

# **SOUTH CAROLINA DAM FAILURE PREPAREDNESS AND RESPONSE PLAN**

## **APPENDIX 4**

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### **I. INTRODUCTION**

#### **A. Purpose:**

The State of South Carolina Dam Failure Preparedness and Response Plan is designed to supplement the South Carolina Emergency Operations Plan and will be identified as Appendix 4 (SC Dam Failure Preparedness and Response Plan). This plan will identify how county, state and federal agencies will prepare, respond, recover and mitigate a failure of regulated dam in South Carolina. This plan will be coordinated with local and federal plans to provide a comprehensive approach to the management of emergency response activities and to assure the state is able to assist those threatened from a dam failure. This plan seeks to save lives and prevent or minimize damage to property. The plan assigns the roles and responsibilities of all agencies at the local, state and federal level that are tasked with the safety and security of regulate dams in South Carolina.

#### **B. Scope**

1. In the event of a dam failure in South Carolina, local, state, federal, and utility (dam owner) personnel and equipment will be utilized with the goal of accomplishing the following priorities in a safe, effective, and timely manner: protecting life and saving property.
2. This Annex applies to all regulated dams affecting South Carolina including the dams regulated by Department of Health and Environmental Control (DHEC) (State Regulated Dams); Federal Energy Regulatory Commission (FERC); and US Army Corps of Engineer, who have dams located within, or just outside South Carolina that could potentially impact local infrastructure within South Carolina.
3. This Annex assigns specific support responsibilities to appropriate departments/agencies and identifies the actions they will take in the overall response to a dam failure incident and how they will coordinate with federal, state, and local agencies.
4. This Annex describes how the State will mobilize resources and conduct activities to guide and support local emergency management efforts through preparedness, response, recovery, and mitigation planning for a dam failure impacting South Carolina.
5. All state departments and agencies within South Carolina are tasked to provide primary or support roles during a dam failure

incident. This Annex is intended to provide guidance and clarification to all departments and agencies involved in dam failure response activities.

## II. SITUATION AND ASSUMPTIONS

- A. This plan is effective for planning purposes upon receipt, and will be activated by the Director, South Carolina Emergency Management Division, when directed by the Governor of South Carolina.
- B. Situations
  - 1. The term "Dam" is defined as any artificial barrier, together with interrelated works, including but not limited to dams, levees, dikes or floodwalls for the impoundment or diversion of water or other fluids where failure may cause danger to life or property. A catastrophic dam failure is characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an uncontrolled release. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters that adversely affect a dam's primary function of impounding water is properly considered a failure. These lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. However in many cases, these type failures may also be amendable with corrective action.
  - 2. South Carolina has over 50,000 dams throughout the state. Most of these dams are small and are used primarily for recreation. Larger dams are used for the production of hydroelectricity, water supply, and flood control. Generally, the most common structural material is earth, but there are several masonry and concrete dams.
  - 3. The Federal Energy Regulatory Commission (FERC), in combination with various power companies and municipalities, regulate thirty-two hydroelectric dams affecting South Carolina (see paragraph IV. C. 3. b). The U.S. Army Corps of Engineers (USACE) regulates five dams, dikes, and locks along the Savannah River and one in the Santee River Basin (see paragraph IV. C. 3. c.). FERC does not regulate USACE projects.
  - 4. Of the remaining dams, approximately 2,313 are large enough to be regulated under state law. Most of these are privately owned and regulated by the SC Department of Health and Environmental

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Control (DHEC). State regulated dams are divided into the following three classes:

- a. High Hazard Dams are Dams where failure will likely cause loss of life or serious damage to homes(s), industrial and commercial facilities, important public utilities, main highway(s) or railroads. High hazard dams are inspected by DHEC bi-annually
  - b. Significant Hazard Dams are Dams where failure will not likely cause loss of life but may damage home(s), industrial and commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important public utilities. Significant hazard dams are inspected by DHEC every three years.
  - c. Low Hazard Dams are Dams located where failure may cause minimal property damage to others and loss of life is not expected. Low hazard dams are not inspected, but the area below the dam is checked every three years for new development and possible reclassification.
  - d. Under state law, owners of high and significant hazard dams are required to maintain emergency notification plans.
5. At any given time, any of these dams may be threatened by upstream flash floods, earthquakes, neglect, or any combination of the above, which can cause personal injury or death, significant high water damage to property or additional failures to dams located downstream.
6. Although no large dams have failed in South Carolina, the following significant events have occurred: In 1983 hundreds of people in Berkeley County were evacuated after a leak in the Pinopolis Dam was discovered. In 1990 floods caused 17 small dams to fail and 81 others to be overtopped. In 1993 Fogles Pond Dam in Orangeburg County failed and disrupted traffic on U.S. 321. In 1994 Red Bank Millpond Dam in Lexington County failed and two additional dams downstream were washed out. In 1997 structural failure at the Edisto Pond Dam in Aiken County caused two smaller dams below it to wash out. Also, additional failures have occurred at Wateree Dam (1916), Lake Lanier Dam (1928), Lake Keowee Dam (1978), Hutto's Lake Dam (1979), Kendall Lake Dam (1990), Lower Twin Lakes Dam (1991), Saxe-Gotha

Millpond Dam (1994), Lake Pauline Dam (1994), Starnes/Brown Dam (1997), and Malcolm B. Davis Dam (1997). These incidents were primarily caused by heavy precipitation. Failures could also result from earthquakes, bombs, civil disorder, rapid runoff, cracks, obstruction of spillways, or vandalism.

C. Assumptions

1. General: A dam breach at any one of the projects in South Carolina could have adverse affects to the state's infrastructure. Almost every county in South Carolina has dams, or could be affected by a dam failure in an adjacent county, or state. In addition, many metropolitan areas, and municipalities could be severely affected. A dam failure accident at any dam presents an offsite flood hazard and would affect the response of the following emergency support functions: transportation, communications, water and sewer facilities, fire fighting, mass care, health and medical, search and rescue, hazardous materials, energy, law enforcement, emergency traffic management, animal response capabilities, as well as business and industry. In order to determine the exact effects a dam breach could have on infrastructure, utilities are expected provide to state and local governments Geographical Information System (GIS) maps of the anticipated inundation area.
2. Possible affected infrastructure may include: transportation arteries (interstates, state highways, rail lines, airports); communications, (telephones lines and stations, and broadcast media); public works and engineering outlets (water treatment, sewer, and waste water facilities); firefighting resources (hydrants, tanks, and refill locations); shelters; health and medical facilities (hospitals, emergency medical service stations, healthcare facilities, and cemeteries); hazardous material sites (above ground and underground storage units, pipelines, and landfills); energy providers (electric facilities, distribution lines, and generating stations); law enforcement facilities; animal care facilities (zoos, poultry farms, and family pets, an estimated 60% of residents located in the state have pets, thus requiring some form of sheltering or assistance); special needs requirements (schools, day care, prisons, public recreational areas, transient populations; and governments (local, state, and federal).
- 3 For any large dam failure listed in the annexes, SCEMD will request the Governor declare a State of Emergency, according to the amount of damage.

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4. A dam failure at one of the larger dams could potentially destroy infrastructure and could quickly exceed state and local resources. It is anticipated that a significant amount of external resources will be required for a disaster response for such an event.
5. Damaged primary and secondary roads may not be functional for many weeks or months.
6. Damage to transportation, communication, and other infrastructure systems will isolate communities, creating virtual islands within the dam failure inundation areas. Significant aid from state/federal governments may not be immediately available, for at least 72 hours after a dam failure. Affected local governments and individuals should be prepared to meet their own emergency needs during the first three days following the dam failure.
7. For large dam failures, South Carolina Emergency Management Division (SCEMD) will activate the Statewide Mutual Aid Agreement, Emergency Management Assistance Compact (EMAC), and established mutual aid agreements will be **executed** to the extent possible.
8. Shelters identified for use during other natural disasters may not be available in the impacted area. Sheltering may take place outside the impacted area.
9. State Emergency Response Team (SERT) will report to the State Emergency Operations Center (SEOC), and the State Assessment Team (SAT) may be deployed.
10. The SEOC and county emergency managers in the damaged areas should designate alternate Emergency Operations Centers (EOC) due to possible structural damage to the primary EOC.
11. The SC Logistical Plan will be implemented.
12. Considerations for emergency sheltering and evacuations will include additional populations (such as tourists, vacationers, and transients) in the state for the emergency response effort.

