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SUBJECT: Forwards Rev 91-03 to Vol A to Oconee Nuclear Implementing Procedures Emergency Plan. D

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DUKE POWER

April 10, 1991

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Emergency Plan, Revision 91-03

Dear Sir:

Enclosed for NRC Staff use and review is Revision 91-02 dated March 22, 1991 to the Oconee Nuclear Station Emergency Plan. This revision is effective March 22, 1991.

This revision is being submitted in accordance with 10 CFR 50.54(q) and does not decrease the effectiveness of the Emergency Plan Implementing Procedures or the Emergency Plan.

By copy of this letter, two copies are being provided to NRC Region II, Regional Administrator.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

HAF:haf

Attachments

9104240193 910410
PDR ADOCK 05000269
F PDR

AD 4/11

Duke Power Company
Oconee Nuclear Station
P.O. Box 1439
Seneca, S.C. 29679

(803) 882-5363



DUKE POWER

April 4, 1991

**SUBJECT: EMERGENCY PLAN MANUAL--(VOLUME A)
REVISION NO. 91-03**

Attached is an update for the Oconee Volume A, Emergency Plan Manual. Follow below instructions for updating your manual.

REMOVE

1. Cover Sheet (Rev. 91-02)
2. Record of Changes
3. Section D (Pages D-12,17,23,
24,27,29,32,33)
4. Section G-2 Brochure
5. Section J-5

INSERT

1. Cover Sheet (Rev. 91-03)
2. Record of Changes 91-03
3. Section D (Pages D-12,17,23,
24,27,29,32,33)
4. Section G-2 Brochure
5. Section J-5

**TO WHOM IT MAY CONCERN: DISTRIBUTION SHOULD BE MADE
TO THE NUCLEAR REGULATORY COMMISSION WITHIN 30 DAYS OF
APPROVAL BY THE STATION MANAGER (BY 04/21/91).**

Ensure that this manual is properly updated within seven working days. This is a controlled document and auditable by the Quality Assurance Group.

If you have questions concerning this revision, please call Nancy Masters at ext. 2403, Document Control.

H. B. Barron
Station Manager

NRM
Attachments

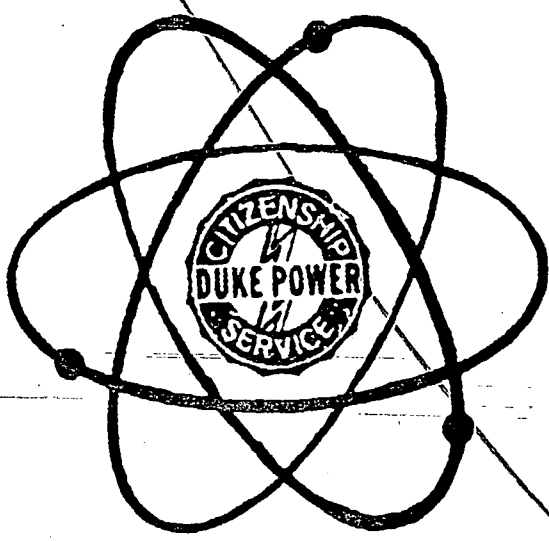
50-269 Superseded Per Rev 91-03 to Vol. A of The

Emergency Plan 4/10/91 #910424R3

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

EMERGENCY PLAN



APPROVED:

H. B. Barron / RLS
H. B. Barron, Station Manager

2/20/91
Date Approved

2/20/91
Effective Date

VOLUME A
REVISION 91-2
FEBRUARY, 1991

Initiating Conditions - NOUE

17. RAPID DEPRESSURIZATION OF THE PWR SECONDARY SIDE.

OCONEE: Same as NUREG 0654.

EAL: OPERATING MODE: HOT SHUTDOWN THRU POWER OPERATIONS Visual observation of non-isolable leak on main steam line requiring plant shutdown or steam line pressure rapidly decreasing or steam line break requiring isolation pursuant to the emergency operating procedure.

BASIS: The significance of this event is that it could lead to an overcooling event which in turn could cause damage to the reactor vessel.

FSAR Accident Analysis: Loss of Electric Power, Steam Line Break.

18. LOSS OF ALL VITAL ONSITE DC POWER

OCONEE: Additional EAL (not required by NUREG 0654)

EAL: Momentary loss of DC power to all vital panelboards >1 but <15 minutes

BASIS: Declaring an Unusual Event for momentary loss of DC power will require a heightened awareness of the event.

Initiating Conditions - Alert

11. **FAILURE OF THE REACTOR PROTECTION SYSTEM TO INITIATE AND COMPLETE A SCRAM WHICH BRINGS THE REACTOR SUB-CRITICAL.**

OCONEE: Anticipated transient without scram (ATWS).

EAL: OPERATING MODE: POWER OPERATION Two or more reactor protective system channels trip without automatic reactor trip and control rods are capable of being inserted (manual trip or driven) from the control room.

BASIS: This scenario may lead to fuel damage which could result in a loss of one fission product barrier (cladding damage). The primary purpose of the RPS is to trip the reactor to prevent fuel clad damage and to prevent the Reactor coolant system from exceeding maximum design pressure. If the reactor protective system fails for whatever reason, damage could occur until the control rods are dropped in the core.

12. **FUEL DAMAGE ACCIDENT WITH RELEASE OF RADIOACTIVITY TO CONTAINMENT OR FUEL HANDLING BUILDING.**

OCONEE: Damage to spent fuel with release of radioactivity.

EAL: Containment fuel damage accident: Unit 1-Valid RIA 2,3,4 HIGH alarm or RIA 49 HIGH alarm and open flow exists from containment. Unit 2&3-Valid RIA 2,3,4 HIGH alarm or RIA 49 ALERT alarm and open flow exists from containment.

BASIS: The HIGH alarm for RIA 2,3,4 (containment area monitors) and the HIGH alarm for Unit 1 and the ALERT alarm for Units 2 & 3 RIA 49 (RB gaseous process monitor) correspond to the setpoints established to assure that 10 CFR 20 limits are not exceeded. Unless a flow exists from containment, activity is confined to the containment building.

EAL: Fuel Handling Building: RIA 6 HIGH alarm or RIA 41 ALERT alarm and RIA 46 HIGH (Units 1 or 2) alarm or RIA 46 ALERT (Unit 3) alarm (verified by RIA 45) and release rate calculations using vent sample analysis and flow rate data are in excess of 10 times limits established by Technical Specifications.

BASIS: The HIGH alarm for RIA 6 (SFP bridge area monitor) and ALERT alarm for RIA 41 (SFP gas monitor) correspond to the setpoints established to assure that 10 CFR 20 limits are not exceeded. Calculations will be made to determine if ten times the technical specifications limits have been exceeded.

FSAR Accident Analysis: Fuel Handling Accident.

INITIATING CONDITIONS-SITE AREA EMERGENCY

Definition: Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Releases do not, nor are they expected to, exceed EPA Protective Action Guideline exposure levels outside the site boundary.

1. **KNOWN LOSS OF COOLANT ACCIDENT GREATER THAN MAKEUP PUMP CAPACITY.**

OCONEE: RCS leakage greater than available makeup pump capacity.

EAL: OPERATING MODE: STARTUP THRU POWER OPERATIONS
Primary or Primary/Secondary. Full HPI unable to maintain subcooling $> 0^{\circ}\text{F}$.

BASIS: Leakage from the reactor coolant system (primary or steam generator) cannot be made up by the high pressure injection pumps to maintain inventory sufficient to maintain subcooling. HPI pumps cannot maintain primary system pressure and heat transfer to the steam generators can no longer be assured. This condition represents the loss of the pressure boundary and the potential to uncover the core and/or damage the fuel.

FSAR Accident Analysis: Loss of Coolant Accident, Steam Generator Tube Rupture.

2. **DEGRADED CORE WITH POSSIBLE LOSS OF COOLABLE GEOMETRY (INDICATORS SHOULD INCLUDE INSTRUMENTATION TO DETECT INADEQUATE CORE COOLING, COOLANT ACTIVITY AND/OR CONTAINMENT RADIOACTIVITY LEVELS).**

OCONEE: Same as NUREG 0654.

