



environmental partners

Crystal River Nuclear Plant

2010 + 2012

Safety Information



**Keep this brochure in a handy place so that
you will have the information in an emergency.**

Para recibir una copia de esta
información en español, por favor
llame al 1.352.563.4489.

 **DUKE
ENERGY®**

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Dear Neighbor:

Our first commitment to our Nature Coast neighbors is to operate the Crystal River Nuclear Plant safely. We take this commitment very seriously, and we have multiple programs in place to ensure that we train our personnel, maintain our equipment and set the highest standards, so that we will continue to operate our plant in a way that protects public health and safety.

As part of our commitment to protecting public health and safety, we have worked very closely with both Citrus and Levy counties, as well as the state of Florida, to develop extensive plans to ensure protection of the public in the unlikely event of an emergency. Information about these plans is contained in this brochure.

Please review this information and keep this brochure where you could locate it should you ever need it. If you or anyone in your family has a special need, please fill out the enclosed special needs postcard and send it to the address on the card.

If you have any questions about plans that are in place, or should there ever be an emergency at the plant, please call your emergency management office in your county (these numbers are listed on page 5 in this brochure), or call the plant at 1.352.563.4489.

Thanks for your continued support.

Sincerely,



Jon Franke
Vice President, Crystal River Nuclear Plant

Sections of this brochure contain information about what to do during an emergency at the Crystal River Nuclear Plant. Please read this information and discuss it with family members and neighbors. Some of them may need your help, or you may need theirs during an emergency. The best way to be safe in an emergency is to be informed, to be prepared, and to use teamwork. Keep this information handy for future reference. Please do not hesitate to call the appropriate county emergency management office for any assistance during an emergency. Please complete and return the attached postcard to the appropriate office so that we can keep your information on file to help you better in an emergency.

Citrus County Sheriff's Office

Emergency Operations Center
3549 Saunders Way
Lecanto, Florida 34461-7108
1.352.746.6555
sheriffcitrus.org

Levy County Emergency Management

P.O. Box 221
Bronson, Florida 32621-0221
1.352.486.5213
LevyDisaster.com

This emergency planning information was produced by Duke Energy in a cooperative effort with the departments of Emergency Management in Citrus and Levy counties, and the Florida Division of Emergency Management (FloridaDisaster.org).

For non-emergency information about Duke Energy and the Crystal River Nuclear Plant, call **1.352.563.4413** or visit duke-energy.com/florida.

Emergency Warning

Methods

The Crystal River Nuclear Plant is designed to operate safely (see page 15). However, there is a very small possibility that an emergency could be serious enough that the public would have to take protective actions. In the event of a serious emergency, plant operators must notify county and state emergency management officials within 15 minutes. If county officials decide protective actions are necessary, they may use any of the following methods to notify the public:

- Sirens and radio/television broadcasts
- Siren public address system
- Emergency vehicles' loudspeakers
- Door-to-door notification
- Mass telephone notifications

Classification of Emergencies

Emergency events at the nuclear plant will fall into one of four emergency categories established by the federal government.

Plant operators must notify the state and county emergency management officials within 15 minutes when any event happens that fits into these categories.

"Declaring" any of these emergency levels causes workers at the plant and state and county officials to start following their special emergency plans and procedures. From least to most serious, the emergency categories are:

Unusual Event

This is a minor problem that may not even be inside the plant. No public action required.

Alert

This is a minor problem that could cause a decrease in the level of safety at the plant, such as plant alarm systems not working. No public action required.

Site Area Emergency

This is a more serious problem that may involve the failure of some plant equipment. Small amounts of radioactive material could be released from the plant. County officials will keep you informed. The sirens may sound. Turn to an Emergency Alert System (EAS) station for more information.

General Emergency

This is the most serious kind of problem. Radioactive material could be released from the plant. People near the plant will have to take protective actions (see page 2). The sirens will sound. County officials will announce what areas are affected and what actions must be taken. Turn to an EAS station for more information.

These warning systems also may be used to notify you of other emergencies such as hurricanes, tornadoes, floods or hazardous material spills.

If You Hear a Siren

- Sirens **do not** mean evacuate.
- If you hear a siren sound for three to five minutes with a steady tone, it means that county officials have emergency information to give you. Turn your radio or television to an Emergency Alert System (EAS) station listed on page 3 for emergency information.
- Sirens also can be used to make public address announcements. Some emergency information could be broadcast through the siren speakers.
- The sirens are tested each Friday at noon (except holidays).
- If you do not hear emergency information and it is not a testing day or if you notice a siren that appears to be damaged, please call the Citrus County emergency number listed on page 5.
- The sirens are located within the 10-mile zone around the Crystal River Nuclear Plant.

