

# 2004 Watts Bar



## **Emergency Information**

State of Tennessee

McMinn County Emergency Management Agency

Meigs County Emergency Management Agency

Rhea County Emergency Management Agency

Tennessee Valley Authority

Please keep this information easily available





## Dear Watts Bar Neighbor:

As in the past, the Tennessee Valley Authority, State of Tennessee, and your local Emergency Management Agency have provided you with a calendar that contains important information about the Watts Bar Nuclear Plant and photographs of the Tennessee Valley Region.

This 2004 calendar contains updated information reflecting additions and changes over the last year. This information will help you better understand Watts Bar and the emergency plans that have been developed for your protection. Please keep the calendar in a convenient place and readily available. Any previous calendars or brochures concerning emergency information or instructions about Watts Bar should be discarded.

We realize that some Watts Bar neighbors would require special assistance in the unlikely event of an emergency at the plant. Therefore, we have included a card for you to fill out and return if such assistance is needed. For your convenience, the card has been self-addressed, and the postage has been paid. In order for emergency officials to maintain a current list of persons who would need assistance, this card must be returned immediately, even though you may have sent a card from a previous calendar or brochure.

If you have any questions about this material, please call one of the numbers listed below, and we will be glad to answer them for you.

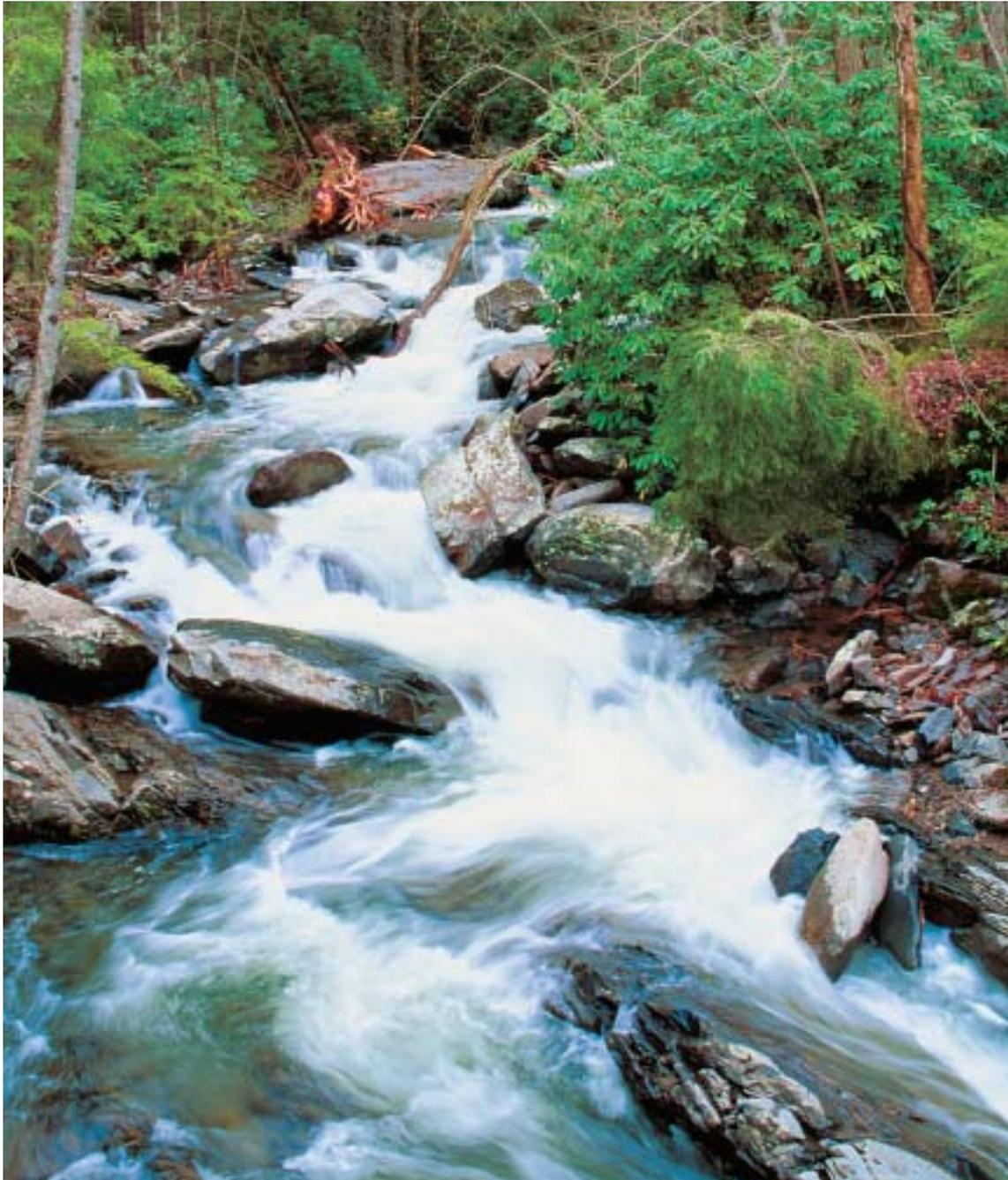
**William R. Lagergren, Vice President**  
Watts Bar Nuclear Plant  
Tennessee Valley Authority

