

APPENDIX 4
(SOUTH CAROLINA DAM FAILURE EMERGENCY RESPONSE PLAN)
TO THE SOUTH CAROLINA EMERGENCY OPERATIONS PLAN

I. INTRODUCTION

- A. A dam is defined as 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.
- B. A dam failure is characterized by the sudden, rapid and uncontrolled release of impounded water or the likelihood of such an uncontrolled release.
 - 1. There are lesser degrees of failure but any malfunction or abnormality outside the design assumptions and parameters which adversely affects a dam's primary function of impounding water is considered a failure.
 - 2. These lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. However, these type failures may also be addressed, minimized or halted through corrective actions.

II. PURPOSE

- A. Identify how County, State and Federal agencies will prepare, respond, recover and mitigate failure of regulated dams in South Carolina.
- B. Provide a guideline to managing State assistance to those threatened from a dam failure.
- C. Task the State Emergency Support Functions (ESF) to provide primary or support roles during a dam failure incident.
- D. Describe how the State will mobilize resources and conduct activities to support local emergency management efforts through preparedness, response, recovery, and mitigation planning for a dam failure impacting South Carolina.

III. SCOPE

- A. Supplement to the South Carolina Emergency Operations Plan (SCEOP).
- B. Establishes the roles, responsibilities, and coordination of agencies at the Local, State, and Federal levels tasked with the safety and security missions for regulated dams in South Carolina.
- C. Applies to all federally and state regulated dams within or affecting South Carolina.
- D. Individual dam Emergency Action Plans and Site Specific Plans shall be used in conjunction with this plan.

- E. Provides guidance to agencies and stakeholders involved in dam failure response activities.

IV. FACTS

- A. There are 47 federally regulated dams and hydroelectric projects whose failure would affect South Carolina. (See Tab 1 –Federally Regulated Dams Affecting South Carolina).
 - 1. Federal regulatory agencies include the Federal Energy Regulatory Commission (FERC), the U.S. Army Corps of Engineers (USACE), and the National Parks Service (NPS).
- B. The South Carolina Department of Health and Environmental Control (DHEC) is the regulatory authority for most regulated dams in South Carolina and is responsible for monitoring and inspections, creating and maintaining Emergency Action Plans, issuing directives, and providing permits to erect new dams and permits for repairing, altering, or removing existing dams.
 - 1. Directives may include emergency orders, inspection reports, repair orders, and notice of violations, in accordance with state DHEC dam regulations.
 - 2. Approximately 2,400 South Carolina dams are regulated, and managed under State law by DHEC.
- C. SC Code of Laws, Title 49 - Waters, Water Resources and Drainage, Chapter 11 is the legal base regarding dams in South Carolina.
 - 1. Article 3 or the “Dams and Reservoirs Safety Act” contains definitions, exemptions, duties of DHEC, and responsibilities of dam owners.
- D. Dams are categorized into Hazard Classifications based on the damage their failure would cause to downstream areas. (See Tab 2 – Hazard Potential Classification Systems for Dams Affecting South Carolina)
- E. Dam failures are categorized into Emergency Levels with regards to the type and size of the failure and the flow and storage conditions upstream and downstream of the dam. (See Tab 3 – Emergency Levels for Dams Affecting South Carolina)

V. ASSUMPTIONS

- A. There are thousands of unregulated dams throughout South Carolina. Most are used for recreation or agriculture.
- B. Dams may fail suddenly and without notice or they may allow some time for further analysis or decision making.

1. If time is available, the State and threatened Counties will use this warning time to prepare using plans, protocols, and procedures predefined and coordinated in this and other plans. State agencies, County and municipal governments and other entities will support preparations for possible failure and the following response.
- C. A dam failure at one or multiple larger dams could potentially destroy infrastructure and quickly exceed State and local resources.
 1. For large or widespread dam failures, South Carolina Emergency Management Division (SCEMD) will request the Governor declare a State of Emergency.
 2. Significant aid from State/Federal government may not be readily available for at least 72 hours after a dam failure.
- D. Damage to transportation, communication, and other infrastructure systems could isolate individuals and/or communities within the dam failure inundation areas.
 1. Affected primary and secondary roads may not be functional for extended periods of time.
 2. Shelters in the impacted area identified for use during other natural disasters may not be suitable for use. Reception Center and Sheltering operations may take place outside the impacted area.
- E. Mutual Aid Compacts and agreements will enable assistance in areas of shortfall of personnel, equipment, and logistics; state-to-state, county-to-county, and municipality-to-municipality. Federal support may be available during recovery.
 1. Established local and regional mutual aid agreements will be honored to the extent possible.

VI. SITUATION

- A. Every County in South Carolina is susceptible to a dam failure within its boundaries, in an adjacent County, or in a neighboring state.
- B. Metropolitan areas and municipalities could be severely impacted.
- C. Although no federally regulated, high hazard dams have failed in South Carolina, numerous significant and destructive state and non-state regulated dam failures occurred in South Carolina during the October Floods of 2015 and multiple failures and breaches associated with Hurricane Matthew in October of 2016. These incidents were both precipitated by a significant rainfall event.