While sirens are the primary method for alerting the public of an emergency, Emergency Management personnel in both Citrus and Levy counties also have the capability of utilizing their CodeRED® emergency notification systems. This high-speed telephone calling system is a powerful emergency notification tool which can deliver messages to homes, businesses or answering machines at a rate of 60,000 calls per hour and can be used to make calls in specific geographic locations.

If your telephone number is listed in the local telephone directory, that number is likely already in the CodeRED database. However, if your telephone number is unlisted or if you use a cell phone, you'll need to register that number (or perhaps even an alternative number) in order to receive notifications via CodeRED.

Those who may be temporarily visiting or residing within the 10-mile zone around the Crystal River Nuclear Plant may register their telephone and/or cell phone information into the CodeRED database so they can receive emergency notifications as well. During the registration process, start and end dates may be selected so that the service will only be active for the period of time needed.

To register for CodeRED notifications in Citrus County:

Log on the sheriff's office Web site at sheriffcitrus.org and click on the CodeRED logo to register and learn more. Or call **1.352.746.6555**.

To register for CodeRED notifications in Levy County:

Log on the Emergency Management Web site at LevyDisaster.com and click on the CodeRED logo to register and learn more. Or call **1.352.486.5213**.

CodeRED registration for permanent residents, temporary residents, and visitors is free, voluntary, and highly recommended.

Siren Tests

Sirens are tested each Friday at noon (except on holidays). Each siren will sound for a few seconds at full volume. The test for all of the sirens should last less than one minute.

Public Address System Test

The siren system also has the capability to make public address announcements.

How Will Homes Be Protected?

- Lock all doors and windows.
- Travel in and out of the evacuated area will be controlled.
- Police will patrol the area.

Protective Actions

Sheltering Indoors and Evacuation

If county officials decide the public should take protective actions, there are two types that may be ordered: Sheltering Indoors or Evacuation.

Finding Your Zone

Refer to the map on pages 8 and 9. There are three zones. It is important to know your zone because different protective actions could be ordered for different zones. Officials will describe areas requiring protective actions by using zone numbers and subdivision names. Zone numbers are provided for many locations and subdivisions so you can mark the zones where you live and work.

Sheltering Indoors

Depending on what has happened at the plant, it may be safer to simply stay indoors. Most homes and other buildings will protect you for several hours.

- Remain indoors until further notice.
- Close all doors and windows.
- Turn off all window fans. Unless instructed otherwise, leave air conditioning on with air exchange vents closed, if possible.
- Cover or refrigerate any uncovered food.
- Stay tuned to a local EAS station listed on this page for official information, because it may become necessary to evacuate.

Evacuation

If officials order an evacuation of your area, you must leave the 10-mile area around the plant. County shelters are available if you cannot stay with friends or relatives, or if you cannot go to a motel. Evacuate quickly but safely. You will be given plenty of time to act.

- Remain calm. Follow all evacuation directions.
- Lock all doors and windows.
- Turn off faucets and unnecessary appliances.
- Leave pets inside your home or garage with plenty of food and water. Do not take pets to a reception center or shelter. (For Citrus County evacuees only; the Lecanto Primary School is a pet-friendly shelter.)
- Make sure your neighbors understand the warning signals and have transportation – especially those with special needs. Avoid using the telephone.

Local Emergency Alert System (EAS) Stations

If you are notified of an emergency, tune to the local radio and television stations listed below for further instructions. Emergency management officials will provide accurate and timely information.