EAL: Average of the five highest thermocouple readings greater than 700°F or Unable to maintain subcooling $\geq 20^{\circ}\text{F}$ or hydrogen concentration greater than or equal to 0.5% and increasing at a rate of $>0.1\%$ per hour or RIA 57 or 58 HIGH alarm (630 R/hr)

BASIS: The RCS pressure boundary and the cladding boundary are considered lost for this scenario. The fuel cladding will balloon at 700 degrees and fission products will be evident in the RCS coolant. Saturation conditions are a precursor to fuel damage. Hydrogen generation (0.5%) and increasing at a rate of 0.1% per hour would imply greater than expected clad oxidation was occurring. Containment radiation monitors reading 630 R/hr indicates that a LOCA has occurred and that some fuel damage has occurred.

FSAR Accident Analysis: Loss of Coolant Accident, Loss of Coolant Flow, Steam Generator Tube Rupture.

Initiating Conditions-Site Area Emergency

3. **RAPID FAILURE OF STEAM GENERATOR TUBES (SEVERAL HUNDRED GPM LEAKAGE) WITH LOSS OF OFFSITE POWER.**

OCONEE: Oconee has deleted this initiating condition from the classification process.

BASIS: Realistically, there is no way to indicate whether a rupture of one tube has occurred or more than one tube has sustained damage. This particular condition is already covered in condition #1, RCS Leakage Greater Than Makeup Pump Capacity or either condition #13, Accidental Release of Gases. Unless subcooling is less than 0°F or releases offsite are greater than or equal to 50 mr/hr WB or 250 mr/hr thyroid, the event would be classified as an Alert.

FSAR Accident Analysis: Steam Generator Tube Rupture, Loss of Power.

4. **BWR STEAM LINE BREAK OUTSIDE CONTAINMENT WITHOUT ISOLATION.**

OCONEE: ONS is not a BWR plant. Not applicable.

5. **PWR STEAM LINE BREAK WITH GREATER THAN 50 GPM PRIMARY TO SECONDARY LEAKAGE AND INDICATION OF FUEL DAMAGE.**

OCONEE: Steam line break with P/S leak equal to greater than 50

EALS: ^{gpm} OPERATING MODE: HOT SHUTDOWN THRU POWER OPERATIONS INSIDE CONTAINMENT WITH INDICATION OF FAILED FUEL. Steam line pressure rapidly decreasing and SG tube leak ≥50 gpm and valid RIA 57 or 58 HIGH alarm (630 R/hr)

OUTSIDE CONTAINMENT. Unisolable steam line break and SG tube ≥50 gpm.

BASIS: A steam line break inside and outside containment will be given emergency action levels. A steam line break inside containment coupled with a 50 gpm steam generator tube leak and an indication of failed fuel assumes the loss of two fission product barriers - the loss of the pressure boundary and loss of the cladding boundary.

A steam line break outside containment coupled with a 50 gpm steam generator tube leak assumes the loss of two fission product barriers - the loss of the pressure boundary and loss of containment.

FSAR Accident Analysis: Steam Line Break, Steam Generator Tube Rupture.

6. **LOSS OF OFFSITE AC POWER AND LOSS OF ONSITE AC POWER FOR MORE THAN 15 MINUTES.**

Oconee: Same as NUREG 0654. (Station Blackout)

Initiating Conditions - Site Area Emergency

10. MAJOR DAMAGE TO SPENT FUEL IN CONTAINMENT OR FUEL HANDLING BUILDING (E.G.; LARGE OBJECT DAMAGES FUEL OR WATER LOSS BELOW FUEL LEVEL).

OCONEE: Major damage to spent fuel with release of radioactivity.

EAL: Radiation monitor alarms. See BASIS statement below.

BASIS: CONTAINMENT:

(1) RIA 57 or 58 (high range RB gas monitors) HIGH alarm (630 R/hr). This amount of activity, if released, could under adverse meteorological conditions ($8.8E-4 \text{ sec/m}^3$) result in a dose rate greater than or equal to 50 mr/hr WB or 250 mr/hr thyroid at the site boundary.

(2) Emergency action levels also include RIA 2 (Main Fuel Bridge in RB), RIA 3 (Auxiliary Fuel Bridge in RB), RIA 4 (Personnel Hatch Entrance inside RB) in valid HIGH alarm and RIA 49 (Reactor Building Gas) reading offscale high. RIA 2,3,4 are all area monitors. Their alarm setpoint values are based on 10 CFR 20 limits for high radiation control zones. The alarm setpoints are at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirems.

RIAs 49, 49A, 57 and 58 monitor reactor building gas. RIA 49A has approximately a 4 decade overlap with RIA 57 or 58. This emergency action level is designed to be consistent with other NUREG 0654 Site Area Emergency initiating conditions where calculations project dose equal to or greater than 50 mr/hr WB or 250 mr/hr thyroid at the site boundary.

FUEL HANDLING BUILDING: This emergency action level uses area monitor readings: RIA 6 (Spent Fuel Bridge) HIGH alarm setpoint is designed to make operators aware of increased readings above 10 CFR 20 limits. RIA 41 (monitors the gaseous atmosphere in the Spent Fuel Pool) ALERT alarm setpoint is set to alarm if four times the limits of 10 CFR 20.103 are exceeded based upon MPC for Xe-133. RIA 45 and 46 monitor noble gas effluent from the auxiliary building. Units 1 or 2 RIA 45 must be in HIGH or Unit 3 in ALERT alarm mode (off scale high) and Units 1 or 2 RIA 46 reading greater than or equal to 3000 cpm or Unit 3 RIA 46 reading greater than or equal to 230 cpm. A release being monitored by Units 1 or 2 RIA 46 of 3000 or Unit 3 RIA 46 of 230 cpm will provide a dose of 250 mR/hr thyroid (iodine is the most limiting) at the site boundary under average meteorology ($2.2E-5 \text{ sec/m}^3$).

FSAR Accident Analysis: Fuelhandling Accident.

NOTE: This initiating condition is almost impossible to encounter because the SF pool atmosphere can be filtered through the RB purge filters and back to the unit vent by the Spent Fuel Pool Filtered Exhaust System. Activation of the SFP fans will reposition the dampers to the filtered mode. An alarm on RIA 45 will isolate the reactor building purge system if a release is made while the purge system is in operation.

Initiating Conditions - Site Area Emergency

BASIS: Oconee revised the initiating condition to reflect the revisions to plant operating license in Appendix I. Average meteorology is used for semi-annual reporting for effluents released to the atmosphere. The wording was changed several years ago and was approved by the NRC.

RIA 45 and 46 monitor noble gas effluent from the auxiliary building. The emergency action level requires a valid radiation indication monitor from Units 1 or 2 RIA 46 of 3000 cpm or Unit 3 RIA 46 of 230 cpm for a site area emergency. The TSC will use the preferred method of 10-minute averaged data from the OAC Computer provided by the TSC Data System. Control Room operators will use the back-up method of an instantaneous readout from the radiation monitor strip chart located in the Control Room. Dose Projections based on Units 1 or 2 RIA 46 reading of 3000 cpm or Unit 3 RIA 46 reading 230 cpm and average meteorological conditions will provide a dose rate at the site boundary greater than or equal to 50 mR/hr WB or 250 mR/hr Thyroid. Since a site area emergency will be declared on a lower and a more conservative activity reading, the need to address a 2-minute high energy release is no longer necessary.

Field monitoring teams will measure activity at the protected area fence out to the Site Boundary. Any unmonitored release should be detected by these teams. Information from air samples and dose rates can be used to determine if the emergency classification needs to be revised.

FSAR Accident Analysis: Waste Gas Decay Tank Rupture, Loss of Coolant Accident, Steam Generator Tube Rupture.

14. **IMMINENT LOSS OF PHYSICAL CONTROL OF THE PLANT.**

OCONEE: Same as NUREG 0654.

EAL: Physical attack resulting in imminent occupancy of the control room or other vital areas; discovery of a bomb in the vital areas.

BASIS: The security program at the Oconee Nuclear Station provides for trained personnel, surveillance equipment, locked doors and key badges to provide controlled access to vital areas of the plant. Physical attack resulting in unauthorized personnel accessing vital areas could lead to destruction of equipment required for current mode of operation. A bomb in the vital area has the potential to lead to damage to safety equipment necessary for plant shutdown.

