heat is used to turn water into steam to drive turbine generators.

Duke Energy’s McGuire, Oconee, Catawba, Robinson and Harris nuclear plants are pressurized reactor designs. Brunswick is a boiling water reactor design.

Pressurized Water Reactor

Pressurized water reactors (also known as PWRs) keep water under pressure so that it heats but does not boil. This heated water is circulated through tubes in steam generators. Water inside the steam generators circulates around these tubes and is heated into steam, which then turns the turbine generator. Water from the reactor and water that is turned into steam are in separate systems and do not mix.

How a Nuclear Pressurized Water Reactor Works

Reactor

The fuel used in nuclear generation is uranium-235. It is manufactured as small pellets. A single pellet is less than an inch long, but it produces the energy equivalent to burning a ton of coal. The pellets are placed end to end into fuel rods 12 feet long. Approximately 200 of these rods are grouped together into what is called a fuel assembly.
Nuclear fission occurs when uranium atoms are split by particles known as neutrons. Uranium-235 atoms have a unique quality that causes them to break apart after colliding with a free neutron. Once a uranium-235 atom splits, neutrons are released that collide with other uranium-235 atoms. A chain reaction begins, and heat is released as a byproduct.

Control rods are inserted among the fuel assemblies to regulate or stop the fission process. These control rods absorb neutrons. When fully inserted among the fuel assemblies, nuclear fission stops. Withdrawing the control rods allows fission to occur.

**Pressurizer**

In a pressurized water reactor, the heat produced in the reactor is transferred to the first of three separate water systems: the primary (reactor) coolant, secondary coolant (steam supply) and condenser systems. The primary coolant is heated to more than 600 degrees Fahrenheit. A pressurizer keeps the primary coolant under pressure to prevent boiling.

**Steam Generator**

The hot, pressurized water from the reactor (primary coolant) passes through thousands of tubes in nearby steam generators. The outside of these tubes is surrounded by water from the secondary coolant system. The heat from the primary coolant is transferred to the secondary coolant system, which then turns into steam. The primary and secondary systems are closed systems. This means the water flowing through the reactor remains separate and does not mix with water from the other system or the lake.

**Turbine**

Steam produced in the secondary coolant system is piped from the containment building into the turbine building to push the blades of a turbine. The turbine is connected to an electric generator by a long shaft. As the turbine blades spin, the shaft turns a magnet inside the generator to produce electricity.
Condenser Coolant

After spinning the turbines, the steam flows across condenser cooling system tubes. The steam is cooled, condensed back into water and returned to the steam generator to be used again and again.

Lake Cooling or Cooling Towers

At some nuclear stations, lake water flows through thousands of condenser tubes to cool steam back to water. Water from the condenser system is then discharged down a long canal (for cooling) and eventually enters the main part of a lake, river or ocean.

At other plants, the condenser cooling water is circulated through tall cooling towers to remove the extra heat it has absorbed. The water is pumped to the top of the cooling towers and is allowed to pour down through the structure. Natural-draft towers utilize the upward flow of air through the towers to cool the condenser water. In mechanical-draft towers, several fans pull air inside to cool the condenser water. After it is cooled, the condenser water is pumped back into the turbine building to cool and condense the steam.

How a Nuclear Boiling Water Reactor Works

Boiling water reactors (also known as BWRs) operate in a fashion similar to a PWR. Water in the reactor vessel is allowed to boil into steam to spin a turbine generator. A closed condenser water system cools this steam back into water so it can be pumped back into the reactor vessel. The nuclear fuel core is cooled in the process.

A BWR uses two separate water systems called “cycles.” To begin, water is pumped through the reactor core, where a controlled nuclear reactor releases heat. The water inside the reactor vessel boils into superheated steam. This steam is then directed against the turbine blades to make the turbine and electric generator spin at approximately 1,800 revolutions per minute (rpm), producing electricity.

After passing through the turbine, the steam passes through a condenser, where it is cooled by water drawn from a body of water, converting it back to a liquid state. The water is then returned to the reactor, where it is converted to steam again. The water from the reactor cycle never comes into direct
contact with the plant’s other water systems and is contained within the reactor building and the turbine/generator building.

Learn more about nuclear power.

Used Nuclear Fuel

Storage
Used nuclear fuel is a solid byproduct of the fission process used to generate electricity in nuclear stations. If all the used fuel produced in nearly 50 years of U.S. nuclear station operation was stacked end to end, it would cover a football field to a depth of less than 10 yards. Of this fuel, 95% could be recycled.

Duke Energy has nearly 50 years of experience handling used nuclear fuel. Our employees are well-trained, environmentally conscious professionals who take pride in their work, including safely managing used fuel.

Duke Energy safely stores used nuclear fuel at its facilities in two ways – in steel-lined, concrete storage pools filled with water and in large, airtight steel canisters (dry cask storage). As with every other vital system at a nuclear station, the used-fuel pools and dry storage canisters have numerous and redundant safety and security systems that ensure the fuel remains safe and secure.