<i>WXCV</i>	<i>95.3 FM</i>
<i>WXOF</i>	<i>96.3 FM</i>
<i>WSKY</i>	<i>97.3 FM</i>
<i>WKTK</i>	<i>98.5 FM</i>
<i>WTRS</i>	<i>102.3 FM</i>
<i>WRGO</i>	<i>102.7 FM</i>
<i>WRUF (Primary station)</i>	<i>103.7 FM</i>
<i>WRZN</i>	<i>720 AM</i>
<i>WUFT-TV</i>	<i>Channel 5</i>
<i>WFLA-TV</i>	<i>Channel 8</i>
<i>Bay News 9</i>	<i>Channel 9</i>
<i>WTSP-TV</i>	<i>Channel 10</i>
<i>WTVT-TV</i>	<i>Channel 13</i>
<i>WCJB-TV</i>	<i>Channel 20</i>
<i>WFTS-TV</i>	<i>Channel 28</i>
<i>WTOG-TV</i>	<i>Channel 44</i>
<i>*WYKE-TV</i>	<i>Channel 49</i>
<i>Adelphia Cable</i>	<i>All Channels</i>
<i>Brighthouse Cable</i>	<i>All Channels</i>
<i>NOAA Weather Radio</i>	<i>162.400 Mhz</i>

** This is a local station that has a direct link to Citrus County EOC during emergencies that can broadcast updated information.*

- While driving, turn to an EAS station listed on this page for official information.
- Evacuation routes are shown on pages 8 and 9. Suggested routes are listed on pages 12 and 13.
- Emergency personnel will be stationed along evacuation routes to assist you.

What to Take with You to a Shelter

Reception centers or shelters are buildings that provide for your safety. They contain only vital necessities, such as food, water and toilet facilities. We recommend you avoid excess baggage, but there are some items you should take with you.

Take the Following Items:

- Identification
- Prescription medicines
- Soap and towels
- Shaving articles
- Sanitary supplies/toilet paper
- Toothpaste and toothbrush
- Sleeping bag and pillow for each family member
- Eyeglasses and dentures
- Checkbook/credit cards/cash
- Other important documents/items

Other Supplies if Readily Available:

- Flashlight
- Portable radio and batteries
- Plastic or paper bags
- Hand tools (for car repairs)

Children and Infant Supplies:

- Disposable diapers and powder
- Bottles
- Milk/formula
- Favorite go-to-sleep toy

Never take a pet to a shelter (except for Citrus County evacuees only, at the Lecanto Primary School, which is pet-friendly).

Special Needs

If you have special needs, such as the following:

- A physical or mental handicap
- Elderly, infirm and alone
- Life-support systems
- Can't drive
- Any reason for needing special assistance

Complete the attached postcard and return it before an emergency occurs, or call your county emergency operations center. Evacuation transportation and special facilities will be arranged for you.

If You Do Not Have Transportation

- Contact your Emergency Management Office before an emergency, using the attached postcard.
- If you do not have transportation, try to find transportation with a friend, neighbor or relative. If that is not possible, help is available by calling:

Citrus County:	1.352.746.6555
after hours:	911
Levy County:	1.352.486.5213
after hours:	1.352.486.5111

If You Have Family Members in a Nursing Home or Hospital Within the Evacuation Zone

- These facilities follow their own evacuation procedures, so do not try to pick up your relative.
- Stay tuned to local radio or television stations listed on page 3 for information regarding where patients are being moved.

Children and Schools

If you have children in school within the evacuation zone, do not pick them up.

- Schools and daycare centers will follow their own evacuation procedures.
- Don't go to the school during an emergency. You will cause confusion and create a traffic problem.
- Local radio and television stations listed on page 3 will announce when and where parents can pick up their children.

Emergency Information and Citizen Information Lines

During an emergency, you may hear rumors. Please don't accept rumor as a fact. Special telephone hotlines will provide the latest official information. However, use telephones only when absolutely necessary so telephone circuits will remain clear for emergency workers.

Citrus County: 1.352.746.6555
after hours: 911
Citizen Information Lines: 1.352.746.5470 or 527.2106

Levy County: 1.352.486.5213
after hours: 486.5111
Citizen Information Lines: 1.352.486.5155 or 486.5576

State of Florida: 1.800.342.3557
Division of Emergency Management

Citrus County Schools

- Citrus County children within the evacuation zone will be assembled and counted, then transported by bus. Crystal River primary and Crystal River high school children will be taken to Citrus County Fairgrounds Auditorium. Academy of Environmental Science and Marine Science Station students will also be transported to the Citrus County Fairgrounds Auditorium. Crystal River middle school children will be taken to Citrus Springs Middle School.
- Children in Citrus County daycare centers that are not picked up by their parents will be taken to the First United Methodist Church in Inverness.
- When the buses arrive at their destination, children will be counted again and cared for until parents pick them up.
- Students from Citrus County evacuated areas shall remain at the designated location until picked up by parent(s).
- Any student not picked up by 7 p.m. will be transported to the Withlacoochee Technical Institute, West Hwy. 44, until picked up by parent(s).