### III. CONCEPT OF OPERATIONS

#### A. General

1. South Carolina Emergency Management Division is responsible for developing, coordinating, and maintaining procedures to support Appendix 4, Dam Failure Preparedness and Response Plan of the South Carolina Emergency Operations Plan.
2. Owners or parent companies of all FERC hydroelectric dams are required to develop, maintain, and exercise emergency action plans (EAPs). These plans consist of a notification flowchart, emergency detection, evaluations, preparedness actions, inundation maps, and supporting appendices. FERC recommends the utilities use two dam failure planning scenarios on the inundation maps, “Sunny Day” and “Probable Maximum Flood” conditions. EAPs are maintained in the SEOC as well as respective county EOCs. Parent companies are required to completely revise and republish their EAPs every five years or when deficiencies requiring attention are identified.
3. Parent companies are responsible for immediately notifying the state and counties at risk if unsafe conditions are detected or likely.
4. SCEMD is responsible for ensuring all dam Emergency Action Plans are accurate and consistent with state and local EOPs. The SCEMD Dam Safety Coordinator is responsible for coordinating site-specific plans for federally regulated dams.
5. In coordination with ESFs 1, 6, 8, 16, 17, and 19, county and municipal governments are responsible for executing evacuation and sheltering operations during dam failures.

B. Warning

1. Alert and Notification
  - a. General: Alert and Notification procedures are designed to inform and instruct the populace in evacuation planning zones, and to notify federal, state and local emergency response forces. Commercial telephone systems are the primary means for alerting agencies and response elements in the event of a dam failure. These systems are expected to be operational during the initial stages of the emergency to allow notification.
  - b. State and Local Emergency Managers Notification

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- 1). Alert and Notification of State and Local Government: Each dam owner (dam owner/private) is responsible for notifying the State SCEMD Warning Point or EOC, and the County Warning Point or EOC of a dam failure emergency. The dam owner's Emergency Action Plan describes in detail procedures for notification of specific state and local emergency management organizations. Notification procedures have been developed for both a Condition A (Failure is Imminent or Has Occurred) and a Condition B (A Potentially Hazardous Situation Developing) classification levels. Backup communications include Local Government Radio (LGR), 800 MHz, SC REACH, and in some cases, a dedicated phone system, or line.
- 2). Once an emergency is confirmed at the dam, the owner will issue a Condition A (Failure is Imminent or Has Occurred) or a Condition B (Potentially Hazardous Situation Developing) classification level, dependent on the severity of the dam breach, simultaneously make internal notification, and notify the affected counties, state emergency management, and the National Weather Service of the situation.
- 3). After receipt of initial notification from the dam owner, the State Warning Point will execute the Dam Failure Checklist, which includes procedures for verifying and confirming notification of affected counties.
- 4). State Emergency Operations Center (SEOC) Activation: The SEOC will be activated for either a Condition A (Failure is Imminent or Has Occurred) or a Condition B (Potentially Hazardous Situation Developing) classification level. A full activation at OPCON 1 of the SEOC under a Condition A (Failure is Imminent or Has Occurred) classification level will normally include activation of the Dam Failure and Hydrology Advisory Teams and, if available, the deployment of state liaison officers to the county EOCs, as well as the dam. Limited activation under a Condition B (Potentially

Hazardous Situation Developing) classification level is situationally dependent, but will normally be a partial activation at OPGON Level 3, consisting of the Operations Group, and ESFs 1, 2, 5, 6, 8, 12, 13, 15, 16, 19 and 24.

- 5). County Emergency Operations Centers (EOC)  
Activation: Affected county EOCs will fully activate during a Condition A (Failure is Imminent or Has Occurred) classification level and will execute a limited activation during a Condition B (Potentially Hazardous Situation Developing) classification level.
- 6). Utilities will activate/operate an Emergency Operations Facility (EOF) at their Dam during a dam failure emergency.

c. Alert and Notification of the Populace

- 1). Siren Systems: Several dams in South Carolina have siren systems to alert the populace. The purpose of a siren system is to alert residents to turn on radios/televisions and listen to Emergency Alert System (EAS) messages. EAS messages will be broadcast within minutes of siren activation. Sirens will be tested according to dam owner procedures. EAS will also be tested annually at the same time. Detailed information on siren locations are located in the respective Site Specific Plan.
- 2). Automated Telephonic Notification System:
  - a). County: Several counties throughout the state have a system that will allow automated telephonic notification. Notification will be prioritized (or phased) based on threat (such as speed flow of water).
  - b). State: The South Carolina Emergency Management Division will utilize an automated telephonic notification system (SC REACH) to alert the emergency responders, or the threatened population of



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possible danger. This system may be activated upon county request.

- c). State: Department of Health and Environmental Control (DHEC): DHEC also utilizes an automated telephonic notification system to notify health care facilities.
- 3). Tone Alert Radios: Schools, nursing homes, day cares centers and individual households may utilize tone alert radios to receive appropriate advisories.
- 4). Emergency Alert System (EAS): EAS will be activated by the State or counties in the event of a dam failure, and will broadcast emergency action messages.
- 5). Route Alert, or door-to-door notifications: Will be used as a backup, as appropriate.
- d. Notification Classifications: Emergency Action Plans (EAPs) exist for all FERC-regulated hydroelectric plants/dams, or US Army Corps of Engineers' regulated hydroelectric plant/dams/dikes/locks. Generally, the following two notification classifications are used when implementing the EAPs for any of these facilities:
  - 1). Condition A (Failure is Imminent or Has Occurred): This classification is also called: Class I, Condition Red, or Rapidly Developing Situation by various utilities whose dams may affect our state.
    - a). Dam Owner Response: If the dam owner determines a Condition A (Failure is Imminent or Has Occurred) classification level exists at one of their dams, the systems controller will initiate their respective call lists, located in each of their Emergency Action Plans. If the capability exists, the system controller may activate the NOAA Weather Tone Alert Radio system, or ask the National Weather Service to activate the Tone Alert Radio. NWS will broadcast a flash flood warning with information about

the dam failure and immediate evacuation requirements. If the dam owner has a siren system, then the system controller may then activate sirens and announce a warning over the sirens' public address system. The system controller will then make notifications to the counties' EMD, SCEMD, other agencies, and corporate personnel in accordance with an emergency notification flow chart maintained in the respective Emergency Action Plan for Dam Failure. The dam owner will provide information to the counties' EMD, SCEMD, other agencies, and corporate personnel regarding the potential for a Condition A (Failure is Imminent or Has Occurred) classification level declaration.

- b). State Response: If a Condition A (Failure is Imminent or Has Occurred) classification level exist, supplemental siren activation and EAS message times will be coordinated as part of this call. EAS messages will be broadcast within minutes of siren activation.
  - c). County Response: If a Condition A (Failure is Imminent or Has Occurred) classification level exists, County EOCs will initiate EAS messages to provide further evacuation instruction and sheltering information.
- 2). Condition B (Potentially Hazardous Situation Developing): This classification is also called: Class II, Condition Yellow, or Slowly Developing Situation by various utilities whose dams may affect our state.
- a). Dam owner Response: If a Condition B (Potentially Hazardous Situation Developing) classification level is declared, the dam owner system controller will notify the affected counties, SCEMD and other agencies and corporate personnel of any potentially hazardous situation at the dam.