INITIATING CONDITIONS - GENERAL EMERGENCY

Definition: Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases, if made, could be expected to exceed EPA Protective Action Guideline exposure levels outside the site boundary.

1. a. **EFFLUENT MONITORS DETECT LEVELS CORRESPONDING TO 1 R/HR WB OR 5 R/HR THYROID AT THE SITE BOUNDARY UNDER ACTUAL METEOROLOGICAL CONDITIONS.**
- b. **THESE DOSE RATES ARE PROJECTED BASED ON OTHER PLANT PARAMETERS (E.G. RADIATION LEVELS IN CONTAINMENT WITH LEAK RATE APPROPRIATE FOR EXISTING CONTAINMENT PRESSURE WITH SOME CONFIRMATION FROM EFFLUENT MONITORS) OR ARE MEASURED IN THE ENVIRONS.**

Note: CONSIDER EVACUATION ONLY WITHIN 2 MILES OF THE SITE BOUNDARY UNLESS THESE SITE BOUNDARY LEVELS ARE EXCEEDED BY A FACTOR OF 10 OR PROJECTED TO CONTINUE FOR 10 HOURS OR EPA PROTECTIVE ACTION GUIDELINE EXPOSURE LEVELS ARE PREDICTED TO BE EXCEEDED AT LONGER DISTANCES.

OCONEE: Accidental release of gases.

EAL: Units 1 or 2 RIA 45 HIGH alarm or Unit 3 RIA 45 ALERT alarm and Units 1 or 2 RIA 46 reading $\geq 60,500$ or Unit 3 RIA 46 reading ≥ 4600 cpm; dose calculations or field monitoring team measurements result in a 2 hour dose projection at the site boundary of greater than or equal to 1 rem whole body or 5 rem thyroid.

BASIS: A valid Unit 1 or 2 RIA 46 monitor reading of 60,500 or Unit 3 RIA 46 monitor reading 4600 cpm will require a declaration of a General Emergency. The TSC will use the preferred method of 10-minute averaged data from the OAC provided by the TSC Data System. Control Room operators will use the back-up method of instantaneous readout from the radiation monitor strip chart located in the Control Room.

To preclude an unmonitored release, a "catch-all" emergency action level has been included. Dose calculations using other than a monitored release point or detection of activity by field monitoring teams of either 1 rem whole body or 5 rem thyroid over a two-hour period of time at the site boundary would require the declaration of a general emergency.

Protective Active recommendations that were a part of NUREG 0654 are not applicable since Information Notice 83-28 supersedes the guidance given in the NUREG 0654. A protective action flowchart has been developed and is contained within the emergency plan and RP/O/B/1000/06.

Initiating Conditions-General Emergency

FSAR Accident Analysis: Loss of Coolant Accident, Steam Generator Tube Rupture, Maximum Hypothetical Accident.

2. **LOSS OF 2 OF 3 FISSION PRODUCT BARRIERS WITH A POTENTIAL LOSS OF 3RD BARRIER, (E.G.; LOSS OF PRIMARY COOLANT BOUNDARY, CLAD FAILURE, AND HIGH POTENTIAL FOR LOSS OF CONTAINMENT).**

OCONEE: Same as NUREG 0654.

EAL: Cladding failure is defined as one of the following: total failed fuel is equal to or greater than 5% per chemistry analysis (Condition 2) or RIA 57 or 58 reading 2500 R/hr or average of five highest thermocouples reading $\geq 700^{\circ}\text{F}$.

BASIS: Cladding failure can be caused by mechanical or flow-induced damage, overtemperature and core melting. It is assumed that radiochemical analysis will be used to determine the extent of damage to the fuel and or cladding; RIA 57/58 reading 2500 R/hr is an indicator that damage has been sustained to the cladding and that some amount (approx. 20%) of GAP activity is present in containment; average of the five highest thermocouples reading $\geq 700^{\circ}\text{F}$ is an indication that the potential exists to lose the cladding boundary.

EAL: Loss of containment barrier is defined as one of the following: known RB penetration(s) not closed off or RB hydrogen concentration is equal to or greater than 8% or containment leakage exceeds TS limits or RB pressure is greater than or equal to 59 psig.

BASIS: A known RB penetration(s) not being valved off or closed would give a direct path for release of radioactive material to the environment. Hydrogen concentration exceeding 8% would compromise the integrity of the containment building. RB pressure greater than or equal to 59 psig meets or exceeds the design pressure for the containment building.

EAL: Loss of RCS pressure boundary is defined as: a loss of coolant (either primary or primary to secondary) greater than 50 gpm that cannot be isolated.

BASIS: NUREG 0654 states that a 50 gpm leak is an indication of the loss of the reactor coolant pressure boundary. Oconee has expanded the definition to include that the leak can be from the primary or secondary system and must be non-isolable.

FSAR Accident Analysis: Maximum Hypothetical Accident.

FIGURE G-1

DUKE POWER COMPANY
OCONEE NUCLEAR STATION

PUBLIC EMERGENCY INFORMATION BROCHURE

FIGURE J-1

PROTECTIVE ACTION RECOMMENDATIONS

CONDITION	FUEL DAMAGE SYMPTOMS (NOTE 2)	CONTAINMENT STATUS (NOTE 3)	PROTECTIVE ACTION RECOMMENDATION TO BE CONSIDERED
<u>CONDITION A</u> GENERAL EMERGENCY DECLARED	N/A	N/A	SHELTER SECTORS A0, A1, B1, C1, D1, E1, F1. EVACUATE NON-ESSENTIAL PERSONNEL
<u>CONDITION B</u> FUEL DAMAGE DETECTED BY MONITORS AND RELEASE IN PROGRESS	1) RIA 57 OR 58 ON SCALE	1) KNOWN CONTAINMENT BREACH OR RB PRESSURE GREATER THAN 1 PSIG	DOSE CALCULATIONS REQUIRED TO DETERMINE EVACUATION REQUIREMENTS. SEE NOTE 1 BELOW. SEE ENCLOSURE 4.2 TO DETERMINE SECTORS.
	2) RIA 46 ON SCALE	2) NOT APPLICABLE	SHELTER REMAINDER.
<u>CONDITION C</u> 1) APPROXIMATELY 20% FUEL GAP ACTIVITY IN CONTAINMENT (ACTUAL OR PROJECTED) OR 2) LOSS OF PHYSICAL CONTROL OF PLANT	1) <u>CONDITION 2</u> FAILED FUEL (CP/0/B/2005/09) • EOP SECTION 507 (ICC) UNSUCCESSFUL • H ₂ IN RB INCREASING • RB HIGH RAD LEVELS • CETC ≥ 1200°F	1) CONTAINMENT IS ISOLATED AND RB PRESSURE IS LESS THAN 59 PSIG.	EVACUATE 2-MILE RADIUS AND 5-MILES DOWNWIND. SHELTER REMAINDER. RELOCATE AS NEEDED.
	2) N/A	2) N/A	SEE ENCLOSURE 4.2 TO DETERMINE SECTORS.
<u>CONDITION D</u> ACTIVITY GREATER THAN FUEL GAP IN CONTAINMENT (ACTUAL OR PROJECTED)	<u>CONDITION 3</u> FAILED FUEL (CP/0/B/2005/09) • CLAD ≥ 1800 °F • H ₂ IN RB INCREASING • RB HIGH RAD LEVELS	NO CREDIT IS TAKEN FOR CONTAINMENT	EVACUATE 5-MILE RADIUS AND 10-MILE DOWNWIND. SHELTER REMAINDER. RELOCATE AS NEEDED. SEE ENCLOSURE 4.2 TO DETERMINE SECTORS.

NOTE 1: EVACUATE THOSE SECTORS THAT CAN BE EVACUATED PRIOR TO PLUME ARRIVAL. SHELTER THOSE SECTORS THAT CANNOT BE EVACUATED PRIOR TO PLUME ARRIVAL AND THEN EVACUATE AFTER PLUME PASSES. IF RELEASE IS EXPECTED TO LAST LONGER THAN 2 HOURS EVACUATION MAY RESULT IN LOWER DOSES.