Levy County Schools

- Levy County children within the evacuation zone in the Inglis/Yankee town area will be taken to Bronson High School.
- Children in the Levy County daycare centers (Inglis/ Yankeetown) within the evacuation zone will be taken to Bronson High School.
- When the buses arrive, children will be counted again and cared for until parents pick them up.

Tune to Emergency Alert Stations listed on page 3 for shelter openings and updates.

If You Have Livestock or Grow Food Products

- Provide as much cover as possible for livestock.
- Leave plenty of water and food (if you are told to evacuate).
- Use stored feed when possible.
- Do not drink fresh milk from unprotected cattle.
- Do not eat or sell fresh fruits or vegetables.
- Tune in to local radio or television stations listed on page 3, or contact area agriculture agents for more information.

Citrus County: 1.352.527.5700
Levy County: 1.352.486.5131

Tune to Emergency Alert Stations listed on page 3 for shelter openings and updates.

Emergency Plans

Duke Energy developed a comprehensive emergency plan for the plant before a license to operate was granted. State and local governments also developed emergency plans. Each year, the plans are tested thoroughly with drills and exercises.

Duke Energy, state and county governments, law enforcement agencies and fire departments have emergency workers who are carefully trained to handle an emergency at the plant. Emergency workers are directed from emergency operations centers. Special telephone and radio systems have been installed between the plant and the emergency centers.

Evacuation Routes

The map on pages 8 and 9 shows the area around the Crystal River Nuclear Plant and suggested evacuation routes. Locate the areas where you live and work, and find the quickest evacuation routes (roads marked with arrows). Evacuation routes are shown in written form on page 13. For a quick reference once you have determined your evacuation route, mark the information provided.

During an emergency, tune to an EAS station listed on page 3 for more information.

Your Quick Reference Safety Information for the Crystal River Nuclear Plant

Please take a minute and complete the information below so you will have it in an emergency.

My local radio station is:

My local television station with information is:

Zones where family members work or live:

The evacuation shelter for the zone where I live is:

The evacuation route for the zone where I live is:

The relocation school(s) for my child (children) is (are):

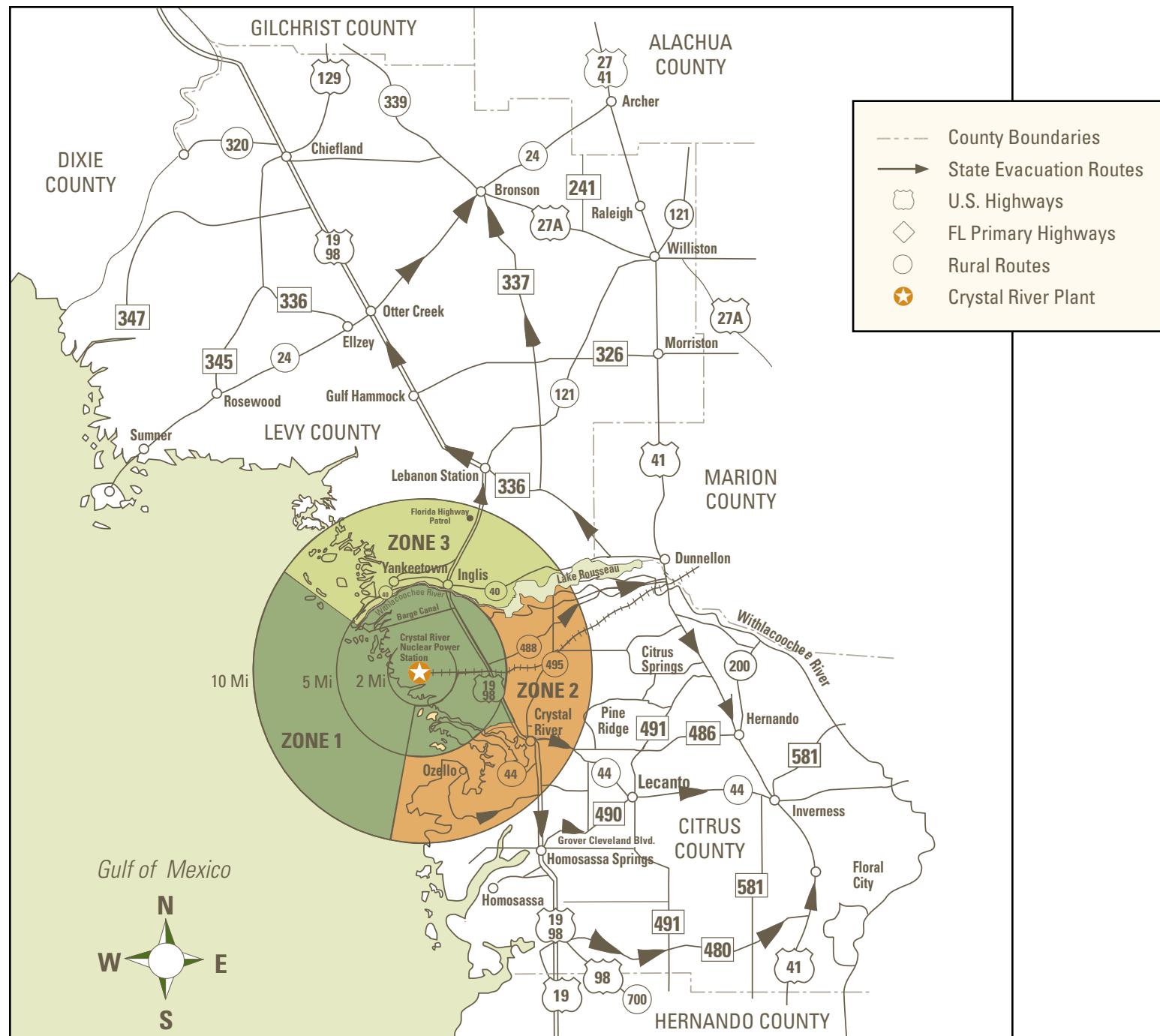
Plan ahead! Drive your route now. If you have any questions, call your emergency management office.