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- b). State Response: A Condition B (Potentially Hazardous Situation Developing) classification level is declared, and if conditions deteriorate rapidly, supplemental siren activation and EAS message times will be coordinated as part of this call. EAS messages will be broadcast soon after the siren activation.
    - c). County Response: If a Condition B (Potentially Hazardous Situation Developing) classification level is declared, County EOCs will initiate Emergency Alert System (EAS) messages as necessary. In addition, a conference call will be conducted between SCEMD, affected counties, DPS, DOT, and the utilities to determine possible evacuation recommendations and activation of specific notification mechanisms. Siren activation and EAS message times will be coordinated as part of this call. EAS messages will be broadcast within minutes of siren activation.
  - 3). No standard notification classification exists for private dams within the state. For the purpose of this plan, all such emergencies are classified as “A Breach of, or Threat to a State Regulated or Private Dam.
- e. Communications
  - 1). The dam owner’s Emergency Operations Facility (EOF): communications will be maintained through the following means:
    - a). Regular telephone lines.
    - b). The SCEMD Local Government Radio (LGR) Network and 800 MHz offers the capability for the Dam owner to communicate with the SEOC, counties and other state and local entities. Although most counties and state agencies have this

capability, not all have access to LGR and 800 MHz.

- c). Mobile telephones.
  - d). Microwave communications systems (intra-company, if available).
  - e). Email.
  - f). Satellite Phones.
- 2). Counties: County communications officers are responsible for maintaining internal communications during a dam failure emergency.

f. Security

- 1). Dam Downstream Area: Upon declaration of a “A Failure is Imminent or Has Occurred” classification level, ESF-13 will coordinate sealing off the anticipated inundation area as deemed appropriate based on the SC Emergency Operations Plan protocols or Site Specific Plans, if available, for general law enforcement and security. The South Carolina Law Enforcement Division (SLED) will coordinate with the Department of Public Safety (DPS) to develop ingress and egress points and controlled access points based on evacuation and rerouting traffic management plans. Use of South Carolina Army National Guard (SCARNG) assets and implementation of the State Law Enforcement Mutual Aid Plan (SLEMAP) may be required. The Department of Natural Resources (DNR) in coordination with DPS traffic and SLED security plans will coordinate the clearance of waterways/boat landings and the unauthorized access to areas downstream from the dam or the secure area. Some or all of the above actions may be required during a Condition B (A Potentially Hazardous Situation Developing) classification level. A credible terrorist threat may also require increased security with either a Condition A (Failure is Imminent or Has Occurred) classification level or a Condition B (Potentially Hazardous

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Situation Developing) classification level declaration. Air space control will be the responsibility of the Air Branch located in ESF 1 (Transportation).

- 2). River flood plain areas: Lakes and recreational areas along the river will be patrolled by DNR to prevent water transportation access downstream from the dam.
- 3). Emergency Operations Facility: Dam owner security personnel will control entrance to the dam(s) and Emergency Operations Facilities (EOF).

#### **C. Evacuation**

General: After receiving notification of a Condition A (Failure is Imminent or Has Occurred) classification level, or a Condition B (Potentially Hazardous Situation Developing) classification level, from the dam owner, the dam owner, SCEMD and the County EOCs will coordinate requirements for a precautionary, limited evacuation of areas closest to or just below the dam. If practical, a conference call will be initiated from SCEMD between SCEMD, affected counties, DPS, DOT, and dam owner to determine possible evacuation recommendations, EAS message times, and if available, siren activation times. If conditions deteriorate gradually, the county director will ask SCEMD to make an immediate recommendation to the Governor to evacuate specified areas. If conditions deteriorate rapidly, due to the urgency of the situation SCEMD may have to make an immediate recommendation to the Governor to evacuate selected areas. Also, if conditions deteriorate rapidly, the county directors may recommend evacuation.

##### **1. Zones:**

For the Lake Murray, Santee North, Lake Wateree, and the Pinopolis dams, dam failure evacuation zones have been pre-identified and generally follow the outline of the inundation areas.

The purpose of evacuation zones is to allow affected residents to: determine if their home is in the inundation area; if transportation nodes will be affected; and move affected populations in one direction to eliminate confusion. These zones separate the inundation area into divisions and include the following objectives:

- a. They must be describable over radio/TV media to public;

- b. If possible, they must be based upon easily identifiable roadways or natural features for boundary identification;
- c. The inundation areas are based on the most recent dam break analysis, contracted by the Dam owner, if applicable.

In some cases, not all of the zones are expected to be inundated and boundaries and descriptions are general in nature due to geographic feature limitations.

2. Traffic Management:

- a. General: The sheriff as Chief Law Enforcement Officer of the county will, in coordination with the SC Highway Patrol (HP) and other law enforcement agencies, coordinate traffic evacuation activities.
- b. Routes: For zones that have been designated, evacuation routes have been established, and shelter locations have been designated for residents in each zone.
- c. Traffic Control Points (TCP): For zones that have been designated, TCPs have been established along evacuation routes and at selected points to restrict movement into the inundation area.
- d. Diversion routes: Routes around the inundation area will be established using roadblocks and TCPs or Diversion Points to facilitate the flow of traffic and ensure traffic is routed correctly and with a minimum of delay. In most cases, diversion routing will be set-up and begun in counties outside of inundation areas and will be maintained for the duration of the inundation, and the resulting response and recovery.
- e. Special Evacuation Requirements
  - 1). Evacuees who do not have transportation and confined persons who require special transportation will be provided transportation by the affected county, if available. State assistance will be available upon request.

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- 2). Schools and Day Care Facilities: Priority of evacuation assistance will be given to those facilities that have been classified as highly vulnerable. Consideration will be given to evacuating schools early in advance of a general population evacuation. For example, consideration should be given to evacuating all schools in the inundation area even though a mandatory evacuation order is limited to selected evacuation zones.
  - 3). Health Care Facilities and Nursing Homes: Licensed facilities are required to develop and coordinate evacuation plans with local government.
  - 4). Prisoner Populations: State and county corrections organizations will develop and coordinate plans with local government to relocate prisoners.
3. Re-Entry: Re-entry into the inundation area may not be allowed immediately after the floodwaters recede. Re-entry may be granted only after state and local emergency management officials determine that hazardous conditions no longer exist. After a final decision is made by local officials, an immediate announcement to this effect will be made from the SEOC. Estimated water recession times for both probable maximum flood (PMF) and a sunny day failure scenarios are contained in the Emergency Action Plans.

#### **D. Shelters**

Sheltering is an important element in the evacuation process during a dam break incident. They provide a place for registration, feeding, sheltering, and distribution of information. Shelters have been selected based on American Red Cross (ARC) criteria and availability.

1. In the event of an evacuation for a dam failure, the American Red Cross (ARC) will open shelters in the affected county, outside of the inundation area, or in a Host (receiving) County if necessary. The ARC manages shelter operations and is assisted by Department of Social Services (DSS), Department of Health and Human Services (DHHS), Department of Health and Environmental Control (DHEC), The Salvation Army and Probation, Pardon, and Parole (PPP) (where previously arranged).

2. Sheltering operations for dam failure follows normal shelter procedures, to include the following special provisions:
  - a. When the decision is made to evacuate an area or zones, the ARC and DHEC will open all ARC/SMNS (Special Medical Needs Shelters) shelters in the county, outside of the impact zone, or in designated host county (ies), as needed.
  - b. The Governor may order county schools designated as shelters located in the impacted or host counties to be closed for and utilized as a shelter.
  - c. If the dam failure is large enough to displace a large population needing shelter, ESF-6 (Mass Care) may, after all available shelters have been opened and filled, request tent cities to be erected in the impacted county or host counties and possibly other counties to accommodate the evacuee population that cannot return to their homes or find temporary shelter elsewhere (relatives, churches, rental property, etc).
  - d. Also, ARC and Salvation Army mobile feeding units may be requested to support feeding at selected shelters.

3. Host County Sheltering

Based on the evacuation zones and associated evacuation routes, host shelter counties may be needed to accept up to 30% of the vulnerable / evacuating public. While specific dam failure shelters may have not been identified, any current, planned shelter (including hurricane shelters) can be available for use.

- D. County Actions

1. Preparedness

The following contains (but is not limited to) actions that are recommended for Counties:

- a. Develop a public information program (ie. pre-scripted news releases, public information materials);



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- b. Determine notification methods for schools, health care facilities, and nursing homes; determine mass care and feeding requirements;
- c. Develop traffic management plans; identify populations with special transportation needs;
- d. Determine sources for water and portable toilets and encourage water suppliers to store water to prepare for water depletion;
- e. Develop debris removal plans;
- f. Participate in dam failure exercises to test functions and plans.
- g. Develop shelter plans; identify populations with special needs.