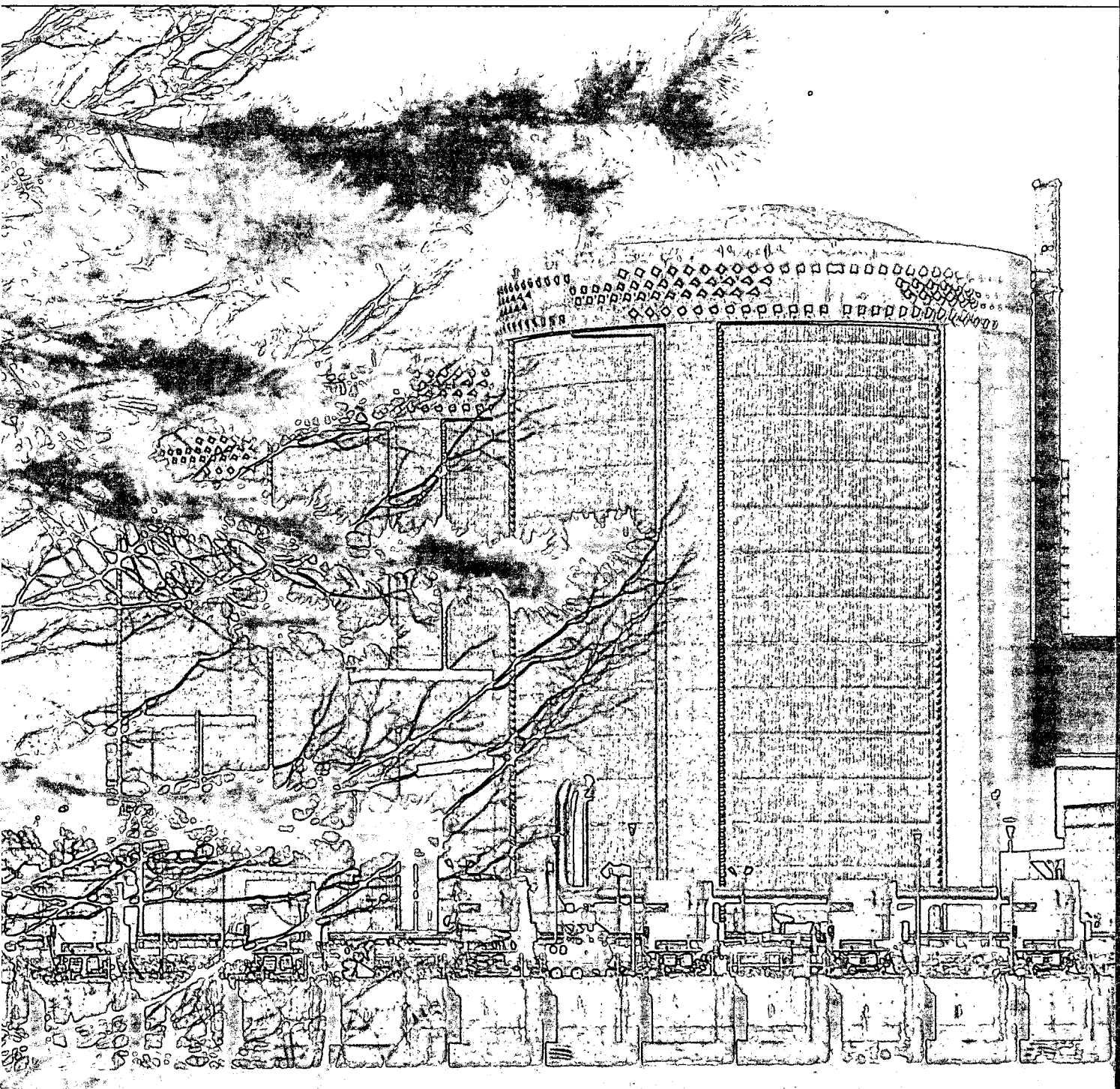
NOTE 2: FUEL DAMAGE - RELEASE OF FISSION PRODUCTS INTO CONTAINMENT.

NOTE 3: CONTAINMENT STATUS - DETERMINE IF CONTAINMENT IS ISOLATED OR WHETHER A RELEASE IS OCCURRING.

Emergency Planning Information

Oconee Nuclear Station

1990 Edition



We Want You To Be Prepared

This is an emergency plan for people who live, work or go to school within 10 miles of Oconee Nuclear Station. The plan was made by state and local officials and Duke Power Company.

We expect Oconee to always operate safely. But we want you to be prepared. You should know what the sirens mean and what to do if you hear them.

Keep this booklet in a place where you can find it. It is new for this year. Throw away your old booklet. Put this one in its place.

Please read this booklet carefully. Study the maps at the back. Make sure your family knows what to do in an emergency. If you know this plan, you will be prepared. If you have questions, call your county emergency preparedness office at the numbers listed below:

Oconee County Emergency Preparedness

(803) 638-4200

Pickens County Emergency Preparedness

(803) 878-7808

Look for the card on page 15 so you can record information about what to do in an emergency.

The Emergency Plan

This brochure tells you what to do in case of a problem at Oconee. There are two ways you would be notified:

1 Emergency sirens would sound repeatedly to tell you of a problem. **If you hear a siren, turn on your radio or tv immediately. Tune to an emergency broadcast station.** They are listed on page 8 of this booklet. The sirens are used to warn local residents of any type of emergency such as a flood or a severe storm. **Hearing a siren does not mean you should evacuate.**

2 Emergency broadcast radio and tv stations would give you information. **Follow their instructions.** Stay tuned.

In case of a problem, you might be told to stay indoors. You might be told to evacuate. **Follow the instructions given on the radio or tv.** See pages 9 and 10 of this booklet for details on what to do.

Special Help For The Handicapped

The county emergency preparedness offices listed above can help people with special needs. They will notify those with needs during an emergency. They will evacuate them if necessary. If you or someone you know cannot see, cannot hear or cannot walk, call your emergency preparedness office **today.** Tell them of the special need. Also, fill out the attached card. Put it in the mail so we can include your needs in our plans. Even if you called and filled out a card last year, please call and send us a new card.

If You Have A Question



Sometimes noises or activities at Oconee may prompt questions. If you hear something or are interested in plant activity, call Duke Power for details. Our information center, the World of Energy, is open seven days a week. Call us at (803) 885-4600. You can get a recorded update on the plant by calling (803) 885-4601 or (803) 868-2267.

Duke Power Company
Oconee Nuclear Station
P.O. Box 1439
Seneca, S.C. 29679

(803) 882-5363



DUKE POWER

Dear Neighbor,

The Oconee Nuclear Station is proud to be a part of this community. Our station employees are committed to enhancing the quality of life in this area; this is where we live and work and, like you, we are dedicated to seeing our community prosper.

We show our commitment to the community through our involvement in a variety of civic, church and cultural activities. More important, however, we demonstrate our commitment by working to ensure the safe, reliable and efficient production of electricity at Oconee.

It's not likely we will ever have a serious emergency at Oconee, but if there were, it's important for you to know what to do. This booklet tells you. Please read it and keep it handy.

If you know someone who is blind, or does not read well, please help that person understand what to do in an emergency. Talk to your children and make sure they know what to do.

State and county officials and your local radio and TV stations are your best sources of information in an emergency situation. Follow their instructions.

We are proud of Oconee and want you to get to know us. If you have questions about plant operations or our emergency plan, call us at our information center, the World of Energy, 803/885-4600 or 803/868-2717, extension 4600.