The federal government has responsibility for permanently disposing of used nuclear fuel. Until a national repository or recycling is available, utilities will continue to safely and securely store used fuel at nuclear stations in storage pools or dry storage containers.

Reprocessing (Recycling)
Used nuclear fuel recycling technology does exist, although not commercially in the U.S. For many years, a number of other countries (India, Japan, France, United Kingdom and Russia) have successfully used recycling to reduce the volume of content of used fuel. The pursuit of these advanced technologies in the U.S. does not relieve the federal government of its statutory responsibility to provide a disposal facility since recycling does not eliminate all used-fuel constituents.

Radiation and Health

Radiation is a natural part of our environment. It is not new or mysterious. We receive radiation from the sun, minerals in the Earth, the food we eat and building materials in our houses. Even our bodies give off small amounts of radiation.

Exposure to extremely large amounts of radiation can be harmful. However, the amount of radiation given off in the normal operation of a nuclear station is very small – smaller, in fact, than the amount we would receive on a coast-to-coast airplane flight.

Although radiation is invisible, it can be accurately measured. Radiation is measured in units called rem and millirem. The rem is a unit of measure that takes into account the effects different types of radiation have on the body. A millirem is 1/1,000 of a rem.

Compute your dose.
Nuclear Industry Lessons Learned
The U.S. nuclear industry relies on a program of continuous improvement based on ongoing lessons learned from worldwide operating experience to further enhance safety. In addition to the NRC’s regulation, other industry organizations like the Nuclear Energy Institute, the World Association of Nuclear Operators and the Institute of Nuclear Power Operations provide significant oversight to ensure the operational safety of nuclear stations worldwide.

Glossary of Nuclear Terms
Here are a few commonly used terms in the nuclear industry. Visit the NRC website for additional information.

**Atom:** The smallest particle of an element that cannot be divided or broken up by chemical means. It consists of a central core called a nucleus, which contains protons and neutrons. Electrons revolve around the nucleus.

**Atomic Energy:** Energy produced in the form of heat during the fission process in a nuclear reactor. When released in a sufficient and controlled quantity, this heat energy may be used to produce steam to run a conventional turbine generator to produce electrical power. Atomic energy is usually referred to as nuclear energy.

**Background Radiation:** Radiation from cosmic rays and radioactive material that naturally exists in soil, water and air is part of our environment. The amount of radiation a person gets is measured in millirems, and the average person in the U.S. receives about 620 millirem of radiation each year – about 50% from natural sources and the rest from man-made sources.

**Boiling Water Reactor (BWR):** In this reactor design, water flows upward through the core, where it is heated by fission and allowed to boil in the reactor vessel. The resulting steam drives turbine blades and a shaft connected to a generator to produce electrical power.

<table>
<thead>
<tr>
<th>Radiation Source</th>
<th>Dose (millirem)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual radiation exposure from all sources</td>
<td>620</td>
</tr>
<tr>
<td>Natural background radiation (radon gas, cosmic, etc.)</td>
<td>310</td>
</tr>
<tr>
<td>Medical sources</td>
<td>298</td>
</tr>
<tr>
<td>Man-made Source</td>
<td></td>
</tr>
<tr>
<td>Consumer products (fertilizer, tobacco, smoke detectors, etc.)</td>
<td>12</td>
</tr>
<tr>
<td>Living next to a nuclear power station</td>
<td>Less than 1</td>
</tr>
</tbody>
</table>

**Capacity Factor:** A measure of reliability reflecting the amount of electricity a generating unit provides versus how much it could provide if operating at all times.

**Containment Building:** The structure housing the nuclear reactor, pressurizer, reactor coolant pumps, steam generators and other associated piping and equipment. It is an airtight, steel-lined structure with heavily reinforced concrete walls several feet thick. It is designed to withstand tremendous physical forces.

**Control Rods:** Rods made of material that absorbs neutrons. When inserted into the nuclear fuel, the rods stop the fission process, thereby shutting down the reactor.

**Cooling Tower:** A large structure that serves as a heat exchanger to aid in the cooling of water used to cool exhaust steam leaving the turbines of a power plant. Cooling towers transfer this heat into the air, instead of into a body of water.

**Core:** The central portion of a nuclear reactor, which contains the fuel assemblies, moderator, neutron poisons, control rods and support structures. The reactor core is where fission takes place.

**Fission:** The splitting of atoms, which releases tremendous amounts of heat energy.
Fuel Rod: A long, slender, zirconium metal tube containing pellets of fissionable material that provide fuel for nuclear reactors. Fuel rods are assembled into bundles called fuel assemblies, which are loaded individually into the reactor core.