#### **2. Response**

The following contains (but is not limited to) actions that are recommended for Counties:

- a. Support public information program; ensure schools, health care facilities, and nursing homes are notified;
- b. Activate traffic management and evacuation plans (including health care facilities/nursing homes);
- c. Coordinate shelter plans; support populations with special needs.
- d. Assist with mass care, feeding, and water distribution;
- e. Assist with special transportation needs;
- f. Support plans for portable toilets to support populations outside inundation area;
- g. Coordinate recovery of deceased and determine which cemeteries have been affected;
- h. Execute swift water rescue operations;

- i. Provide state with reports on deaths, injuries, and damage, and needs for state resources.

3. Recovery

The following contains (but is not limited to) actions that are recommended for Counties:

- a. Continue to support public information program;
- b. Coordinate traffic management re-entry plans for evacuees to include re-entry of populations with special transportation needs;
- c. Support displaced populations; assist water distribution to populations without water service;
- d. Assist with portable toilets to support the population outside the inundation area without water service;
- e. Continue to provide state with reports on deaths, injuries, and damage, and need for state resources.

4. Mitigation

The following contains (but is not limited to) actions that are recommended for Counties:

- a. Support mitigation actions as required
- b. Establish and conduct dam failure mitigation and awareness public education programs.

E. State Actions

1. Preparedness

The following contains (but is not limited to) actions that are required for State agencies:

- a. Develop plans to support law enforcement, traffic management, and evacuation operations;
- b. Identify water suppliers from impact area and develop plans to support population without water service;

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- c. Identify shelters to support emergency shelter and mass feeding operations including use of host counties;
- d. Identify impacted health care facilities and nursing homes and determine notification mechanisms;
- e. Develop plans to recover deceased and identify impacted cemeteries;
- f. Develop plans to support swift water rescue operations;
- g. Develop system to notify affected regulated hazardous materials treatment, storage and disposal facilities;
- h. Develop plans for providing security at dams;
- i. Coordinate dam owner, local and state law enforcement security plans in evacuated areas;
- j. Coordinate with utilities to develop/maintain a public information program.

2. Response

The following contains (but is not limited to) actions that are required for State agencies:

- a. Support law enforcement, traffic management, and evacuation operations;
- b. Support populations without water service;
- c. Support emergency shelter and mass feeding operations;
- d. Coordinate health care related facilities' evacuations;
- e. Implement alert and notification procedures for health care facilities;
- f. Coordinate recovery of deceased;
- g. Execute swift water rescue operations;

- h. Notify regulated hazardous materials treatment, storage and disposal facilities;
- i. Ensure dam security;
- j. Support security plans in evacuated areas;
- k. Implement public information program;
- l. Coordinate debris removal;
- m. Process requests for additional assistance.

3. Recovery

The following contains (but is not limited to) actions that are required for State agencies:

- a. Continue to support law enforcement, traffic management, evacuation operations;
- b. Assist with obtaining/distributing water to support the population without water service;
- c. Support emergency shelter and mass feeding operations;
- d. Continue to support health care related activities;
- e. Support swift water rescue operations;
- f. Continue to coordinate with impacted regulated hazardous materials treatment, storage and disposal facilities;
- g. Ensure dam security;
- h. Support public information program;
- i. Provide debris removal engineering and support.

4. Mitigation

The following contains (but is not limited to) actions that are required for State agencies:

- a. Support mitigation actions

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- b. Establish and conduct dam failure mitigation and public awareness programs.

#### **F. Federal Actions**

##### **1. Preparedness**

The following contains (but is not limited to) actions that are planned for Federal agencies:

- a. Survey dams for structural integrity and mandate Emergency Action Plans for each dam;
- b. Ensure emergency action plans are exercised on a regularly scheduled basis.

##### **2. Response**

The following contains (but is not limited to) actions that are Planned for Federal agencies:

- a. Deploy engineers to dam, determine cause of failure
- b. Provide technical personnel to state/local Emergency Operations Centers.
- c. Dependent on the magnitude of the failure, deploy Incident Management Assist Teams (IMATs) (also referred to ERT-A Teams) and the Federal Incident Response Support Teams (FIRST) to provide affected areas with Federal assistance.

##### **3. Recovery**

The following contains (but is not limited to) actions that are planned for Federal agencies:

- a. Continue to assist in ensuring the dam is no longer susceptible to failure and
- b. Revise Emergency Action Plan based on observations during an exercise or actual dam breach.

- c. Dependent on the magnitude of the failure, deploy Incident Management Assist Teams (IMATs) (also referred to ERT-A Teams) and the Federal Incident Response Support Teams (FIRST) to provide affected areas with Federal assistance.

4. Mitigation

The following contains (but is not limited to) actions that are planned for Federal agencies:

- a. Support mitigation actions as required
- b. Conduct dam failure mitigation and awareness public education programs.

G Public Information

1. Dissemination of complete and accurate information to the public in South Carolina in the event of a failure at each dam is essential to promote a controlled response by the population and to instill confidence that necessary actions are being undertaken for the public's health and safety. The public, through the news media, will expect emergency instructions and on-going information regarding the incident from the dam owner and government at all levels.
2. A Joint Information Center (JIC) where federal, state, and local representatives can respond to media inquiries and ensure an orderly and coordinated release of emergency information will be established, as appropriate. At a minimum, SCEMD, the affected counties, and the dam owner will provide public information personnel to staff the JIC.
3. A state public information specialist will also be located at the SEOC (at ESF 15 cell) as lead PIO. The state public information specialist will coordinate public information and EAS activities at the SEOC and maintain effective coordination and communication with the public information director at the JIC. Public information releases originating from ESF 15 in the SEOC will be coordinated with, and approved by, the Governor's press secretary or designated representative.

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4. Public Education:
  - a. A public information program should address potential hazards resulting from a dam failure at the dam, appropriate actions for public self-protection in the event of a failure, and state and local dam failure emergency response programs. Ideally, the dam owner should provide this information in the form of a pamphlet or brochure which would include the following elements:
    - 1). Possible causes of dam failures and potential threat to the population and property damage.
    - 2). Public alert and notification mechanisms.
    - 3). Appropriate actions for public self-protection.
    - 4). Sources of additional information prior to and during an emergency.
    - 5). Information relating to state, local, and the dam owner's response plans including but not limited to, evacuation sectors, routes, sheltering, and life saving precautions.
    - 6). Information relating to special segments of the population including schools, day cares, hospitals/nursing homes, other institutions and physically impaired, mentally impaired and transportation-dependent individuals.
  - b. Educational information will be primarily disseminated through the following means:
    - 1). Print Media: The dam owner should publish annually a Dam Failure Emergency Information Brochure and distribute it to all households and businesses located in the inundation area.
    - 2). The dam owner should continue to provide additional public education information.
5. Emergency Alert System Messages: See Attachment A - EAS Messages, (Lake Murray Dam, Santee North Dam, and Pinopolis Dam Site Specific Plans (Annexes 1, 2, and 4) for examples.

6. News Releases: See Attachment B (News Releases) (Lake Murray Dam, Santee North Dam, and Pinopolis Site Specific Plans (Annexes 1, 2, and 4) for examples.

#### IV. ASSIGNMENT OF RESPONSIBILITIES

##### A. General

In the event of a dam failure, the SERT and SEOC will coordinate emergency operations in support of local EOCs. State agencies assigned specific missions as outlined in this Plan will develop specific procedures and checklists necessary to accomplish assigned tasks.