Sincerely,

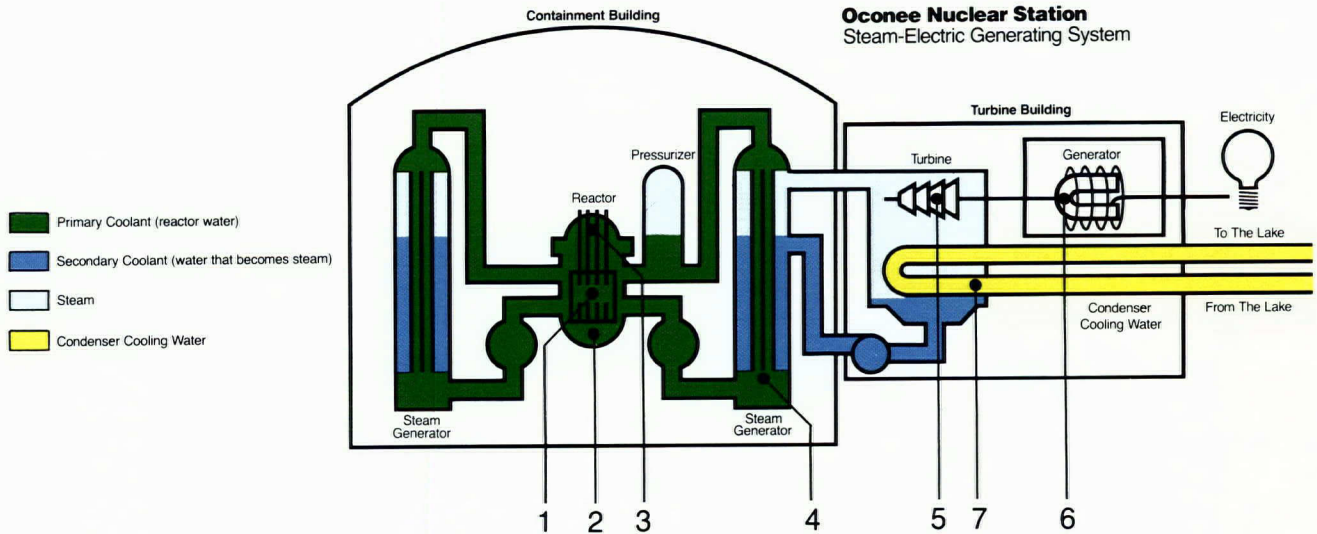
Brew Barron
Station Manager

How Oconee Makes Electricity

The Oconee Nuclear Station uses steam to generate electricity. Steam pushes against the blades of a turbine to turn them. As the turbine spins, it turns a generator. The generator produces electricity.

Since Oconee is a nuclear station, it uses uranium as its fuel. Uranium atoms can be split apart. This process is called nuclear fission. When the atoms split, heat and fission products are produced. The heat is used to make steam. Some of the fission products are radioactive. The plant is designed to keep this radiation inside.

Here's how it works:



There are three separate systems of water at Oconee. Water in one system doesn't touch water in another system.

The first system is the primary water system (shown in green). It circulates around the nuclear fuel, called the core (1).

As it flows through the reactor (2), it heats to about 600°F. Because this water is under very high pressure, it does not boil. The amount of heat produced in the reactor is controlled by control rods (3). The reactor shuts down when the control rods are lowered.

The heated primary water next flows through tubes in the steam generator (4). There it gives off its heat to water (dark blue) in the secondary water system. The primary water system is then pumped back to the reactor to be heated again.

Water in the secondary system is changed to steam (light blue) in the steam generator. The steam spins a turbine (5) connected to an electric generator (6) and produces electricity. As the steam leaves the turbine, it falls on pipes (7) carrying cooling water in the third system (yellow). This cooling water comes from Lake Keowee.

As the steam hits the outside of the pipes, it is changed back to water. It is then pumped to the steam generator to be heated to steam again.

Oconee Nuclear Station

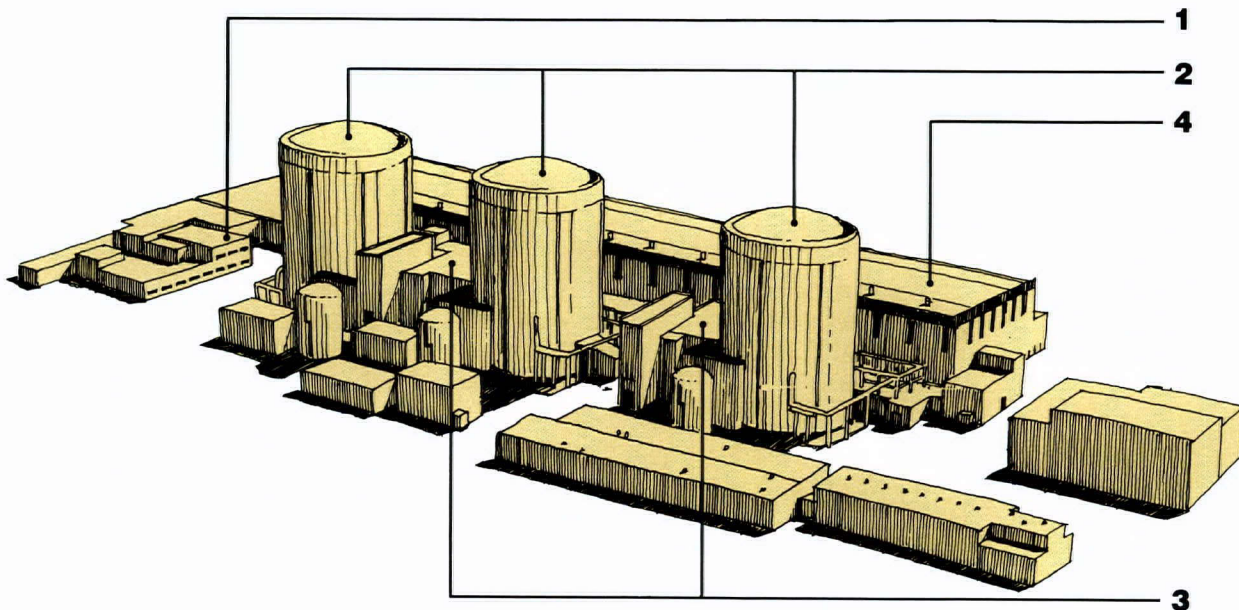
Three Units (846,000
kilowatts each)

1 Administration Building contains security and administration offices.

2 Containment Building (or reactor building) is made of steel and reinforced concrete. It houses the reactor vessel, pressurizer, reactor coolant pumps, steam generators, piping and other equipment. This building is designed to keep radiation inside.

3 Auxiliary Building contains equipment and laboratories for normal operation of the plant. It also houses back-up systems. The control room is in this building.

4 Turbine Building contains the secondary (non-radioactive) system of water. The steam turbines, the electric generator and the condenser system are in this building.



Radiation... A Fact Of Life

Radiation is energy. Radar, radio waves, ultraviolet (sun) rays and X-rays are common forms of radiation.

Radiation is all around us. It is in the air we breathe, in the food we eat and in our homes. It is even in our bodies. These sources of radiation are combined and called background radiation.

In addition to natural background radiation, there is also man-made radiation. It comes from such things as medical and dental X-rays and treatments. Very small amounts of radiation come from the normal operation of nuclear power plants.

There are three types of radiation that could be found in a nuclear power plant: alpha particles, beta particles and gamma rays. Alpha particles are the least penetrating. They can be stopped by a sheet of paper. Beta particles can be stopped by a thin sheet of metal. Gamma rays are the most penetrating. But they can be stopped by concrete or lead.

Radiation is measured in units called millirem. The average person receives about 360 millirem of background and man-made radiation a year.* Each year we get more radiation from natural sources than we get from an operating nuclear plant. The chart on the next page shows how much radiation we get from different sources. You can see an operating nuclear power plant adds very little to the amount of radiation we get.