**James H. Bassham, Director**  
Tennessee Emergency Management Agency  
State of Tennessee

### FOR QUESTIONS ABOUT THIS MATERIAL

|   |              |
|---|--------------|
| Tennessee Valley Authority<br>Inside local calling area | 365-1574     |
| Outside local calling area                              | 800-467-1388 |
| McMinn County Emergency Management Agency               | 744-8105     |
| Meigs County Emergency Management Agency                | 334-3211     |
| Rhea County Emergency Management Agency                 | 775-2506     |
| Tennessee Emergency Management Agency (NONEMERGENCY)    | 615-741-0001 |

*During emergency operations, additional telephone numbers will be published and broadcast over the Emergency Alert System (EAS).*



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## The Prompt Notification System

We expect Watts Bar Nuclear Plant to operate safely. However, if an emergency occurs at the plant, TVA will inform state officials at once.

In-depth emergency plans have been prepared by TVA, the State of Tennessee, and your local Emergency Management Agency. These plans are in place to protect your health and safety, and this calendar is a part of those plans because we want you to be prepared, to know what the sirens mean, and what you should do if you hear them.

If needed, the Prompt Notification System will be activated quickly to inform the public of any potential threat. The Prompt Notification System uses sirens and tone alert radios to notify the public to tune their radios or televisions to an Emergency Alert System (EAS) station. The EAS station will provide information and emergency instructions for the public to follow.

The Emergency Alert System includes local radio and television stations, NOAA weather radio, and the cable-TV interrupt system. Fixed sirens provide coverage out to approximately 10 miles around Watts Bar. If you hear the sirens, tune to a local radio or television station for news and instructions.

The sirens and other warning systems are operated by the Tennessee Emergency Management Agency (TEMA) and may be used to warn residents of an emergency other than an incident at Watts Bar. For example, the sirens may be used to warn the public of floods, tornadoes, or other natural or man-made disasters.

If you note a problem with one of the sirens, please notify your county or state Emergency Management Agency using the numbers listed inside the front cover.



## If you hear the sirens

**Check it out**—it could be only a test. Siren tests occur in your area on the first Wednesday of each month at noon. If there is severe weather in the area at the time of a scheduled test, the sirens may not be tested.

**Remember:** Hearing a siren or tone alert radio does not mean you should evacuate. It means turn on your radio or television and listen for instructions.

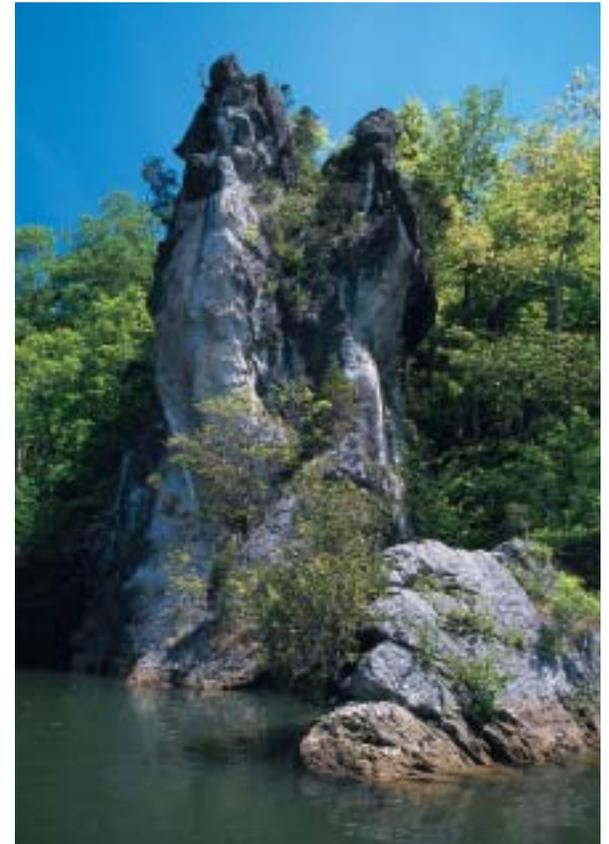
**Tune to your local radio or television station and listen for details.** WSKZ-FM (106.5) in Chattanooga and WIVK-FM (107.7) and WIVK-AM (990) in Knoxville are the primary/alternate EAS stations in the area and are monitored by other stations. A real warning could mean fire, tornado, chemical spill, nuclear incident, or other emergency.

Most radio and television stations in the area participate in the EAS and will be making announcements. NOAA Weather radio (162.55 MHz) will instruct listeners to tune to one of these stations.

**Check on your neighbors.**

**Do not use the phone** unless absolutely necessary. The phone lines need to be open for emergency workers. Do not call 911 for information if you hear the sirens.

**If the warning involves an incident at Watts Bar,** you might be advised to go indoors and close all windows, doors, and other sources of outside air. Or you may be advised to leave (evacuate) your area. In either case, see page 2 for additional information.