##### B. Emergency Organization

The primary Agency for this Annex is the South Carolina Emergency Management Division. Support agencies include all 46 Counties in South Carolina and the following South Carolina state and volunteer agencies: Department of Health and Environmental Control; Department of Public Safety; State Law Enforcement Division; Department of Natural Resources; Department of Corrections; Department of Social Services; Budget and Control Board; American Red Cross; The Salvation Army;

##### C. Assignment of Responsibilities

###### 1. County

- a. Assist dam owner in the development of a public information program.
- b. Provide an authorized spokesperson/representative to support public information activities at the JIC.
- c. Ensure tone alert radios are issued to all schools in the inundation area.
- d. In conjunction with SCEMD, develop evacuation areas.
- e. In conjunction with DPS, coordinate evacuation and traffic management.
- f. Identify populations with special transportation needs including schools, health care facilities, nursing homes,



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prisoner populations, and those without transportation. Develop corresponding plans to ensure timely evacuation.

- g. Identify shelter locations to support estimated displaced county population.
- h. Identify water distribution points to support the population outside the inundation area without water service.
- i. Develop distribution plans for portable toilets to support the population outside the inundation area without water service.

#### **2. State**

##### **a. South Carolina Emergency Management Division**

SCEMD is the coordinating agency for state level disaster response and resource allocation. SCEMD responsibilities for dam failure planning include but are not limited to:

- 1). Prepare an Incident Action Plan (IAP) to direct response actions and resource allocations.
- 2). Use the Operational Area concept, as applicable for response and resource deployment to areas that will be isolated as a result of severe transportation infrastructure damage.
- 3). Prepare Geographic Information System (GIS) and additional information systems to display maps to assess, process, and display emergency information about the dam failure.
- 4). Coordinate and assist affected counties and dam owners in developing Dam Failure Site Specific Plans to include concept of operations, standardized reporting format, and communication needs.
- 5). Coordinate and assist in identification of infrastructure priorities for dam failure aerial reconnaissance.
- 6). Update the Critical Needs Assessment for dam failure response to include information on resource

availability, shortfalls, and where additional resources can be obtained.

- 7). Assist state agencies located in or near the inundation area in developing plans to relocate and ensure continuity of operations.
- 8). Maintain copies of and review all FERC, US Army Corps of Engineers, and if available, SC DHEC dam emergency action plans to ensure consistency with state and local EOPs.
- 9). Analyze dam owner prepared inundation areas to determine the threat to downstream and upstream infrastructure.
- 10). Maintain copies of SC DHEC dam inventories.
- 11). Assist DHEC and utilities in the conduct of on-going statewide dam safety program, to include public information and education. Coordinate with federal, state, and local agencies to provide assistance in support of dam safety training.
- 12). Maintain response personnel and equipment readiness appropriate to existing and anticipated dam safety activities.
- 13). Coordinate site-specific plans for high risk federally regulated dams (see Annexes 1 - 4).
- 14). In conjunction with the affected counties develop evacuation zones from the inundation maps provided by the utilities.
- 15). Support dam owners during dam failure operations.
- 16). Coordinate with federal, state, and local agencies to provide assistance in support of dam failure operations. Establish communications and coordinate assistance with FERC and US Army Corps of Engineers, and DHEC as required.

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- 17). Coordinate emergency information for public release through ESF-15 (Public Information) in the SEOC.
- 18). Support mitigation actions, as required.
- 19). Coordinate execution of the South Carolina Dam Failure Preparedness and Response Plan (Appendix 4) to the South Carolina Emergency Operations Plan (SCEOP) to the maximum extent with the emergency activities of local governments, state government, private agencies and organizations and the federal government.
- 20). Operate the State Emergency Operations Center (SEOC).
- 21). Maintain surveillance of potentially threatening conditions to and in South Carolina and direct appropriate warning and response actions.
- 22). Establish procedures for the maintenance and distribution of this plan on a current basis.
- 23). Encourage mutual aid agreements with federal agencies, other states, private industry and relief organizations and between local governments.
- 24). Provide technical and planning assistance to state agencies and local governments upon request.
- 25). Provide for periodic exercises to test and evaluate state and local plans to maintain a high standard of preparedness.
- 26). Establish an appropriate level of operational readiness.
- 27). Initiate any and all other actions deemed necessary for effective implementation of this Annex.
- 28). Advise Governor, state agencies, local government officials, and necessary federal agencies of severity and magnitude of the emergency/disaster situation.

- 29). Maintain this plan and update as required.
- 30). Maintain, update and distribute all changes to this annex with an annual review.

b. Department of Health and Environmental Control

- 1). Monitor and inspect all high hazard, significant hazard, and low hazard dams not regulated by FERC or USACE projects.
- 2). Conduct on-going statewide dam safety program, to include public information and education. Coordinate with federal, state, and local agencies to provide assistance in support of dam safety training.
- 3). Monitor precipitation forecasts that may contribute to dam failures.
- 4). Monitor statewide dam safety occurrences, losses, and cause factors.
- 5). Maintain and coordinate listing of Special Medical Needs Shelters (SMNS). Due to variations in shelter demand, SMNS sheltering will be accomplished on a case-by-case basis.
- 6). Review inundation area health care facilities and nursing homes evacuation plans.
- 7). Develop a plan to implement a notification system to use reverse 911 systems or SC REACH to alert health care facilities located in the inundation area.
- 8). Develop plans to recover the deceased as a result of dam failure.
- 9). Identify cemeteries in the inundation area and develop plans to recover remains.
- 10). Identify hazardous waste facilities in the inundation area.
- 11). During a failure, activate dam failure advisory team and man the SEOC.

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- 12). Following a failure, conduct evaluations of dam failure, related damage and determine improvement methods.
  - 13). Support mitigation actions as required.
  - 14). In coordination with counties, develop plans to support the population without water service.
- c. Department of Public Safety (DPS)
- 1). In conjunction with DNR, develop plans to clear lakes and downstream waterways in the inundation area.
  - 2). In conjunction with county law enforcement authorities, develop and coordinate evacuation and traffic management plans.
  - 3). Coordinate and implement procedures to route traffic around the larger metropolitan areas.
- d. SC Law Enforcement Division (SLED)
- 1). In coordination with all ESF-13 support agencies, develop plans for the implementation of a secure area around the inundation area.
  - 2). Provide a central point of contact for law enforcement services assistance to local law enforcement agencies to access state police and SCARNG assets for security missions.
  - 3). Provide specialized support assets to include:
    - a). Aviation support for evacuation (including public address system, rescue, and security operations).
    - b). Forensic support.
    - c). Investigative and crime scene services should the breach be determined to be by intentional means (terrorist acts).

- d). Coordination of additional assets through activation of the State Law Enforcement Mutual Aid Plan (SLEMAP).
- e. Department of Natural Resources (DNR)
  - 1). In conjunction with ESFs 13 and 16, develop plans to clear the lake and downstream waterways in the inundation area.
  - 2). Patrol the lake and recreational areas to prevent access downstream from the dam.
- f. Department of Corrections (DOC)
  - 1). Develop procedures to relocate prisoners if they are located in the inundation area
  - 2). Assist local governments with prisoner transport.
- g. Department of Social Services (DSS): In conjunction with American Red Cross (ARC) and the Salvation Army, identify shelters and develop plans to support shelter and mass feeding operations as the result of a failure at any dam in South Carolina. Shelters have been designated in each County in South Carolina.
- h. Budget and Control Board, Division of Procurement Services, Materials Management Office: Develop plans to obtain bulk and bottled water to support the population outside the inundation area without water service.
- i. All SERT members will take the following actions after a major dam failure:
  - 1). Immediately report to the SEOC upon notification by SCEMD of a “major” dam failure.
  - 2). If applicable, deploy resources into the affected area.
  - 3). Alert and mobilize personnel and resources.

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- 4). Determine the extent of damage in area and the operational capability of all related infrastructure.

- j. Responsibilities of Voluntary and/or Non-Profit Organizations

- a. The American Red Cross: Develop plans to support ESF-6 shelter and mass feeding operations.
- b. The Salvation Army: Develop plans to support ESF-6 mass feeding operations.

3. Federal

- a. Federal Emergency Management Agency

Temporary Housing: Initial emergency shelters may operate up to 30 days. Most, if not all, displaced persons will require temporary housing for periods of up to several months before they can return to their homes. Federal Housing Assistance can be provided for up to 18 months to victims whose residences have been rendered uninhabitable by a disaster through a 100% federally funded program. Temporary housing consists of trailers or mobile homes that may be placed either on private property or in parks. Existing trailer or mobile home parks may be used or new parks established. Temporary housing locations will be coordinated between SEOC and FEMA or Joint Field Office (JFO), if activated and the local emergency managers, although it is the responsibility of every individual to find his or her own housing.