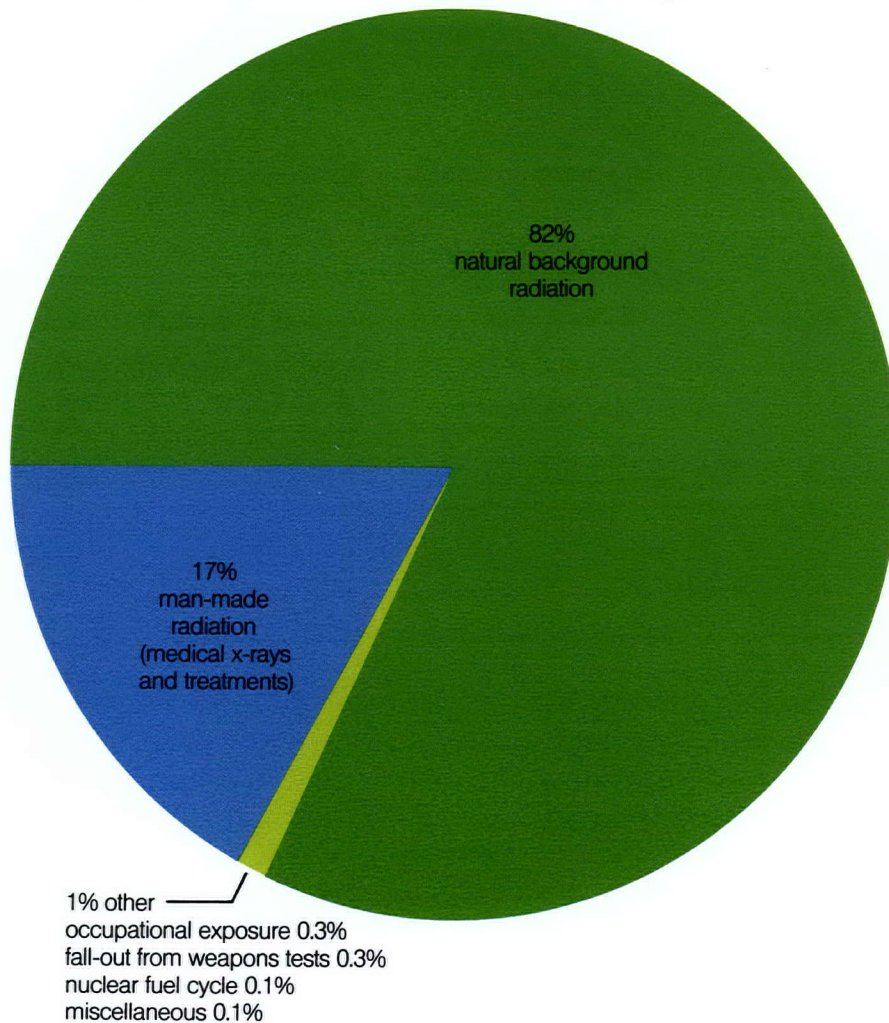
If there were a major emergency at Oconee, people near the plant might be exposed to levels of radiation higher than background levels. Exposure to very high levels of radiation may make you sick and in extreme cases, it may be fatal. For your protection, follow the instructions on the emergency broadcast stations.

Unborn babies and children up to age six are more likely than others to be harmed by radiation. Early precautions might therefore be ordered for pregnant women and very young children.

According to medical experts, evidence shows radiation doses of 25,000 to 50,000 millirem do not cause permanent health problems. To be extra careful, protective actions would be ordered at much lower levels. This would assure you and your family extra protection from damaging levels of radiation.

*This includes approximately 200 millirem from radon. Radon is radioactive gas produced by the natural decay of uranium in the earth.

Sources of Radiation



Sources and amounts of natural background radiation (measured in millirem per year)

Radon	200
Cosmic Rays	27
Air-food-water	40
The earth	27

Sources and amounts of man-made radiation (measured in millirem)

Dental X-rays:	
Bitewing series	40
Panoramic	500
Coast-to-coast airline flight	1
Color television	1 per year
Living next to an operating nuclear plant	less than 1 per year

Levels of radiation and emergency planning (measured in millirem – exposure all at once)

Protective actions recommended	1,000-5,000
Person would have temporary health effects	25,000-50,000

Sources: National Committee on Radiation Protection and Measurements, 1987; "BEIR Report V" – National Academy of Sciences, Washington, DC, 1989.

Nuclear Terms

Chain Reaction—The point in the fission process at which the production of neutrons in the reactor core is self-sustaining.

Cold Shutdown—The nuclear reactor is shut down and the temperature in the primary system is less than 200°F.

Contamination—Loose radioactive materials in unwanted places such as on the skin or on clothes. It can usually be removed by simple cleaning.

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

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

Dose—The amount of radiation received by the body.

Emergency Core Cooling System—A series of back-up emergency systems designed to pump thousands of gallons of water into the reactor core to cool the fuel.

Exposure—Receiving radiation. Being in contact with or close to radioactive material will result in exposure.

Fission—The nuclear process in which a heavy atom, such as uranium, splits into two or more lighter atoms.

Fission Products—Lighter atoms formed after a heavy atom, such as uranium, is split.

Fuel Assemblies—A collection of rods that contain the nuclear fuel pellets which produce heat to make steam used to generate electricity.

Fuel Pellets—Thimble-sized uranium oxide 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, such as the Oconee plant, contains up to 10 million pellets.

Fuel Rods—Hollow tubes 12 feet long that contain stacks of uranium oxide fuel pellets. These rods are bundled together to form fuel assemblies.

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

Millirem—The unit used to measure radiation dose to humans. It is 1/1000th of a REM. REM stands for Roentgen Equivalent Man, a measure of radiation that indicates potential effect on human cells.

Radioactivity—The property possessed by some elements that gives off energy in the form of particles or waves. Radiation may be alpha, beta or gamma.

Reactor Trip—The situation in which control rods are quickly inserted into the fuel core of the reactor. This stops the fission process.

Emergency Classifications

Here are four classifications used to describe a nuclear power plant problem or emergency condition. You should know these terms. Duke Power would contact federal, state and local authorities in each of the following situations.

1 An Unusual Event is the least serious of the four classifications. It means there is a minor problem at the station. Because of strict federal regulations, a number of problems are reported as unusual events even though they pose no danger to the public.

2 An Alert is an event that could reduce the plant's level of safety. There would still be no danger to the public. County and state officials and Duke Power would get emergency operation centers ready in case the situation got worse.

3 A Site Area Emergency is an event that could involve major problems with plant systems. The sirens would be sounded and other means of notification readied. The public should listen to emergency broadcast stations for information and instructions.

4 A General Emergency is the most serious of the four classifications. State and local authorities would take action to protect the public. Emergency broadcast stations would give information and instructions. People in affected areas would be advised to stay indoors or to evacuate.

Locating Your Zone

Look at the map on page 12 of this booklet. You will see the 10-mile area around Oconee Nuclear Station is divided into zones. **Find the zone where you live, work, and/or go to school.** This way you will know if you are in the area affected by an emergency. For example, residents in zones A-0, A-1 and B-1 might be told to stay indoors.

Next turn to the chart on page 13. Find the reception centers for your zones. Locate them on the map of reception centers on page 14. This is where you would go if there were an evacuation. **Record this information on the removable card on page 15.**

How Would I Be Told About An Emergency?

If there were an emergency at Oconee Nuclear Station, Duke Power would immediately tell state and county officials. These officials would tell you if any action was needed.

To warn you of an emergency, county officials would sound sirens around the station. Sirens will sound repeatedly in an emergency. For example, the sirens would also be used to notify you of a storm or other emergencies in the area.

If you hear a siren, turn on your radio or tv immediately. Tune to one of the emergency broadcast stations. These stations would give you information and tell you what to do. If you hear no message on radio or tv, call your county's emergency preparedness office. The phone number is listed on the inside front cover. It may have been a siren test.

To ensure that the sirens are in working condition, they will be tested regularly. These tests will last three minutes or less. The testing is a part of normal maintenance and no public action is necessary.

Remember: Hearing a siren does *not* mean you should evacuate.

The emergency broadcast stations for the area around Oconee are:

AM Radio

Anderson	WAIM	1230	Fountain Inn	WFIS	1600	Greer	WCKI	1300
	WANS	1280	Greenville	WESC	660	Greer	WPJM	800
Belton	WHPB	1390		WFBC	1330	Seneca	WSNW	1150
Clemson	WCCP	1560		WMUU	1260	Travelers Rest	WBBR	1580
Easley	WLWZ	1360				Walhalla	WGOG	1000

FM Radio

Anderson	WCKN	101.1	Greenville	WESC	92.5	Greenville	WSSL	100.5
	WANS	107.3		WFBC	93.7	Honea Path	WRIX	103.1
Clemson	WSBF	88.1		WMUU	94.5	Seneca	WBFM	98.1
Easley	WTLT							

Television

Greenville	WYFF	Ch. 4	Greenville	WGGS	Ch. 16	Greenville	WNTV	Ch. 29
	WLOS	Ch. 13		WHNS	Ch. 21			

Protecting Yourself Against Radiation Exposure

A major accident at Oconee could expose people nearby to levels of radiation higher than background levels. Exposure to very high levels of radiation can make you sick. In extreme cases it can be fatal. For that reason, plans are made to protect you from exposure.

State and local governments have guidelines about when people should be protected from radiation. These guidelines call for protective action at levels far below those that can make you sick. You would be told to protect yourself if radiation levels at or above those guidelines were expected.