## If you are advised to take shelter indoors

- Go indoors and stay.
- Close all doors and windows.
- Shut off all systems that draw outside air into the house such as furnaces, air conditioners, fireplace vents, and dampers.
- Stay tuned to your local EAS radio or TV stations. Emergency officials will be providing information and instructions over EAS stations.
- If you must go outside, protect your breathing. Place a damp cloth or towel over your nose and mouth.
- If you are told that it is safe to go outside, try to check on your neighbors. They may not have heard the announcements.
- Do not use the phone unless you have a special emergency and need help. Leave the lines open for official business.
- Primary/Alternate EAS Stations  
WSKZ-FM (106.5)  
WIVK-FM (107.7)  
WIVK-AM (990)

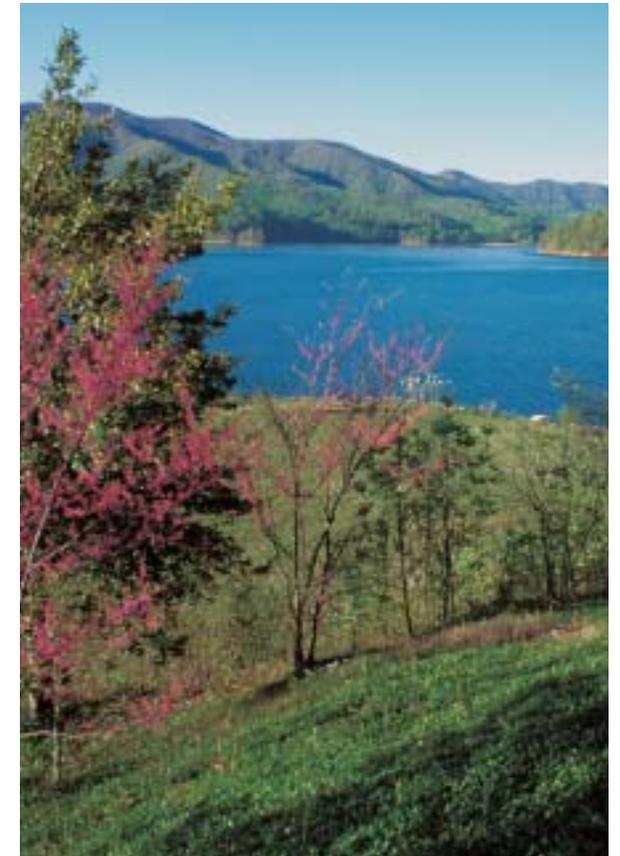


## If you are asked to leave (evacuate) the area

- Stay calm and do not rush. Evacuation can work properly and reduce your risk only if you act safely and calmly.
- Take a few items with you. Gather personal items you or your family might need, using the checklist on page 6.
- Turn off lights, appliances, and water.
- As you leave, lock your house and tie a white cloth or white towel on your front door. This sign will let emergency workers know that everyone in your home has left the area.
- Please leave your pets at home with plenty of food and water. Pets will NOT be allowed in the public shelters.
- Use your own transportation or, if possible, make arrangements to ride with a neighbor. Also, keep car windows and air vents closed and listen to an EAS radio station.
- Use the map on page 3 of this booklet to find the sector where you live and the evacuation route you should follow. *(Write this information in the space provided next to the map.)*
- Follow the evacuation routes shown on the map. If you need a place to stay, shelter information points will be located along the controlled evacuation routes.

### While you are away. . .

- Local police officers will secure the evacuated areas to protect homes and businesses.
- ONLY authorized persons will be allowed in the evacuated areas.
- Officials of the Tennessee Department of Radiological Health will monitor affected areas. You will be notified when it is safe to return home.