- D. The integrity of the dams may be challenged or compromised by upstream flash floods, earthquakes, neglect, bombs, civil disorder, rapid runoff, cracks, obstruction of spillways, or vandalism or any combination of the above.
1. The resulting dam failure could result in personal injury or death, damage or loss to infrastructure, and property damage.
 2. In certain situations, dam failures may result in a cascading effect that could cause the failure of dams downstream.

VII. CONCEPT OF OPERATIONS

A. General

1. SCEMD is the primary agency for this Appendix and is responsible for developing, coordinating, and maintaining procedures to support it.
2. SCEMD plans for the consequence management response to dam failures or related hazards.
3. SCEMD, DHEC, affected county Emergency Management agencies coordinate, and other stakeholders for an organized response to address or resolve known or discovered issues/concerns at dams.
4. SCEMD consults with the following agencies to monitor observed and forecasted flooding events that might lead to possible dam failures:
 - National Weather Service (NWS)
 - Southeast River Forecast Center (SERFC)
 - US Geological Survey (USGS)
 - SC Department of Natural Resources (DNR)
 - SC Department of Health and Environmental Control (DHEC)
5. In the event of a dam failure, state agencies may provide support to local governments, as required.
6. SCEMD verifies the Emergency Action Plan notification with the dam owner and State and local Emergency Management organizations to ensure accuracy and consistency.
7. The SCEMD Dam Safety Coordinator synchronizes off-site response with dam owners and impacted counties to develop a consequence management strategy, called Site-Specific Plans for FERC regulated dams.
8. State and County Emergency Managers in the potentially impacted areas should identify and be prepared to designate Alternate EOCs should there be the risk of structural damage or actual damage to the primary EOCs.

B. Federal and State Dam Planning and Exercise Regulations and Guidelines

1. On-Site Planning Coordination

- a. Detailed Emergency Action Plans (EAPs) exist for federally regulated dams. These plans include roles and responsibilities, notifications flowcharts, EAP activation conditions, notification and warning protocol, and downstream affects (inundation maps).
- b. Federally regulated dam owners are required to have Emergency Action Plans updated annually.
- c. For State regulated dams, EAPs are only required for high or significant hazard dams.

2. Off-Site Planning Coordination (Site Specific Planning)

- a. Developing Site Specific Plans is coordinated effort between all emergency organizations and the dam owner to coordinate a consequence management strategy (off-site plan) to evacuate and shelter populations being threatened, through developing Site Specific Plan.
- b. For dam failure, South Carolina has developed a process to include the dam owner, affected counties, state emergency response teams, and all stake-holders in the development of Site Specific Plans. These plans detail impacts to infrastructure, emergency procedures for alert and notification, evacuation, mass care, and responder roles and responsibilities. Supporting appendices detail pre-scripted messages, shelter locations, evacuation routes, and more.
- c. In order to effectively respond to dam failures in South Carolina, the planning process has been divided into two types of Plans:
 - Detailed Site Specific Plans. Plans prepared primarily for FERC High Hazard Dams and include detailed response actions for evacuations such as: pre-identifying evacuation zones, evacuation routes and diversion routes; affected infrastructure; and areas not to be directly impacted by a dam's projected inundated area.
 - Abbreviated Site Specific Plans. These plans are developed only for FERC High Hazard Dams with reduced potential impacts regarding affected populations, infrastructure, extent of inundation, etc. These plans are smaller and address aspects of response such as planning for evacuation/diversion routes, and shelters.

- d. In order to determine the likely effects a dam breach scenario could have on infrastructure, all FERC regulated High Hazard dam owner/utilities are expected to provide Geographical Information System (GIS) maps of the anticipated inundation areas to State and local agencies in order to enable the State, Counties and municipalities to identify affected infrastructure.
- e. There are no available Federal agency guidelines specifically developed for non-Federal entities that provide current modeling and GIS standards for dam inundation mapping.
- (1) FEMA recommends the dam owners use two dam failure planning scenarios on the inundation maps - “Sunny Day Failure” and “Probable Max Flood” conditions.
- (a) Fair Weather (Non-Hydrologic) Failure (Sunny Day) breach is a dam failure that occurs during fair weather (i.e., non-hydrologic or non-precipitation) conditions.
- (b) Probable Max Flood breaches occur with extreme precipitation and runoff are termed “rainy day” or hydrologic failures.
- **For off-site planning (Site Specific Plans), one scenario is used, that is the larger extent of inundation (worse-case scenario).
- f. These inundation scenarios are overlaid onto the following critical infrastructure files to determine affects:
- Transportation arteries (e.g., interstates, highways, streets, roads, rail lines and airports)
 - Communications (e.g., telephones lines and stations and broadcast media)
 - Public works and engineering outlets (e.g., water treatment, sewer and waste water facilities)
 - Firefighting resources (e.g., hydrants, tanks and refill locations, fire stations)
 - Mass Care
 - Health and medical facilities (e.g., hospitals, emergency medical service stations, healthcare facilities)
 - Cemeteries and graveyards