- b. Federal Energy Regulatory Commission (FERC)

The FERC regulates two types of dams: Investor-Owned and Public-Owned. FERC mandates that these companies and subsequent projects (dams) develop Emergency Action Plans and conduct dam safety drills and exercises on a scheduled or as warranted basis:

- 1). Investor-Owned Utilities (Dams) include:
  - a). Progress Energy (Blewett Hydroelectric Plant and Tillery Hydroelectric Plant)

- b). South Carolina Electric & Gas Company (Fairfield Pumped Storage Facility; Parr Hydroelectric Plant; Saluda Hydroelectric Project; and Stevens Creek Hydroelectric Project)
- c). Duke Power Company (Bridgewater Hydro Station (in North Carolina); Oxford Hydro Station (in North Carolina); Cowans Ford Hydro Station (in North Carolina); Mountain Island Hydro Station (in North Carolina); Wylie Hydro Station (in North and South Carolina); Fishing Creek Hydro Station; Great Falls/Dearborn Hydro Station; Rocky Creek/Cedar Creek Hydro Station; Wateree Hydro Station; Keowee Hydro Station; Jocassee Hydro Station; Gaston Shoals Hydro Station; Ninety-Nine Islands Hydro Station; and Bad Creek Hydro Station)
- d). City of Greenwood (Buzzard Roost Hydro Station)
- e). Broad River Electric Company (Cherokee Falls Hydro Project)
- f). Lockhart Power Company (Lockhart Hydro Project)
- g). Enel North American, Inc. (Upper Pelzer Hydro Project)
- h). ALCOA Inc, Yadkin Division (High Rock Dam, Tuckertown Dam, Narrows Dam, and Falls Dam (in North Carolina))
- i). City of Abbeville (Lake Secession Dam)
- j). Southern Company (North Georgia Projects in Georgia)
- k). Spartanburg-Welford-Jackson-Duncan, Inc. (SWJD) (aka Apalache Dam)



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2). Public-Owned Dams include:

Santee Cooper (SC Public Service Authority) (Santee North Dam; Santee Spillway; Santee South Dam; Pinopolis East Dam; Pinopolis South Dam; Pinopolis Powerhouse; Pinopolis Lock; and Pinopolis West Dam

3). Both Investor-Owned and Public Owned Dams are generally responsible for the following activities:

- a). Develop, coordinate, test, and implement dam failure emergency action plans.
- b). Ensure compliance with Federal Energy Regulatory Commission (FERC) guidance.
- c). Inspect dams as required by FERC guidance.
- d). Participate in periodic drills and exercises of appropriate EAPs to ensure plans are accurate and feasible.
- e). Maintain personnel and equipment in a state of readiness appropriate to anticipated dam failures.
- f). If applicable, install, operate, maintain, and periodically test siren system.
- g). Assist in the development and update of Site Specific Plans for effected dams.
- h). Develop a public information program.
- i). Develop procedures to provide timely information and recommendations to the SEOC during both a Condition A (Failure is Imminent or Has Occurred) and a Condition B (Potentially Hazardous Situation Developing) classification levels.

- j). Ensure state and all risk counties are immediately notified if unsafe conditions are detected or likely.
  - k). Initiate warning as detailed in each respective Emergency Action Plan.
  - l). Provide regular information updates to SEOC and threatened jurisdictions.
  - m). Provide an authorized spokesperson or representative to support public information activities at the JIC.
  - n). Monitor flood emergency to assist in determining when it is safe for re-entry into flooded or threatened areas.
  - o). Prepare and disseminate public information through appropriate news media.
  - p). Secure dam and EOF during either a Condition A (Failure is Imminent or Has Occurred) classification level or a Condition B (Potentially Hazardous Situation Developing) classification level.
  - q). Phase down operations as directed by/or coordinated with the SEOC.
  - r). Conduct evaluations of dam failure related damage and determine improvements.
- 3). The dam owner, in coordination with SCEMD, and county directors are responsible for assuring the Dam owner's dam failure training is conducted in accordance with state and federal emergency response requirements.
  - 4). Drills and Exercises:

According to FERC guidance, there are five exercise types, Orientation Seminar, Drill, Table Top, Functional, and Full Scale Exercises, listed from simplest to most complex, are:

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- a). Orientation Seminar - An orientation seminar is a face-to-face meeting that involves bringing together those with a role or interest in an EAP (i.e., licensee and State and local emergency management agencies) to discuss the project and EAP. As the name implies, these meetings should take place at least once a year.
- b). Drill - A drill tests, develops, or maintains skills in a single emergency response procedure. Each licensee is required to conduct an annual EAP training session and exercise known as the in-house drill to test the state of training and readiness of key licensee personnel responsible for actions during an emergency. The licensee should conduct an annual drill for each of its EAPs. It is acceptable for an annual drill to concurrently test the EAP for several dams when an overlap in notification is involved.
- c). Tabletop Exercise. The tabletop exercise involves a meeting of the licensee, and the State and local emergency management officials in a conference room environment. The exercise begins with the description of a simulated event and proceeds with discussions by the participants to evaluate the EAP and response procedures. The exercise provides opportunities throughout the exercise to stop and discuss what actions and responses would be appropriate. The Commission recommends that tabletop exercises be performed prior to comprehensive exercises.
- d). Functional Exercise  
  
The functional exercise simulates a dam failure and other specified events in a stress-induced environment with time constraints. The participants “act out” their actual roles in a simulated emergency. Conducting a

functional exercise should be a major goal of every exercise program. It offers the opportunity to test participants' responses in a full simulation under "real-life" conditions, but without a field deployment of resources. A functional exercise is considered a "comprehensive exercise". The Commission tries to have at least one comprehensive (i.e., functional or full-scale) exercise over a five year period in each river basin where there is a project required to have an EAP. This schedule is meant to ensure that licensee personnel and local emergency management agencies in each river basin do not have excessive lengths of time between exercises. If there are several dams owned by different organizations within a river basin or a licensee owns dams in adjacent basins, the following methods can be used to avoid excessive exercises: 1-Combining Exercises, 2-Alternating Tabletop and Functional Exercises, and/or 3-Piggybacking on Other Functional Exercises.

e) Full-Scale Exercise

The full-scale exercise is the most complex level of exercise. It evaluates the operational capability of all facets of the emergency management system (both licensee and State and local emergency management agencies') interactively in a stressful environment with the actual mobilization of personnel and resources. It includes field movement and deployment to demonstrate coordination and response capability. The participants actively "play-out" their roles in a dynamic environment that provides the highest degree of realism possible for the simulated event. Actual evacuation of critical residents may be exercised if previously announced to the public. The Commission tries to have at least one comprehensive (i.e., functional or

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full-scale) exercise over a five year period in each river basin where there is project required to have an EAP. Due to the complexity and expense in terms of personnel and equipment, the full-scale exercise will normally be performed at the licensee's option.

An exercise simulating a dam failure accident at each Dam including participation of emergency response personnel from each of the affected counties will be conducted at least once every 5 years and will be evaluated by federal observers.

c. US Army Corps of Engineers

In South Carolina, the following two districts manage Dams, Dikes, or Berms in the state: US Army Corps of Engineers (Savannah District) and US Army Corps of Engineers (Charleston District).

Although both US Army Corps of Engineer Districts manage their programs separately, the US Army Corps of Engineers Districts generally contain the following information in their Emergency Action Plans: Emergency Condition Procedures; Emergency Notification Procedures; Operational Procedures for Emergencies; Hydraulic Analyses; Inundation Maps; Listing of Available Resources; and Pertinent Data Associated with Each Dam.