There are two things you might be told to do:

- 1** Stay indoors.
- 2** Evacuate.

Sometimes staying indoors is safer than evacuating. Emergency officials will know which is better. Do as they say.

You Might Be Told To Stay Indoors

If you are told to stay indoors:

- 1** Stay indoors until you are told it is safe to go out.
- 2** Close all windows and doors. Turn off fans, air conditioners, heat pumps, and heating systems, which bring in outside air.
- 3** Go to a basement if possible. If you don't have a basement, go to a downstairs room in the center of the house. It should be a room without windows or outside doors.
- 4** Listen to a local radio or tv emergency broadcast station. They will tell you what to do.

If You Are Ordered To Evacuate

If you are ordered to leave the area:

- 1** Do not try to take all of your things with you. You could be away from home for a few hours or a few days.
- 2** Turn off appliances and faucets. Lock all windows and doors.
- 3** Get into your car or other vehicle. Close all windows and vents. Drive to your reception center where you will be given directions to a shelter. You may stay at a shelter.
- 4** Note that pets would not be allowed at the shelters. Leave food, water and shelter for your pets and livestock. You may take pets if you don't plan to stay at a shelter.
- 5** The South Carolina Emergency Preparedness Division has published a special brochure concerning livestock and crops. You may request a copy by calling (803) 734-8020, or by contacting your South Carolina county agriculture extension agent. Water, milk and food supplies will be checked for radiation. Radio and tv stations will tell you if these are not safe.

Exit Routes During An Evacuation

Look at the map and protective action zones chart on pages 12, 13 and 14 to find your exit route. Routes would also be announced on radio and tv. Police would direct traffic during an evacuation. **DRIVE SAFELY.**

Services Provided At Reception Centers and Shelters

If you are ordered to evacuate, you must first go to your designated reception center. The reception center for your area is listed on page 13. If you needed a place to stay, you would be directed to a nearby shelter. The following services would be provided at shelters:

- 1** Food, water, medical help, showers and toilets.
 - 2** People from help organizations like the Red Cross.
 - 3** Decontamination facilities, if necessary.
-

Things You May Want To Keep At Home To Take In An Evacuation

- 1** Two changes of clothing.
 - 2** Two blankets or a sleeping bag for each person.
 - 3** Important personal papers.
 - 4** Toilet articles (soap, toothbrush and toothpaste).
 - 5** Personal medications and prescriptions.
 - 6** Special baby formulas or food.
 - 7** Battery operated radio, flashlight and batteries.
-

What If I Don't Have Transportation?

If you or members of your family cannot drive or do not have transportation, call the emergency preparedness agency in your county **today**. The number is listed on the inside front cover. Also, fill out the attached card and mail it today. You will be on a list of people who would need transportation in an emergency. If an evacuation were ordered, you would be picked up.

What If My Children Are In School?

There is an emergency plan for school children in the area around Oconee Nuclear Station.

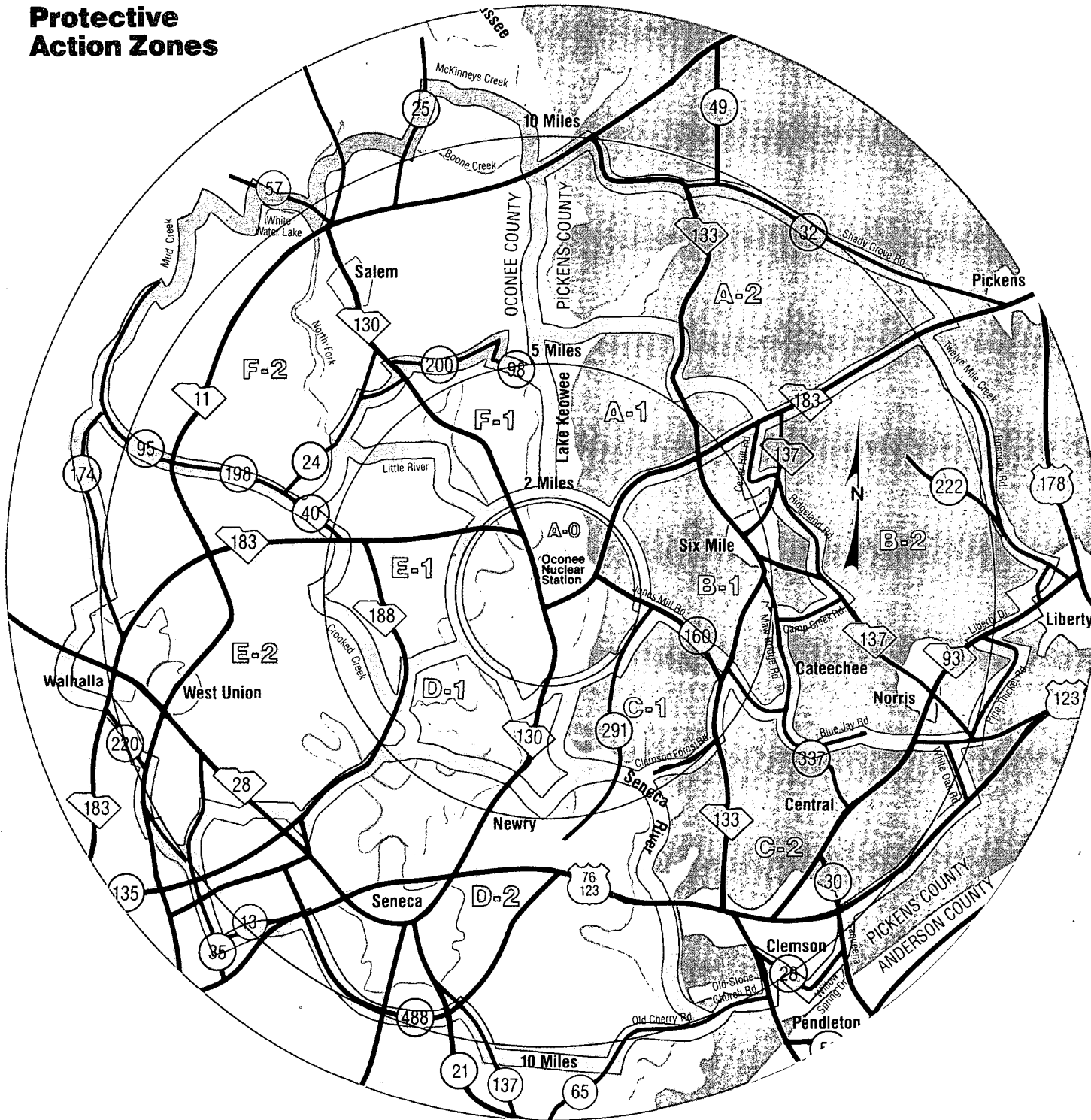
- In an emergency, school officials would be contacted by local emergency preparedness officials.
- If an evacuation were ordered, all children would be moved by bus to the reception center for their school. This may be different from the designated reception centers for the students home. **PARENTS SHOULD PICK UP STUDENTS AT RECEPTION CENTERS ONLY. DO NOT GO TO THE SCHOOLS. THIS WOULD HELP AVOID DELAYS.** All reception centers are more than 10 miles from the plant.
- Adults would care for the children until parents arrive at the reception center.
- It is important for parents to know what zones their children's schools are in. To find out, look at the list below.
- To find the reception center for your children's schools, look at the list below and the map on page 14. Write reception centers for your children's schools on the removable card on page 15.

If your children are ever left home alone, you should tell them what to do in an emergency.