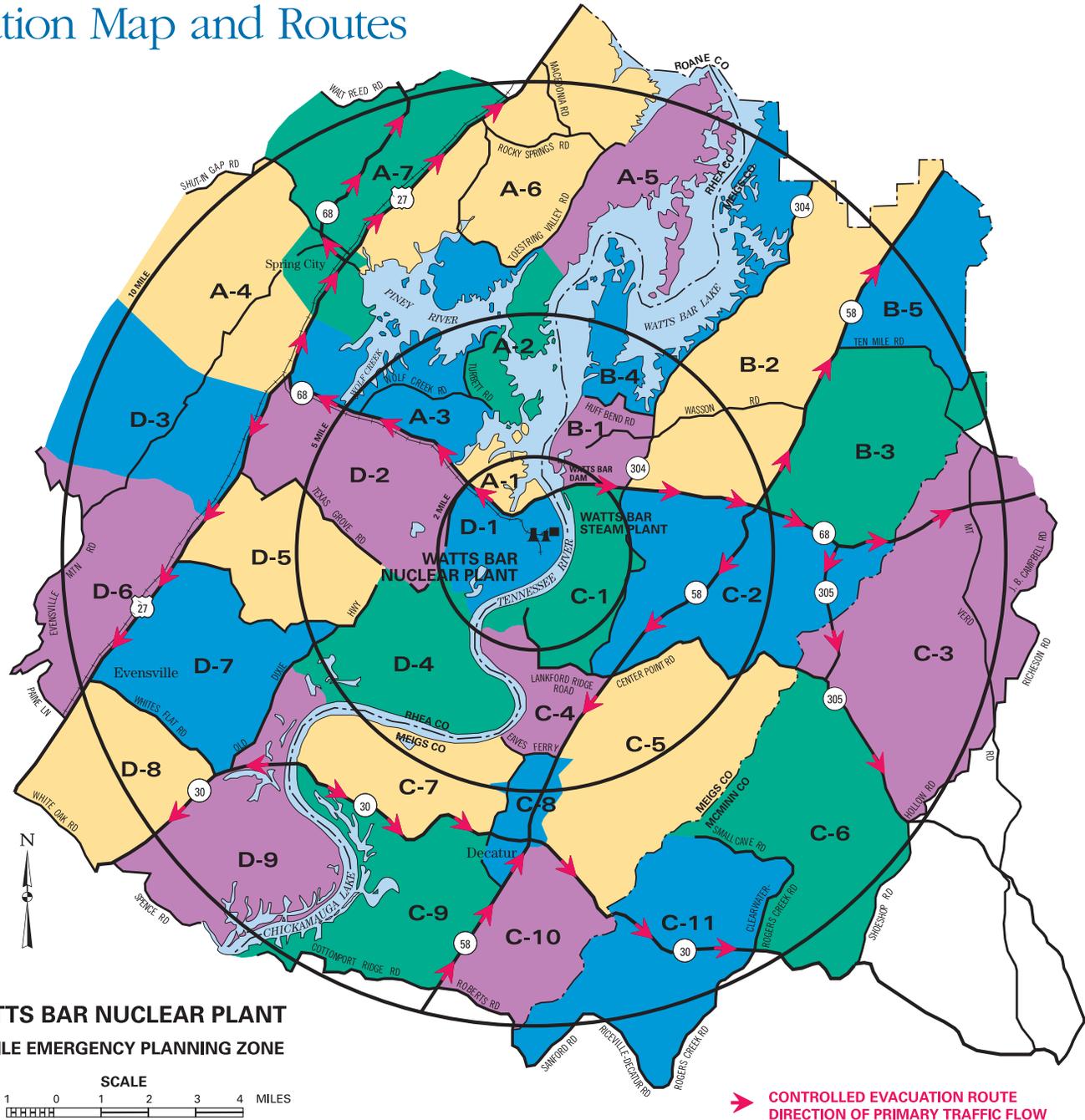
# Watts Bar Evacuation Map and Routes

If an evacuation is ordered, it is important that you follow the evacuation routes shown on the map.

The 10-mile Emergency Planning Zone (EPZ) is divided into sectors. For quick reference, locate the sector in which you live or work and write it in the space below.

Special evacuation routes for each sector are listed on page 4. If an evacuation is ordered, locate the number for your sector and follow that route. Emergency workers will patrol these roads and will provide any aid or guidance you need.

Note: Individuals in doubt as to sector of residence or work should contact their local Emergency Management Agency.



My sector number is:

Home

Work

**WATTS BAR NUCLEAR PLANT**  
10 MILE EMERGENCY PLANNING ZONE





# Controlled evacuation routes

**Controlled evacuation routes** are established for the purpose of helping the traffic flow. These routes will be patrolled by law enforcement officers and traffic-assist teams. In addition, if you are not familiar with the area or your shelter assignment, shelter information points will be set up on each route to assist in getting you to your assigned shelter. The controlled evacuation routes are indicated by arrows on the map on page 3 and are as follows:

**US 27:** North from the intersection of State Route (SR) 68 into Roane County and south from the intersection into Hamilton County.

**SR 68:** West from the Tennessee River to US 27; north from Spring City into Cumberland County and east from the river to I-75.

**SR 58:** North from the intersection of SR 68 into Roane County; south from the intersection to SR 68 to SR 30, then east on SR 30; north from Cottonport Ridge Road/Roberts Road to SR 30, then east on SR 30.

**SR 30:** West from the Tennessee River to US 27; east from the Tennessee River into Athens.

**SR 305:** South from the intersection with SR 68 to SR 30 in Athens.

## MCMINN COUNTY EVACUATION ROUTES

### C-3, C-6, C-11

#### To: Central High School (McMinn County)

Take the most direct route from your location, following evacuation signs on secondary roads, to SR 68, SR 30, or SR 305; east on SR 68 to I-75; south on I-75 to SR 30; south on SR 305 to SR 30; east on SR 30, through

Athens to Etowah; turn left at the intersection of US 411 and SR 30; go two miles to the school on the right.

## MEIGS COUNTY EVACUATION ROUTES

### B-1, B-2, B-3, B-4, B-5

#### To: Roane County High School (Roane County)

Take the most direct route from your location, following evacuation signs on secondary roads, to SR 58; go north on SR 58 into Kingston; turn left at the intersection of US 70 and SR 58 and go 3/4 mile to the school on the right.

### C-1, C-2

#### To: Central High School (McMinn County)

Take the most direct route from your location, following evacuation signs on secondary roads, to SR 68; east on SR 68 to SR 305 or I-75; south on SR 305 or I-75 to SR 30; east on SR 30, through Athens to Etowah; turn left at the intersection of US 411 and SR 30 and go two miles to the school on the right.

### C-4, C-5, C-7, C-8, C-9, C-10

#### To: Central High School (McMinn County)

Take the most direct route from your location, following evacuation signs on secondary roads, to SR 30; east on SR 30 through Athens into Etowah; turn left at the intersection of US 411 and SR 30, go two miles to the school on the right.

## RHEA COUNTY EVACUATION ROUTES

### A-1, A-2, A-3, A-5, A-6

#### To: Harriman High School (Roane County)

Take the most direct route from your location, following evacuation signs on secondary roads, to US 27; north on US 27 through Rockwood to Harriman. Harriman High

School is located at the intersection of US 27 and Georgia Street.