- 1). The Savannah District US Army Corps of Engineers regulates, and is responsible for all USACE Savannah River dams, diversion dikes and locks within their district. These include the J. Strom Thurmond Dam, Richard B. Russell Dam, Hartwell Dam, New Savannah Bluff Lock and Dam, and the Clemson Diversion Dikes. Plans are required to be exercised and updated annually.
- 2). The Charleston District US Army Corps of Engineers regulates and is responsible for the St. Stephens Dam in the Santee Cooper River Basin. The facility EAP is exercised and updated annually.

4. Responsibilities of State Departments and Agencies (See Paragraph IV. C. 2)
5. Responsibilities of the Director (See Basic Plan to SCEOP, Paragraph III. F.)
6. Responsibilities of Voluntary Organizations (See Paragraph IV. C. 2. j.)

## V. ADMINISTRATION, LOGISTICS, AND FINANCE

### A. General

A large-scale dam failure emergency or disaster will place great demands on resources of the state. Distribution of required resources may be made difficult by such emergencies. Initially, priority for distribution of supplies will be given to shelter, food, water and medication. Resources will be identified and provided as soon as a need has been established. Coordination with appropriate departments and agencies will be performed to ensure that operational readiness is maintained at all times. Administrative procedures will be conducted in accordance with existing rules and regulations.

### B. Logistics

#### 1. Authorities and References

- a. South Carolina Emergency Operations Plan, 2008.
- b. Dam owner Emergency Action Plan, as amended.

#### 2. Plan Development and Maintenance

In order to facilitate a concerted response effort for a dam failure, Site Specific Plans will be developed for all FERC High Hazard Regulated Dams. There are two types of Site Specific Plans, as follows:

- a. Detailed Site Specific Plans: These plans are prepared for FERC High Hazard Dams that will affect large populations, as well as impose large scale impacts to major infrastructure, and affect multiple counties / jurisdictions. Such plans require detailed response actions including, but not limited to mass evacuations of pre-identified zones, identifying evacuation routes and diversion routes, the

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affected infrastructure, and areas that may not be directly impacted by a dam's projected inundation area.

- b. Abbreviated Site Specific Plans: These plans are developed for High Hazard Dams, but with potential impacts of a reduced scope/scale regarding affected populations, infrastructure, extent of inundation, etc. These plans will identify only unique aspects of response and require relatively limited planning for evacuation / diversion routes, and shelters.
3. Site Specific Plans will be updated in the year prior to the FERC scheduled functional exercise conducted approximately every five years, or sooner, if needed.
4. SC DHEC Emergency Action Plans

Any Dam or reservoir whose failure would likely cause loss of life or substantial property damage, a dam or reservoir classified as a High or Significant hazard under existing regulations, shall provide the Department of Health and Environmental Control a current emergency action plan in the format the department by regulation requires. Although Low Hazard Dams are not required to submit and Emergency Action Plan, they are surveyed every three years to determine if their hazard level increases (based on any development below the dam).

#### C. Funding and Accounting

##### 1. State

Expenditures of State funds for dam failure emergency operations will be accomplished in accordance with SC law. Utilizing emergency powers, the Governor may mobilize all available resources of the state government as necessary to cope with the emergency. Accounting for expenditure of state funds will be conducted under state laws and regulations and is subject to audit by the State Auditor. State agencies/departments and local governments are responsible for the collection, reporting and maintenance of records of obligation and expenditures incurred during a response to an emergency or disaster situation. These records shall serve as a database in assessing the need and preparation of requests for federal assistance.

2. Federal

Federal funds made available to the state pursuant to a dam failure emergency or disaster program will, to the extent provided by law, be channeled through the Governor or his designated representative. Use of federal funds is subject to audit and verification by state and federal auditors. Local governments and heads of state agencies and departments will establish systems to report on and account for any public funds used for emergency or disaster purposes.

3. Dam Owner

Each dam owner is ultimately liable for damages resulting from a failure at one of their dams. Dam owners should determine approximate reimbursements from insurance and other sources of financial assistance, and also identify alternatives for financing residual costs. During a federally declared disaster, through the FEMA Public Assistance program, Dams fall under Category D - Water Control Facilities and may be eligible for reimbursement for some types of repairs.

## **VI. CONTINUITY OF GOVERNMENT**

(For Complete Listing of Continuity of Government Operations See Basic Plan to SCEOP, paragraph VIII. A through F)

### **Emergency Operations Center**

- A. Primary State Emergency Operations Center: The State Emergency Operations Center is the facility from which state response to emergencies is coordinated, directed and controlled. It is the designated headquarters for the Governor when he is directing state response to disasters. The SEOC is staffed by representatives of state agencies and other personnel, as required. The coordination of a state response, as well as a federal response, will come from the SEOC, under the direction of the Governor. The State Emergency Operations Center (SEOC) is located at 2779 Fish Hatchery Road, West Columbia, SC 29172
- B. Alternate State Emergency Operations Center (AEOC): All agencies shall prepare for the possibility of unannounced relocation of essential functions and/or continuity of government contingency staffs to alternate facilities. Facilities shall be capable of supporting operations in a threat-free environment, as determined by the geographical location of the facility, a favorable assessment of the local threat, and/or the collective protection



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characteristics of the facility. Department of Public Safety Headquarters in Blythewood has been designated as the AEOC in the event that the SEOC is not operational. The Alternate SEOC is located at 10311 Wilson Boulevard, in Blythewood, SC 29016.

#### **VII. CONTINUITY OF OPERATIONS (COOP)**

(For Complete Listing of Continuity of Operations (COOP) Activities, See Basic Plan to SCEOP, paragraph IX.)

#### **VIII. PLAN DEVELOPMENT AND MAINTENANCE**

(See Paragraph III. H. 2 for planning development and maintenance requirements)

#### **IX. SUPPORTING PLANS AND DOCUMENTS**

A. The following Site Specific Plans have been completed, are kept under separate cover, and are updated annually:

1. Lake Murray Site Specific Plan December 2004 (Revised) Appendix 4, Tab A to the South Carolina Emergency Operations Plan (SCEOP)
2. Santee Dam Site Specific Plan, December 2007, Appendix 4, Tab B to the South Carolina Emergency Operations Plan (SCEOP)
3. Wateree Dam Abbreviated Site Specific Plan 2008, Appendix 4, Tab C to the South Carolina Emergency Operations Plan (SCEOP)
4. Pinopolis Dam Site Specific Plan, April, 2008, Appendix 4, Tab D to the South Carolina Emergency Operations Plan (SCEOP)

B. Site Specific Plan attachments include (but not limited to):

A – EAS Messages

B – News Releases

C – Evacuation Zones

D – Evacuation Routes and Associated Shelters

E – Traffic Management

F – Shelters

G – Executive Orders

H – Siren Locations

I – School Evacuation Plans

J – Communications Drill Procedures

## **X. AUTHORITIES AND REFERENCES**

### **A. State**

1. South Carolina Emergency Operations Plan (SCEOP), as updated
2. South Carolina Constitution
3. South Carolina Code of Laws Ann., 25-1-420 thru 25-1-460
4. Regulation 58-1, Local Government Preparedness Standards, SC Code of Regulations
5. Regulation 58-101, State Government Preparedness Standards, SC Code of Regulations
6. Governor's Executive Order 2003-12
7. South Carolina Emergency Recovery Plan, as updated
8. South Carolina Operational Radiological Emergency Response Plan (SCORERP), as updated
9. South Carolina Hazard Mitigation Plan, as updated
10. State Assessment Team (SAT) Standard Operating Procedures (SOP), as updated
11. State of South Carolina Hazard Assessment, as updated
12. South Carolina Code Of Laws, Title 49, Chapter 11, Waters, Water Resources and Drainage
13. SC R.72-1 through R.72-9, Dams and Reservoirs Safety Act Regulations

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#### **B. Federal**

1. Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, Title VI, as amended
2. Code of Federal Regulations (CFR), Title 44, as amended
3. National Response Framework (NRF), as updated
4. Presidential Executive Order 12148 - Federal Emergency Management Agency
5. FERC Regulations. Code of Federal Regulations – Title 18: Conservation of Power and Water Resources
6. US Army Corps of Engineers Regulations. DP 1130-2-16 - Savannah River Emergency Action Plan, December 97, Change 3, 10 Aug 01, CESAS-EN-EM