10- and 50-Mile Emergency Planning Zones

Federal authorities have set up two Emergency Planning Zones as the basis for planning to protect the public. Residents living within a 10-mile radius of the plant must be protected from direct exposure to a radioactive release. Residents within a 50-mile radius must be protected from eating contaminated foods or drinking contaminated milk and water. The State Division of Emergency Management will implement their plans to control and sample food supplies (milk, seafood, crops, etc.) within the 50-mile zone. Although the 50-mile zone is not shown on the map below,

it includes all or parts of the following counties: Dixie, Gilchrist, Alachua, Marion, Lake, Sumter, Hernando and Pasco.

If radioactive material was released from the plant, the affected area would be determined by weather conditions like wind speed and wind direction. You should tune in to a local radio or television station listed on page 3 for information about the affected area in an emergency situation.



Evacuation Shelters – Citrus County

Reception Center

Withlacoochee Technical Institute
1201 W. Main St.
Inverness, Florida

Special Needs Shelters

Citrus High School
600 W. Highland Blvd.
Inverness, Florida

Lecanto Middle School
3800 W. Educational Path
Lecanto, Florida

Renaissance Center
3630 W. Educational Path
Lecanto, Florida

Daycare Shelter

First United Methodist Church
3896 S. Pleasant Grove Rd.
Inverness, Florida

Pet-Friendly Shelter

Lecanto Primary School
3790 W. Educational Path
Lecanto, Florida

Other Shelters

Central Florida Community College 3800 S. Lecanto Hwy. Lecanto, Florida	Hernando Elementary School 29 75 E. Trailblazer Lane Hernando, Florida
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Central Ridge Elementary School 185 W. Citrus Springs Blvd. Citrus Springs, Florida	Inverness Middle School 1950 Hwy. 41 N. Inverness, Florida
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Citrus Springs Elementary School 3570 W. Century Blvd. Citrus Springs, Florida	Inverness Primary School 206 S. Line St. Inverness, Florida
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Citrus Springs Middle School 150 W. Citrus Springs Blvd. Citrus Springs, Florida	Lecanto High School 3810 W. Educational Path Lecanto, Florida
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Crest School 2600 S. Panther Pride Dr. Lecanto, Florida	Pleasant Grove Elementary School 630 Pleasant Grove Rd. Inverness, Florida
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Forest Ridge Elementary School 2927 N. Forest Ridge Blvd. Hernando, Florida	Rock Crusher Elementary School 814 S. Rock Crusher Rd. Homosassa, Florida
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Floral City Elementary School 8457 E. Marvin St. Floral City, Florida	
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In Citrus County, public schools are typically used as evacuation shelters. All shelters may not be opened. Citizens living within the 10-mile zone of the plant should listen to one of the EAS Stations listed on page 3, or call the Citizen Information Lines (1.352.746.5470 or 527.2106) to find out which shelters are open and available to the public.