### A-4, A-7

#### To: Cumberland County High School (Cumberland County)

Take the most direct route from your location, following evacuation route signs on secondary roads, to SR 68; go north on SR 68 into Cumberland County through Homestead on SR 68/US 127 into Crossville; turn left at the intersection of SR 68/US 127 and SR 392 (Miller Avenue), go about 1-1/2 miles to the second traffic light (intersection of SR 392 and Stanley Street); turn left on Standley Street to the school on the right.

### D-1, D-2, D-3, D-4, D-5, D-6, D-7, D-8, D-9

#### To: Soddy-Daisy High School (Hamilton County)

Take the most direct route from your location, following evacuation signs on secondary roads, to US 27; go south on US 27 into Soddy-Daisy; turn left at the intersection of Sequoyah Access Road and US 27 and go about 1/2 mile to the school at 600 Sequoyah Access Road



# School pairings for relocation

If an incident involving an actual or potential radiological release occurs at the Watts Bar Nuclear Plant, first consideration will be given to the safety of children.

If a "Site Area Emergency" is declared at the plant (see page 7, "How emergencies are classified"), students in the 10-Mile Emergency Planning Zone (EPZ) will be relocated to paired schools in a safe area. Children will be under the supervision of school officials at all times during and after the movement.

In order for school officials to move the children quickly and safely, without causing unnecessary delay, do not attempt to pick up children at the schools once the relocation order is issued.

A list of schools in the EPZ and the paired schools where the children will be taken is provided below. (Sector location in parentheses.)

## **McMinn County Schools**

### **E.K. Baker School (C-6)**

Relocated to: Central High School, Etowah, TN



## **Meigs County Schools**

### **Meigs North Elementary School (C-2)**

Relocated to: Central High School, Etowah, TN

### **Head Start North (C-2)**

Relocated to: Central High School, Etowah, TN

### **Meigs County High School (C-8)**

Relocated to: Central High School, Etowah, TN

### **Meigs Middle School (C-8)**

Relocated to: Central High School, Etowah, TN

### **Watts Bar Christian Academy (B-2)**

Relocated to: Central High School, Etowah, TN

## **Rhea County Schools**

### **Spring City Elementary School (A-7)**

Relocated to: Cumberland County High School, Crossville, TN

### **Rhea County High School (D-6)**

Relocated to: Soddy-Daisy High School, Soddy-Daisy, TN



## **Meigs County Child-Care Facilities**

### **Watts Bar Day Care (B-2)**

Relocated to: Central High School, Etowah, TN

### **Head Start North (C-2)**

Relocated to: Central High School, Etowah, TN

## **Rhea County Child-Care Facilities**

### **Cedine Bible Camp (A-5)**

Relocated to: Harriman High School, Harriman, TN

### **Rhea County Alternative School (D-6)**

Relocated to: Soddy-Daisy High School, Soddy Daisy, TN

### **Rhea County Alternative School II (D-6)**

Relocated to: Soddy-Daisy High School, Soddy Daisy, TN

### **Rhea County Preschool (D-6)**

Relocated to: Soddy-Daisy High School, Soddy Daisy, TN

### **Sequatchie Valley Head Start (A-7)**

Relocated to: Cumberland County High School, Crossville, TN



## If you need special help

Your health and safety are important. Therefore, special plans must be made to assist and care for persons who are medically disabled or handicapped.

If you or someone you know lives within 10 miles of Watts Bar and needs special help, please fill out and mail the card provided in this brochure. The card is pre-addressed and postage-paid and must be mailed as soon as possible so adequate arrangements can be made.

**Please fill out and return this card even though you may have returned the card from a previous brochure or calendar.**

This will enable your emergency officials to maintain a current list of all persons who would need assistance.

After you have answered all the questions, drop the card in a mailbox.

If you have any questions, or need additional cards, you can contact emergency management officials listed in the front of this publication.



## For farmers and home gardeners

If a major incident happens at the Watts Bar Nuclear Plant, the Tennessee Department of Agriculture will issue periodic information concerning the safety of using home-grown products.

You should stay tuned to an EAS station for these announcements.

Information on actions you can take to protect crops and livestock is available from your County Agricultural Extension Agent.

### Your crops

- An unharvested crop is hard to protect. But normal harvesting and processing may still be possible if time permits.
- Crops already harvested will be safer if they are stored inside.
- You should wash and peel vegetables and fruits from your garden before use if they were not already harvested.

### To protect your livestock

- Provide as much shelter as possible. If you do not have enough space in barns or sheds, use natural shelters such as wooded lots or culverts.
- Take care of milk animals first.
- Provide plenty of food and water and make sure shelters are well-ventilated.
- Use stored feed when possible.

**\* Potassium Iodide Tablets** - In cases where you may be exposed to certain types of radioactivity, the Tennessee Department of Health may direct you to take Potassium Iodide (KI) tablets. These tablets, when taken as directed, may reduce the amount of radioactive iodine absorbed by your body's thyroid gland. Should an accidental release of radiation occur, KI will be available at all mass-care shelters. However, if you live within five miles of the plant and prefer to have it on hand, you can pick up a supply at the following locations: **Rhea County Health Department, 344 Eagle Lane, Evensville, TN (423) 775-7819**  
**Meigs County Health Department, 400 River Road, Decatur, TN (423) 334-5185**

Any questions concerning KI should be referred to the Health Departments listed above.