#### **C. Other**

Emergency Management Assistance Compact (EMAC) Guidebook and Standard Operating Procedures (SOP)

## **XI. ACRONYMS AND GLOSSARY**

#### **A. Acronyms**

1. EAP – Emergency Action Plan
2. EOF – Emergency Operations Facility
3. ETA - Estimated Time of Arrival
4. EZ – Evacuation Zones
5. FERC-Federal Energy Regulatory Commission
6. PMF – Probable Maximum Flood
7. SWJD – Spartanburg-Welford-Jackson-Duncan, Inc.
8. SSP – Site Specific Plan
9. USACE –US Army Corps of Engineers

B. Glossary

1. Berm. A nearly horizontal step in the sloping profile of an embankment dam. Also a step in a rock or earth cut.
2. Breach. An opening through a dam that allows the uncontrolled draining of a reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional opening caused by discharge from the reservoir. A breach is generally associated with the partial or total failure of the dam.
3. Class I. One of several terms used by various utilities indicating Failure is Imminent or Has Occurred at a FERC Regulated dam.
4. Class II. One of several terms used by various utilities indicating Potential Hazard, Situation Developing at a FERC Regulated dam.
5. Cofferdam. A temporary structure enclosing all or part of the construction area that construction can proceed in the dry. A diversion cofferdam diverts a stream into a pipe, channel, tunnel, or other watercourse.
6. Comprehensive EAP exercise. An in depth exercise of an EAP that involves the interaction of the dam owner with the state and local emergency management agencies in a stressful environment with time constraints. Functional and full-scale EAP exercises are considered comprehensive EAP exercises.
7. Condition A (Failure is Imminent or Has Occurred) classification level. One of several terms used by various utilities indicating Failure is Imminent or Has Occurred at a FERC Regulated dam.
8. Condition B (Potentially Hazardous Situation Developing) classification level. One of several terms used by various utilities indicating Potential Hazard, Situation Developing at a FERC Regulated dam.
9. Condition Red. One of several terms used by various utilities indicating Failure is Imminent or Has Occurred at a FERC Regulated dam.

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10. Condition Yellow. One of several terms used by various utilities indicating Potential Hazard, Situation Developing at a FERC Regulated dam.
11. Consequences. Potential loss of life or property damage downstream of a dam caused by floodwaters released at the dam or by waters released by partial or complete failure of dam. Also effects of landslides upstream of the dam on property located around the reservoir. Construction joint. The interface between two successive placements or pours of concrete where bond, and not permanent separation, is intended.
12. Dam. An artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.
13. Dam failure. Catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an uncontrolled release. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters that adversely affect a dam's primary function of impounding water is properly considered a failure. These lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. They are, however, normally amenable to corrective action.
14. Dam safety. Dam safety is the art and science of ensuring the integrity and viability of dams such that they do not present unacceptable risks to the public, property, and the environment. It requires the collective application of engineering principles and experience, and a philosophy of risk management that recognizes that a dam is a structure whose safe function is not explicitly determined by its original design and construction. It also includes all actions taken to identify or predict deficiencies and consequences related to failure, and to document, publicize, and reduce, eliminate, or remediate to the extent reasonably possible, any unacceptable risks.
15. Dike. See saddle dam.
16. Diversion channel, canal, or tunnel. A waterway used to divert water from its natural course. The term is generally applied to a temporary arrangement, e.g., to bypass water around a dam site.

during construction. “Channel” is normally used instead of “canal” when the waterway is short.

17. Drainage area. The area that drains to a particular point on a river or stream.
18. Drawdown. The difference between a water level and a lower water level in a reservoir within a particular time. Used as a verb, it is the lowering of the water surface.
19. Emergency Action Plan (EAP) exercise. An activity designed to promote emergency preparedness; test or evaluate EAPs, procedures, or facilities; train personnel in emergency management duties; and demonstrate operational capability. Exercises consist of the performance of duties, tasks, or operations very similar to the way they would be performed in a real emergency. However, the exercise performance is in response to a simulated event.
20. Emergency Action Plan (EAP). A plan of action to be taken to reduce the potential for property damage and loss of life in an area affected by a dam failure or large flood.
21. Erosion. The wearing away of a surface (bank, streambed, embankment, or other surface) by floods, waves, wind, or any other natural process.
22. Failure mode. A potential failure mode is a physically plausible process for dam failure resulting from an existing inadequacy or defect related to a natural foundation condition, the dam or appurtenant structures design, the construction, the materials incorporated, the operations and maintenance, or aging process, which can lead to an uncontrolled release of the reservoir.
23. Flood. A temporary rise in water surface elevation resulting in inundation of areas not normally covered by water. Hypothetical floods may be expressed in terms of average probability of exceedance per year such as one-percent-chance-flood, or expressed as a fraction of the probable maximum flood or other reference flood.
24. Flood, Probable Maximum (PMF). The flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in the drainage basin under study.

## SOUTH CAROLINA DAM FAILURE PREPAREDNESS AND RESPONSE PLAN

### APPENDIX 4

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- 25. Flood plain. An area adjoining a body of water or natural stream that may be covered by floodwater. Also, the downstream area that would be inundated or otherwise affected by the failure of a dam or by large flood flows. The area of the flood plain is generally delineated by a frequency (or size) of flood.
- 26. Flood storage. The retention of water or delay of runoff either by planned operation, as in a reservoir, or by temporary filling of overflow areas, as in the progression of a flood wave through a natural stream channel.
- 27. Hazard potential classification. A system that categorizes dams according to the degree of adverse incremental consequences of a failure or misoperation of a dam. The hazard potential classification does not reflect in any way on the current condition of the dam (i.e., safety, structural integrity, flood routing capacity).
- 28. Instrumentation. An arrangement of devices installed into or near dams that provide for measurements that can be used to evaluate the structural behavior and performance parameters of the structure.
- 29. Inundation map. A map showing areas that would be affected by flooding from releases from a dam's reservoir. The flooding may be from either controlled or uncontrolled releases or as a result of a dam failure. A series of maps for a dam could show the incremental areas flooded by larger flood releases.
- 30. Leakage. Uncontrolled loss of water by flow through a hole or crack.
- 31. Notification. To inform appropriate individuals about an emergency condition so they can take appropriate action.
- 32. Peak flow. The maximum instantaneous discharge that occurs during a flood. It is coincident with the peak of a flood hydrograph.
- 33. Probable Maximum Precipitation (PMP). Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographical location during a certain time of the year.

- 34. Risk analysis. A procedure to identify and quantify risks by establishing potential failure modes, providing numerical estimates of the likelihood of an event in a specified time period, and estimating the magnitude of the consequences. The risk analysis should include all potential events that would cause unintentional release of stored water from the reservoir.
- 35. River basin. The drainage area for a river above a particular point.
- 36. Seepage. The internal movement of water that may take place through the dam, the foundation or the abutments.
- 37. Spillway. A structure over or through which flow is discharged from a reservoir. If the rate of flow is controlled by mechanical means, such as gates, it is considered a controlled spillway. If the geometry of the spillway is the only control, it is considered an uncontrolled spillway.
- 38. Storage. The retention of water or delay of runoff either by planned operation, as in a reservoir, or by temporary filling of overflow areas, as in the progression of a flood wave through a natural stream channel. Definitions of specific types of storage in reservoirs are: Active storage. The volume of the reservoir that is available for some use such as power generation, irrigation, flood control, water supply, etc. The bottom elevation is the minimum operating level.
- 39. Tailwater. The water immediately downstream from a dam. The water surface elevation varies due to fluctuations in the outflow from the structures of a dam and due to downstream influences of other dams or structures. Tailwater monitoring is an important consideration because a failure of a dam will cause a rapid rise in the level of the tailwater.
- 40. Volume of dam. The total space occupied by the materials forming the dam structure computed between abutments and from top to bottom of dam. No deduction is made for small openings such as galleries, adits, tunnels, and operating chambers within the dam structure. Portions of power plants, locks, spillway, etc., should be included only if they are necessary.
- 41. Weir. A notch of regular form through which water flows.