Evacuation Shelters – Levy County

Primary/Special Needs Shelters

Bronson High School*
350 School St.
Bronson, Florida

Chiefland Elementary School
1205 NW 4th Ave.
Chiefland, Florida

Williston Elementary School
801 S. Main St.
Williston, Florida

Secondary Shelters

Williston High School
427 W. Noble Ave.
Williston, Florida

Williston Middle School
1345 NE 3rd Ave.
Williston, Florida

Chiefland High School (Gym)
816 N. Main St.
Chiefland, Florida

Daycare Shelter

Bronson High School
350 School St.
Bronson, Florida

**During a radiological event, evacuees will be sent to Bronson High School for radiological monitoring before being sent to a shelter. Williston and Chiefland high schools will be the primary shelters during a radiological event.*

Potassium Iodide

In cases where the public may be exposed to certain types of radioactivity, state and local officials may advise the public to take potassium iodide (KI) tablets.

KI is an over-the-counter drug that may reduce the amount of radioactive iodine absorbed by the body's thyroid gland. KI saturates a person's thyroid so it cannot absorb any radioactive iodine. The public should take KI only when directed by public health officials.

Evacuation or sheltering indoors, based on directions given by county and state officials, is the best protective action in the unlikely event of a serious incident. The county health department has plans in place for KI distribution at the reception centers.

Evacuation Route Directions

- 1. Persons located north of the plant in Levy County:** Take 19 north or 40 east to 336 north to Bronson.
- 2. Persons located north of the plant in Citrus County:** Take 19 north to Bronson, or take 488 east to 41 south to Inverness.
- 3. Persons located near 488:** Take 488 east to 41 south to Inverness.
- 4. Persons located south of the plant near Hwy. 19:** Take 19 south to 44 east to Inverness.
- 5. Persons located on 495 north of the railroad tracks:** Take 495 north to 488 east to 41 south to Inverness.
- 6. Persons located on 495 south of the railroad tracks:** Take 495 south to Turkey Oak Drive east to 44 east to Inverness.
- 7. Persons located near 44 East between 19 and 486:** Take 44 east to Inverness.
- 8. Persons located near 19 between 44 East and 44 West:** Take 19 north to 44 east to Inverness.
- 9. Persons located on 44 West and on 19 South:** Take 19 south to Grover Cleveland Blvd. (Homosassa Springs) east to 491 south to 480 east to 41 north to Floral City.
- 10. Persons located on 494:** Take 19 south to Grover Cleveland Blvd. (Homosassa Springs) east to 491 south to 480 east to 41 north to Floral City.

Evacuation Zones and Routes

Below is a list of locations and subdivisions in the 10-mile area around the plant. Each listing shows the number of the zone it is in and the number(s) of suggested evacuation route(s) from page 13. Find and mark the listings that apply to you. If your location is not listed, use the one closest to you.

Location	Zone	Evacuation Route(s)
Citrus County		
Cedar Lake Estates	1	4
Citronelle	2	5
Country Oaks	1	4
Crystal Manor	1	3
Crystal Pointe	1	3
Crystal River Airport area	2	9
Crystal River Archeological Site	1	4
Crystal River (east of 19)	2	4, 6, 7, 8
Crystal River (west of 19)	1	4, 7, 8
Crystal River Mall	2	4
Crystal River Manor	1	4
Crystal River Oaks	1	4
Crystal River Yacht Club area	1	4
Crystal Shores	2	9
DeRosa Village	2	5
Dixie Shores	2	9
Fort Island Gulf Beach	1	9
Garden Hills	2	7
Greenwood Estates	2	6
Highland Heights	2	3
Holiday Acres	2	7
Holiday Heights	2	3
Hollinswood Ranch/Holnam Mining	1	2
Indian Waters	1	4