## Emergency supplies checklist

To help you prepare for any type of emergency, we have provided two lists of supplies.

One contains items you may need to keep in your home to aid your response to any emergency. The second list contains supplies to take with you if you are asked to leave the area. Check the supplies you would need, and add supplies not listed.

### Emergency supplies for your home

- Firstaid kit
- Toolbox
- Candles and matches
- Portable radio, flashlight, extra batteries
- Potassium Iodide tablets\*
- \_\_\_\_\_

### Evacuation supplies

- This calendar
- Medicine or any special medication
- Personal health products (shaving cream, toothbrush)
- Special diet food
- Blankets and pillows
- Cash, checkbook, credit cards, important papers
- Items for children (favorite toy, books)
- Change of clothing
- Potassium Iodide tablets\*
- \_\_\_\_\_



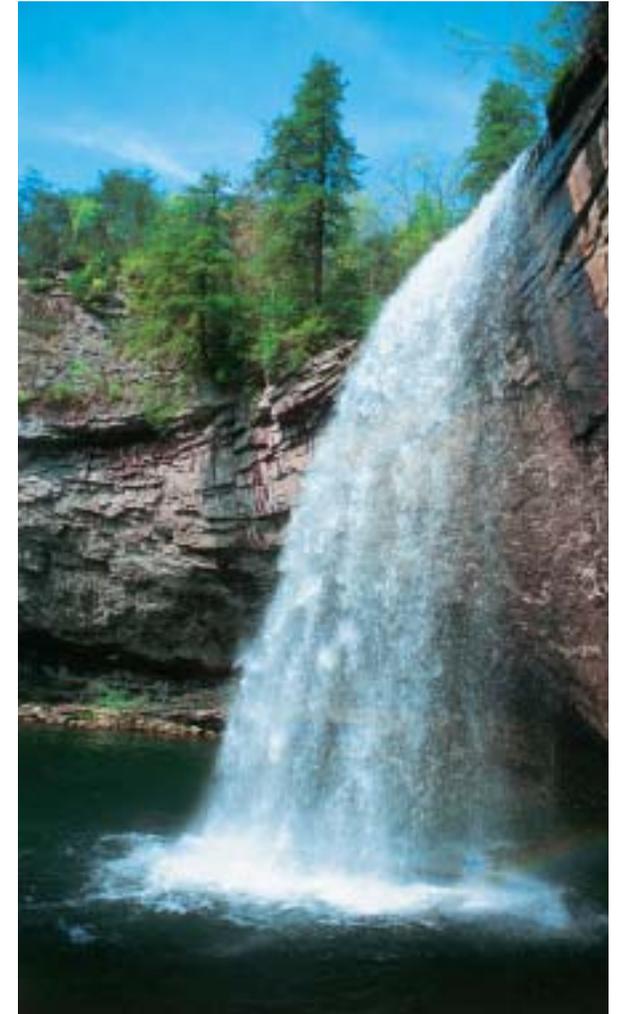
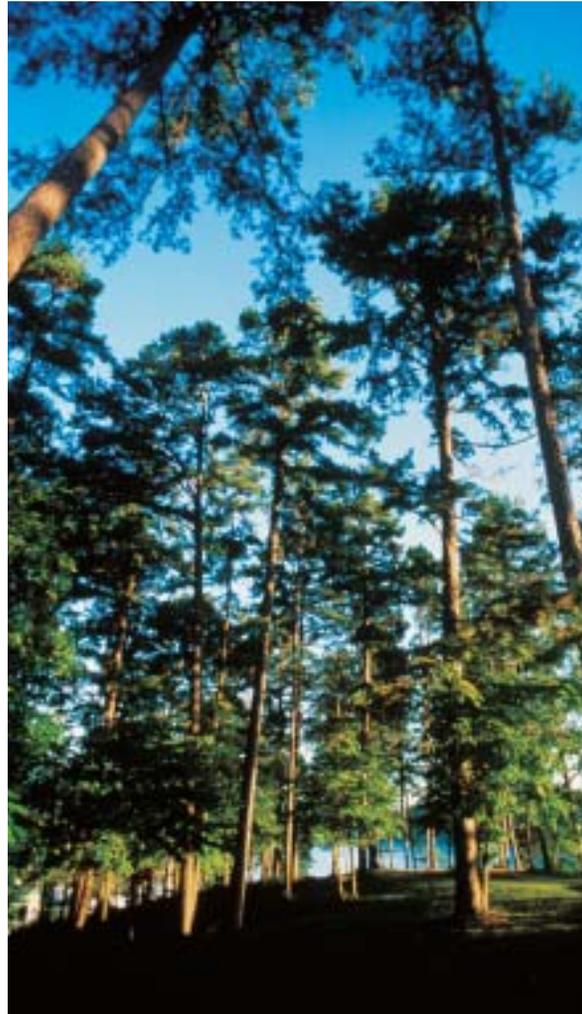
# General Information

## How emergencies are classified

If there is an incident at Watts Bar Nuclear Plant, it will be categorized from least serious to most serious. These four emergency categories have been set by the United States Nuclear Regulatory Commission and adopted by the State of Tennessee and TVA.