Pressurized Water Reactor (PWR): The reactor heats water in a closed system that then transfers its heat to another closed system in the steam generators to produce steam to turn the turbine generator.

Radiation: Particles and/or energy given off by unstable atoms as they undergo radioactive decay to a stable state.

Reactor: A cylindrical, steel vessel that contains the core, control rods, coolant and structures that support the core.

Steam Generator: In a pressurized water reactor, it’s the large steel component where steam is produced. It is located inside the containment building.

Subsequent License Renewal: A license that is issued by the NRC authorizing a licensee to operate a nuclear generating unit at a specific site in accordance with established laws and regulations. A subsequent license renewal allows for a plant to operate for a total of 80 years.

Turbine Generator: A steam (or water) turbine directly coupled to an electrical generator. The two devices are often referred to as one unit.

Uranium: The fuel used in nuclear power reactors because of the ability of its atoms to undergo fission.

Energy Education Websites

ABC’s of Nuclear Science  
www.lbl.gov/abc

American Nuclear Society  
www.ans.org

Center for Energy Workforce Development  
www.cewd.org

Clean Energy Education  
www.cerei.org

Consumer Energy Center  
www.consumerenergycenter.org

Contemporary Physics Education Project  
www.cpepweb.org

Duke Energy Nuclear Information Center  
Nuclear.Duke-Energy.com

Edison Electric Institute (EEI)  
www.eei.org

Electric Power Research Institute (EPRI)  
www.epri.com

The Energy Collective  
TheEnergyCollective.com

EnergyExplorium at McGuire Nuclear Station  
www.duke-energy.com/energyexplorium

Energy Information Administration  
www.eia.gov

Federal Energy Regulatory Commission  
www.ferc.gov

Foundation for Water and Energy Education  
www.fwee.org

Get Into Energy  
www.getintoeenergy.com

Energy & Environmental Center at Harris Nuclear Plant  
www.duke-energy.com/eecenter

International Atomic Energy Agency  
www.iaea.org

Jefferson Lab  
www.jlab.org

National Science Teachers Associations  
www.nsta.org

Nuclear Energy Agency  
www.nei.org

Oak Ridge National Laboratory  
www.ornl.gov

U.S. Nuclear Regulatory Commission (NRC)  
www.nrc.gov

U.S. Department of Energy (DOE)  
www.energy.gov

World of Energy at Oconee Nuclear Station  
www.duke-energy.com/worldofenergy

World Nuclear Association  
www.world-nuclear.org
Nuclear Emergency Classifications

Four classifications are used to describe an emergency at a nuclear station. Appropriate federal, state and local authorities are informed in each of the following classifications:

<table>
<thead>
<tr>
<th>Class</th>
<th>General Description</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Unusual Event    | The least serious of the four classifications. It means that a minor event – either operational or security – has occurred at the station. Unusual events pose no threat to public safety but due to strict federal regulations warrant an increased awareness by the plant operator and off-site emergency response agencies. No release of radioactive material is expected. | 1. A natural or other destructive event (i.e., tornado, earthquake, vehicle crash, etc.) occurs that affects the station.  
2. A fire lasting more than 15 minutes in an area where station safety equipment is located.  
3. A loss of AC electrical power from all off-site electrical transmission lines for more than 15 minutes. |
| Alert            | In this classification, an event – either operational or security-based – has occurred that could reduce the plant’s level of safety. Although there would be no threat to public safety, county and state officials and the plant operator would prepare emergency operation centers in case the situation worsens. Any radioactive release associated with the event would be minimal. | 1. Indications of possible damage to the used fuel stored at the station.  
2. A failure of the automatic system used to shut down the reactor.  
3. A fire or explosion causing significant damage to permanent plant equipment and/or structures. |
| Site Area Emergency | This classification means an event has occurred in which major safety equipment has failed or is likely to fail, or a security event has occurred in an area where the reactor (and/or equipment used to safely shut down the reactor) is located. The sirens could be sounded. The public should listen to the Emergency Alert System (EAS) for information and instructions. Any release of radioactive materials would be expected to stay within strict federal guidelines. | 1. Failure of the plant systems needed to cool the fuel or keep the reactor shut down.  
2. A confirmed act of sabotage in an area containing vital plant structures.  
3. Radiation doses projected to exceed 0.1 rem total body (i.e., one-fourth the amount in a typical upper GI medical X-ray) at the site boundary. |
| General Emergency | The most serious of the four classifications. It means that an event has occurred in which actual or imminent fuel damage is likely. State and local authorities would take action to protect the public. EAS would give information and instructions for people in the affected areas. Any release of radioactive materials associated with the event could exceed strict federal guidelines. | 1. Radiation doses projected to exceed one (1) rem total body (i.e., four times the amount in a typical upper GI medical X-ray) at the site boundary.  
2. All AC electrical power sources (on-site and off-site) are lost and recovery is not expected for a long period of time. |