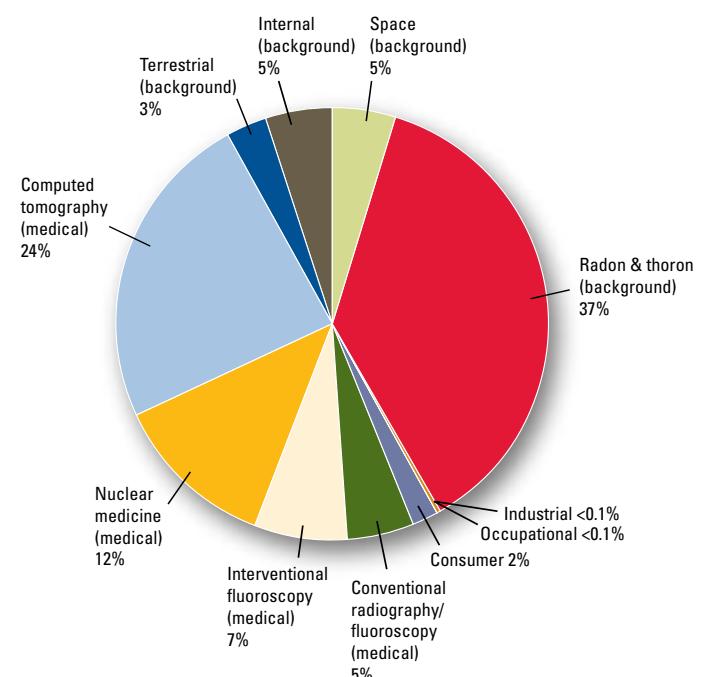
Location	Zone	Evacuation Route(s)
Citrus County		
The Islands	2	9
Lake Rousseau Country Estates	2	3
Ozello	2	10
Palm Springs	2	9
Paradise Point	2	7, 9
Plantation Golf Club area	2	9
Rainbow Estates	2	3
River Road area (south of Inglis/Yankeetown)	1	2
Seven Rivers Country Club area	2	7, 9
Seven Rivers Farms	2	3
Seven Rivers Heights	2	3
Shamrock Acres	2	6
Sunshine Gulf Estates	2	3, 5
Whitehall Estates	2	3
Woods 'N Waters	2	3
Levy County		
Cason Inglis Acres	3	1
Gulf Hammock area (Butler Road area)	3	1
Inglis	3	1
Peaceful Acres	3	1
Pleasant Acres	3	1
Yankeetown	3	1

Evacuation Route Directions

- 1. Persons located north of the plant in Levy County:** Take 19 north or 40 east to 336 north to Bronson.
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- 8. Persons located near 19 between 44 East and 44 West:** Take 19 north to 44 east to Inverness.
- 9. Persons located on 44 West and on 19 South:** Take 19 south to Grover Cleveland Blvd. (Homosassa Springs) east to 491 south to 480 east to 41 north to Floral City.
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Radiation Information

Simply stated, radiation is energy that is released as a particle or wave. Radiation is invisible, tasteless, odorless and silent. It can be "natural" or "man-made." Examples of radiation include light, heat and radio waves. Ionizing radiation can produce electrically charged particles in materials it passes through. These electrically charged particles are called "ions." Certain ions can cause harmful chemical changes in people and animals. Background radiation can come from nature or be man-made. It generally occurs in small amounts and is the type of radiation we are routinely exposed to without harmful health effects. We are constantly exposed to natural sources of radiation. For example, as the sun shines, we are exposed to cosmic rays from space. Also, very small amounts of "natural" radioactive elements such as radium and uranium exist in our food, water, soil and building materials.



NCRP Report #160, 3 Mar 09, "Ionizing Radiation Exposure of the Population of the United States"

We are also exposed to small amounts of "man-made" radiation from dental and medical X-rays, color television and smoke detectors.

Radiation is generally measured in millirems. In north-central Florida, we receive about 600 millirems of background radiation each year. (See pie chart.)

Accurate instruments around the Crystal River Energy Complex measure radiation levels from the Crystal River Nuclear Plant. Officials from Duke Energy and the state government routinely monitor these instruments.

The average additional radiation exposure for people living within a 50-mile radius of the Crystal River Nuclear Plant is less than one millirem per year. It would take about 100,000 times this amount before you would feel sick.

During normal plant operations, a person would have to stand at the plant boundary for about 2,000 years to receive the same amount of radiation as from a full-mouth dental X-ray.