Pickens County Schools	Zone	Reception Center
Central Elementary School	C-2	4 Pendleton High School
Clemson University	C-2	5 Donaldson Center
Daniel High School	C-2	4 Pendleton High School
R.C. Edwards Junior High School	C-2	4 Pendleton High School
Albert R. Lewis Elementary School	A-2	1 Table Rock State Park Recreational Building
Morrison Annex	C-2	4 Pendleton High School
Morrison Elementary School	C-2	4 Pendleton High School
Six Mile Elementary School	B-1	2 Pickens High School

Oconee County Schools	Zone	Reception Center
Code Elementary School	D-2	7 West-Oak High School
J. N. Kellet Elementary School	D-2	7 West-Oak High School
Keowee Elementary School	E-1	5 Westminster Middle School
Northside Elementary Schools	D-2	7 West-Oak High School
Fred P. Hamilton Vocational Center	D-2	7 West-Oak High School
Ravenel Elementary School	D-2	7 West-Oak High School
Seneca High School	D-2	7 West-Oak High School
Seneca Middle School	D-2	7 West-Oak High School
Seneca Preschool	D-2	7 West-Oak High School
South Pine Street Elementary School	E-2	5 Westminster Middle School
Tamassee Elementary D.A.R. School	F-2	6 Westminster Elementary School
Tamassee-Salem High School	F-2	6 Westminster Elementary School
Victory Christian School	D-2	7 West-Oak High School
Walhalla Elementary School	E-2	5 Westminster Middle School
Walhalla High School	E-2	5 Westminster Middle School
Walhalla Middle School	E-2	5 Westminster Middle School

Oconee Nuclear Station Protective Action Zones



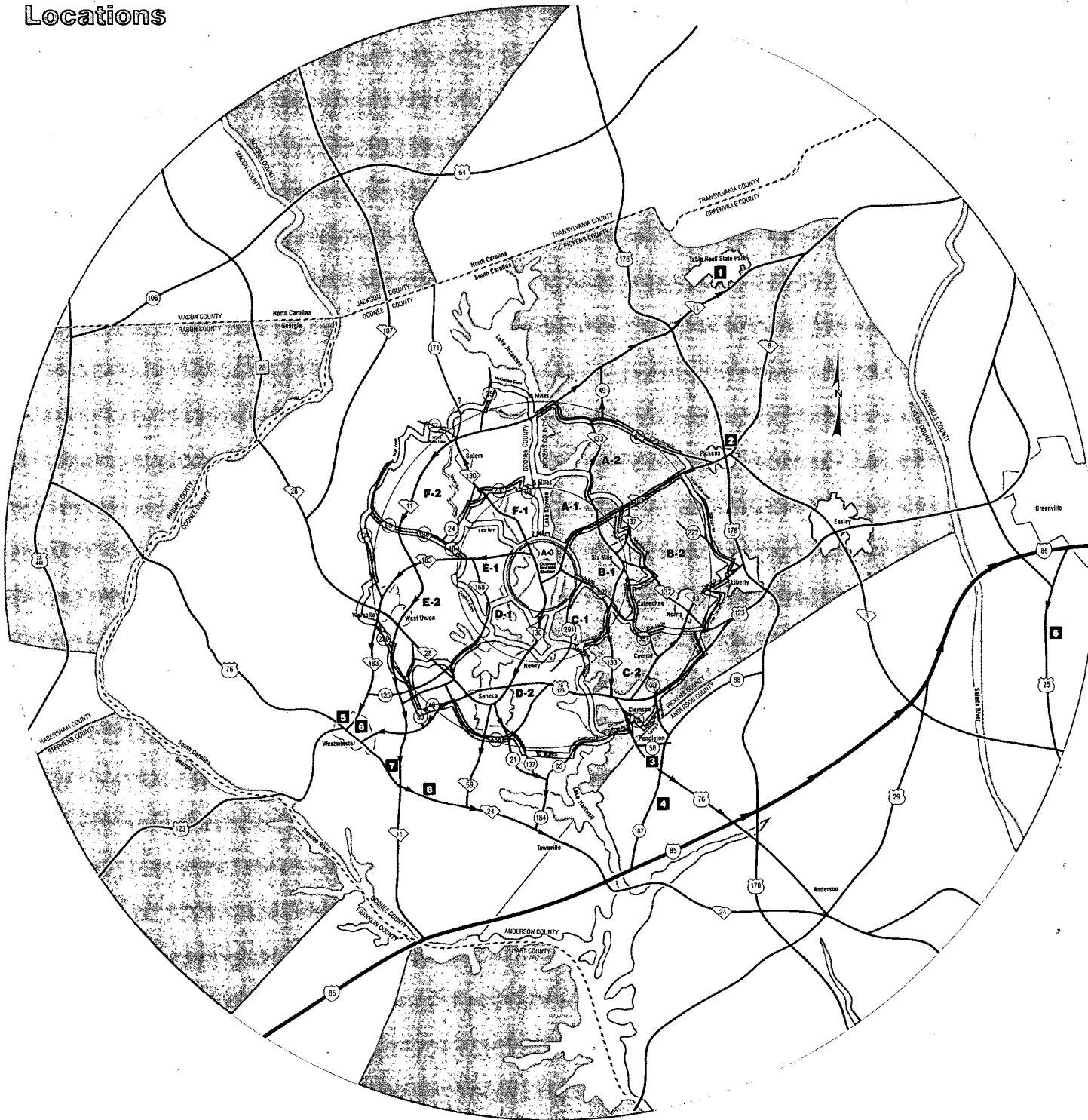
Zones	Communities	Primary Evacuation Routes	Reception Centers
PICKENS COUNTY			
A-0	Gap Hill	SC 183 East to Pickens	2 Pickens High School
A-1	Mile Creek, Mile Creek County Park	SC 133 to Highway 49 to SC 11 to Table Rock State Park, West Gate	1 Table Rock State Park Recreational Building
A-2	Shady Grove, Grove Creek, Mountain View	SC 133 to SC 11 to Table Rock State Park, West Gate or SC 133 to Highway 49 to SC 11 to Table Rock State Park, West Gate	1 Table Rock State Park Recreation Building
B-1	Six Mile, King Grove	SC 183 East to Pickens	2 Pickens High School
B-2	Norris, Catechee, Praters, Roanoke, Golden Creek, Terrapin Crossing	SC 183 East to Pickens or SC 93 to US 178 to SC 183 to Pickens	2 Pickens High School
C-1	Pleasant Hill	SC 133 to US 123 to US 76	3 Tri County Technical College
C-2	Central	Highway 123 to US 76	3 Tri County Technical College
C-2	Clemson	Highway 30 South to SC Business 28 to US 76 south	3 Tri County Technical College
C-2	Clemson University	US 76 to I-85 North to US 25 South from Greenville	5 Donaldson Center
OCONEE COUNTY			
A-0	South of Oconee Station North of Oconee Station (Keowee Key)	South on SC 130 to US 123 to SC 11 to SC 24 SC 183 West to SC 11 to SC 24 South to Oakway	8 Oakway Middle School 8 Oakway Middle School
D-1	Fairview	SC 188 to Secondary Road 135 to SC 183 to Westminster	5 Westminster Middle School
D-2	Bayshore, Newry, Utica, Port Santorini, Bountyland, Tanglewood, Seneca	US 123 and 76 to SC 11, south to Highway 24, or SC 59 to Highway 24 west toward Westminster. West-Oak High School is located on Highway 24 near the intersection of Highway 11.	7 West-Oak High School
E-1	Keowee, New Hope	SC 188 to Secondary 135 to SC 183 to Westminster	5 Westminster Middle School
E-2	Walhalla, Forest Acres	SC 183 to Westminster	5 Westminster Middle School
E-2	Wolfs Stake, Ebenezer, West Union, Poplar Springs	SC 11 to US 123 to SC 183 to Westminster	5 Westminster Middle School
F1		Stamp Creek	6 Westminster Elementary School
F2	Tamassee, Salem, Pickett Post, Oconee Creek, D.A.R., Fall Creek, Flat Shoals	SC 11 to US 123 to SC 183 to Westminster	6 Westminster Elementary School

Oconee Nuclear Station
Duke Power Company
Seneca, SC 29678

Bulk Mail
US Postage
PAID
Charlotte, NC
Permit No. 41

Please Note 1990 Changes To Your Brochure

Regional Reception Centers Locations



Record your personal emergency planning information on this card and keep this booklet in a convenient place.

Emergency Planning Information: Oconee Nuclear Station

Home

Work

My zone is:

My reception center is:

My evacuation route is:

The reception centers for my childrens' schools are:

If I hear a siren:

1 Turn on EBS.

My local EBS station is _____.

2 If there is no message on EBS, it is probably a test.

Call county emergency preparedness officials to make sure. My county emergency preparedness office telephone number is _____.

(Quarterly siren tests last three minutes. In an emergency the sirens will sound repeatedly.)

For information call Duke Power at (803) 885-4600 or (803) 868-2717, extension 4600. Call collect if necessary. You may also call 1-800-777-0005.