The four emergency levels, in order from least to most severe, are:

1. Notification of Unusual Event is the least serious of the four levels. Because of strict federal laws, any event out of the ordinary is reported to federal, state, and local authorities. The event poses no threat to you or to plant employees, but emergency officials are notified.
2. Alert is declared when an event has occurred that could reduce the level of safety of the plant, but back-up plant systems still work. Emergency agencies are notified and kept up-to-date, but no action by the public is necessary.
3. Site-Area Emergency is declared when an event involving major problems with plant safety systems have progressed to the point that a release of some radioactivity into the air or water is possible. The sirens will be sounded. If so, you should listen to EAS radio and television stations for details.
4. General Emergency is the most serious of the four classifications and is declared when an event at the plant has caused a loss of safety systems and is likely to lead to a release of radiation into the environment. State and local authorities would take action to protect the residents living near the plant. People in affected areas would be advised to stay indoors or to evacuate.



# Glossary

**Background Radiation** — This is radiation from natural sources. It comes from the sun's rays; it is in the ground, building materials, and the human body.

**Core** — The central part of a nuclear reactor that contains the uranium fuel.

**Fission** — The nuclear process in which a heavy atom, such as uranium, splits into fragments.

**Fuel Assemblies** — A collection of fuel rods that contains the nuclear fuel pellets. The fuel pellets are used to produce heat to make steam used to generate electricity.

**Fuel Pellets** — Thimble-sized uranium dioxide pellets used in nuclear power generation. Each pellet contains about the same amount of energy as that produced from burning one ton of coal. A modern reactor core may contain up to 10 million pellets.

**Fuel Rods** — Hollow tubes that contain stacks of uranium dioxide fuel pellets. These rods are bundled together to form fuel assemblies.

**Half-Life** — The time required for a radioactive substance to lose one-half of its radioactivity. Half-life can vary from minutes to years, depending on the substance.



# What is radiation?

Radiation is energy traveling in the form of invisible particles or rays after the breakdown of radioactive atoms. Everyone is exposed to small amounts of radiation every day. Air, water, food, and sunshine are a few sources of natural background radiation. Most people are exposed to about 300 to 400 millirems of natural background radiation a year. "Millirem" is a term used to measure the amount of radiation exposure on the human body.

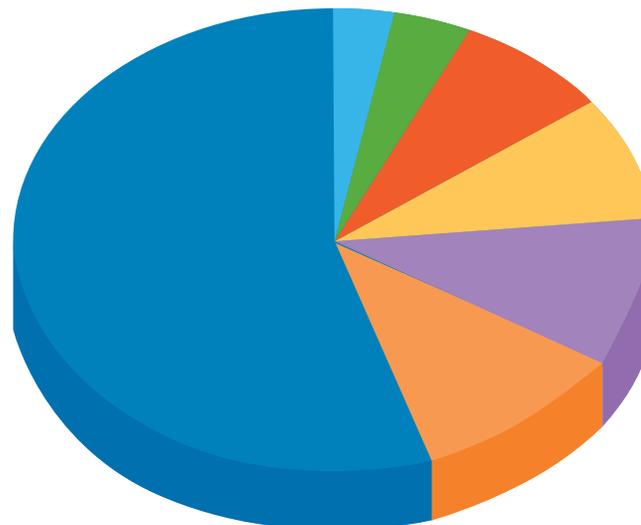
Radiation also comes from other sources. Color televisions produce about 1 millirem of radiation every year. Medical procedures, such as x-rays and diagnostic tests, can result in 20 to several thousand millirems of radiation a year, depending on a person's treatment for disease or injury.

People are concerned about radiation exposure because it can alter or damage human-cell structure. That is why work-