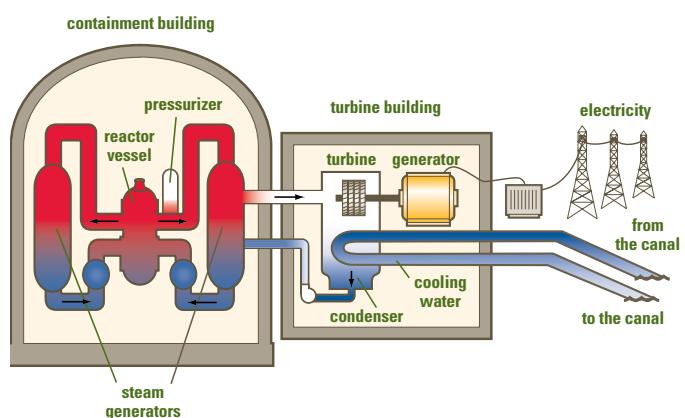
How the Nuclear Power Plant Works

The Crystal River Energy Complex contains five power plants: four coal-burning and one nuclear. Electricity from the nuclear plant is generated in much the same way as in coal-burning plants. The major difference is the heat source. No fossil fuels are needed to produce electricity in the nuclear plant.

At the Crystal River Nuclear Plant, uranium fuel is contained in long, thin rods. Uranium atoms are split by striking them with tiny particles called neutrons. This produces heat and releases more neutrons, which split more uranium atoms. This process repeats itself over and over in what is called a chain reaction. The chain reaction is completely contained within the reactor vessel.

Control rods are raised and lowered into the reactor to control the chain reaction and the amount of heat produced. The heated water from the reactor vessel is kept under pressure to prevent it from boiling. The water is then piped to the steam generator where heat is transferred through the walls of tubes to water in an entirely separate system. The water in this secondary system then turns to steam. The steam spins the turbine, which is connected to an electric generator that produces electricity. As the steam leaves the turbine, it falls on pipes carrying cooling water in the condenser system where it changes back to water. It is then pumped to the steam generator to be heated hot enough to become steam again.

A nuclear explosion CANNOT happen at Crystal River because the uranium fuel in the reactor contains only a very small amount of the uranium used in nuclear weapons.



Did You Know?

The two huge, hourglass-shaped cooling towers, the tall stacks and most of the other buildings you see when you look at the energy complex from a distance are part of the coal-burning plants and have nothing to do with the nuclear plant.

Types of Radioactivity

There are three major types of ionizing radiation that would be harmful to the public in a serious nuclear accident.

Alpha

Alpha particles are the least penetrating type. They travel about one inch in the air and can be stopped by a sheet of paper. They are harmful only if swallowed or inhaled, or if they enter the body through an open wound.

Beta

Beta particles have more penetrating powers than alpha particles. They travel a few feet in the air and can be stopped by thin layers of wood or glass. Beta particles also can be harmful if ingested into the body.

Gamma

Gamma waves have great penetrating powers. They can travel long distances and can be stopped only by heavy shielding material, such as lead or concrete. Gamma waves are harmful because they can penetrate the body and damage or destroy the cells.

Multiple Barrier Safety Design

Safety in the nuclear plant operation begins with a safe design. Crystal River has many backup safety systems to keep the uranium fuel from overheating. The plant is also designed with many physical barriers to prevent the release of radioactive materials and to protect the public and the environment.

- The uranium fuel is contained in marble-size ceramic pellets.
- The ceramic pellets are stacked end-to-end inside sealed tubes of a corrosion-resistant and heat-resistant metal called zirconium.
- The zirconium tubes are inside the nine-inch-thick steel reactor vessel.

The reactor vessel is inside the round, dome-shaped "containment building" made of concrete walls more than three feet thick, reinforced with steel rods and cables. The inside of the containment building walls has a steel lining one inch thick. The containment structure is designed to withstand a major hurricane or tornado, or even the impact of a jet airliner.

Safety and Security

- Nuclear plants are built with multiple layers of safety systems and structures designed to protect both the plant and the community. Our safety systems have separate, multiple backup systems to provide additional protection and reliability.
- Containment buildings are reinforced concrete and steel structures that can withstand tremendous forces such as hurricanes, tornadoes, earthquakes and other catastrophic events.
- Nuclear plants are among the most secure industrial facilities in the world. Each facility has a specially trained and equipped security force that monitors and controls access to the plant 24 hours a day.
- Duke Energy operates the Crystal River Nuclear Plant with uncompromising safety guidelines monitored by our own stringent internal programs, as well as industry and Nuclear Regulatory Commission guidelines.
- Most of the employees who work at Crystal River are also residents of the local area. They and their families may be your friends and neighbors.



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