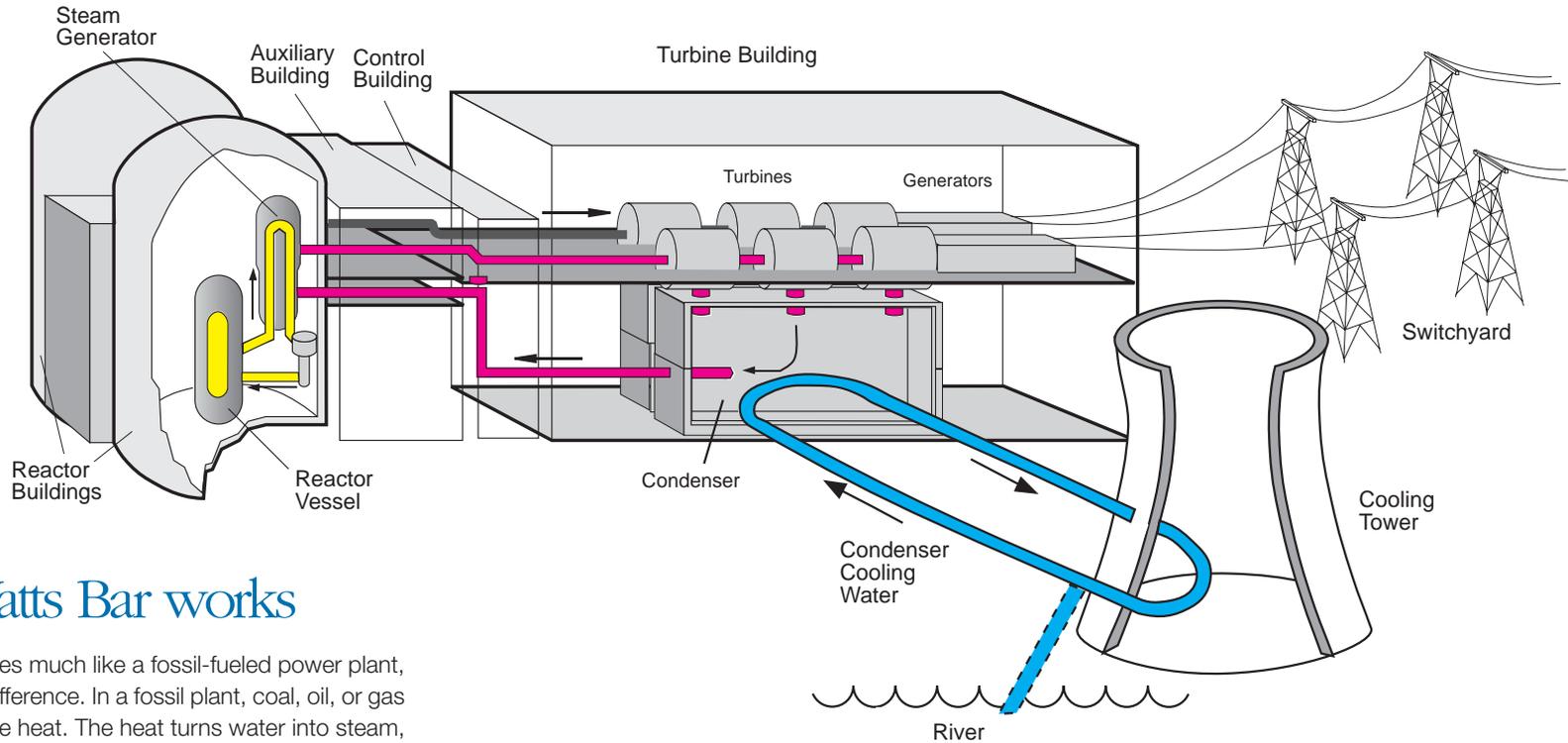
ers at nuclear power plants are carefully monitored and trained to limit their exposure to a level that is as low as is reasonably achievable. The Nuclear Regulatory Commission, which issues licenses to all nuclear power plants, has set a maximum safe individual exposure of 5,000 millirems a year, measured over the entire body. To avoid coming even close to this level, TVA work procedures set an administrative limit of 1,000 millirems per year for any worker, with any additional exposure requiring written approval.

A nuclear power plant's containment building, reactor vessel, and fuel assemblies are barriers designed to contain radiation and protect plant workers and persons living near the plant from any exposures to elevated levels of radiation. Repeated surveys around TVA operating nuclear plants have shown no detectable increase in radiation above normal background levels.

## Sources of Radiation



- Consumer products — 3%
- Nuclear medicine — 4%
- Terrestrial (rocks and soil) — 8%
- Cosmic (outer space) — 8%
- Medical x-rays — 11%
- Internal (inside human body) — 11%
- Radon — 55%



## How Watts Bar works

Watts Bar operates much like a fossil-fueled power plant, with one major difference. In a fossil plant, coal, oil, or gas is burned to make heat. The heat turns water into steam, the steam drives a turbine, and the turbine spins an electrical generator, thus producing electric power.

The operation is the same at Watts Bar, except the heat is provided by a process called fission. The fuel for Watts Bar is uranium, which is made into pellets and sealed inside long metal tubes, called fuel rods. These rods are placed into a reactor vessel, making up a fuel core. In addition, some rods are designed to collect tritium for use by the U.S. Department of Energy.

When a uranium atom is struck by a small particle called a neutron, it can split (fission), giving off heat and more neutrons. Those neutrons can strike other uranium atoms, causing them to split and continue the chain reaction. The reaction is started and stopped by substances that absorb neutrons. Control rods are made of material which absorbs neutrons and can be moved in and out of the fuel core.

When inserted into the core, they stop the chain reaction.

It is physically IMPOSSIBLE for the nuclear fuel at Watts Bar to explode like a nuclear bomb. The fuel for Watts Bar and most other nuclear power plants is only about 3 to 5 percent fissionable uranium. Nuclear weapons are made in excess of 90 percent fissionable uranium. Thus, there is not enough fissionable material for an explosion. The illustration above shows how the heat from the fission process is used to make steam and generate electricity at Watts Bar.

In the primary loop (yellow), water is pumped through the reactor core and is heated. The water is kept under high pressure to prevent it from boiling. The heated water is pumped to a steam generator where the heat is transferred to a secondary loop of water.

The water in the secondary loop (magenta) boils to produce steam. The steam is piped to the turbines. The force of the expanding steam drives the turbines which spin a magnet in a coil of wire (the generator) to generate electric power.

After passing through the turbines, the steam is converted back to water by circulating it around tubes carrying cool water from Chickamauga Reservoir (blue). The condensed steam—now water—is pumped back to the steam generator to repeat the cycle.

The condenser cooling water is passed through the cooling towers before being recycled through the plant. The three water systems are separate from each other. Most important, the radioactive water in the primary loop is not permitted to mix with the other nonradioactive water systems.