- Potential Hazardous material sites (e.g., above ground and underground storage units, pipelines carrying hazardous materials and landfills)
- Energy facilities (e.g., electric facilities, distribution lines and generating stations)
- Law enforcement facilities
- Schools
- Animal care facilities (e.g., zoos, poultry farms and commercial livestock farms)
- Military Facilities

C. Alert and Notifications

1. Emergency Management Alert and Notification. Once an emergency is confirmed at the dam, the owner should issue an emergency classification level and simultaneously initiate the notification process via the EAP notification flowchart for that emergency level. (See Tab 3 – Emergency Levels for Dams Affecting South Carolina)
2. After receipt of initial notification, the State Warning Point (SWP) will execute the Dam Failure Checklist which includes procedures for verifying and confirming notification of affected Counties.
3. Federal
 - a. Federally regulated dam owners are required to develop Notification Flowcharts to identify who is to be notified of a dam safety incident, by whom, and in what order (FEMA-64). Specifically, the notification chart should include:
 - Emergency level of the Notification Flowchart if more than one flowchart is required
 - Individuals who will be notified and their contact information
 - Prioritization of notifications
 - b. Dam owners shall maintain communications with the affected County EOCs and SEOC for the duration of the emergency.
4. State
 - a. Depending on the magnitude, and anticipatory effects of a dam failure, the SEOC and affected County EOCs may be activated (or partially activated).

5. County.
 - a. Based on initial information received, county may:
 - Send agency to scene to evaluate
 - Determine if EOC should be activated
 - Determine whether or not roads should be closed
 - Swift water rescue may be needed
 - Evacuations to higher ground
 - Shelters or reception centers be available

6. Alert and Notification of the Populace
 - a. Siren Systems
 - (1) Some regulated dams in South Carolina use siren systems to alert the populace and turn on radios/televisions and listen to Emergency Alert System (EAS) messages.
 - (2) These dam owners should test their sirens often to ensure functionality, and according to the dam owner's regulatory procedures.
 - (3) Dam owners, in coordination with the County Emergency Management and/or the SEOC/SWP, may activate their sirens to warn portions of, or all downstream residents.
 - (4) Maps of siren locations are located in the above mentioned EAPs.
 - b. Automated Telephonic Notification System
 - (1) Some Counties have systems to conduct automated telephonic notifications. Notification will be prioritized (or phased) based on threat (such as speed flow of water).
 - (2) The SWP will initiate Code Red to alert emergency responders and the threatened population of possible danger.
 - c. Tone Alert Radio Notifications.

Once notified by dam owner that deteriorating conditions are observed at the dam, the NWS may activate tone alert Radios and issue either Flash Flood Watch or Flash Flood Warning for the affected areas, as appropriate.

- d. Emergency Alert System
 - (1) The SWP or affected Counties will activate EAS to broadcast emergency action messages after verifying notification of a potential or imminent dam failure.
- e. Counties or municipalities will use door-to-door alert notifications as a backup and as appropriate.

D. Security Requirements

1. At Dam

- a. Dam owners are responsible for the physical and cyber security of their facilities.
- b. Local law enforcement resources may be available to assist if necessary.

2. Downstream and Upstream Areas

- a. Upon declaration of “A Failure is Imminent or Has Occurred” classification:
 - (1) The SC Department of Public Safety (SCDPS) in coordination with ESF-16 (Emergency Traffic Management) will coordinate with local law enforcement authorities to assist in sealing off the inundation areas to include coordinating ingress and egress points, and controlling access points based on evacuation and traffic management plans.
 - (2) The South Carolina Law Enforcement Division (SLED)/ESF-13, will coordinate with local law enforcement authorities to assist in law enforcement and security operations.
 - (3) DNR, in coordination with ESF-16 (Emergency Traffic Management) and ESF-13 (Law Enforcement), will coordinate the clearance of waterways/boat landings and preventing unauthorized waterway access to areas downstream and upstream from the dam or the secure area.
 - (4) As required, ESF-1 (Transportation) will coordinate air space management.

- b. Use of South Carolina National Guard (SCNG) assets and implementation of the State Law Enforcement Mutual Aid Plan (SLEMAP) may be required.
- c. Some or all of the above actions may be required during “A Potentially Hazardous Situation Developing” classification level, as well.
- d. A credible terrorist threat may also require increased security during either a “Failure is Imminent or Has Occurred” classification or “Potentially Hazardous Situation Developing” classification declaration.

E. Evacuation

- 1. Counties and municipal governments are responsible for evacuations and support operations. Considerations should include transportation, sheltering, health and medical, emergency traffic management, animal and agricultural emergency response, and military support.
- 2. Immediately after receiving notification of a “potential” or “actual” dam failure SCEMD, County EOCs and the dam owner should coordinate requirements for a precautionary, limited evacuation of areas closest to, or downstream from the dam.
 - a. If water from the affected dam is discharging slowly, the County Director may coordinate with SCEMD to make a recommendation to the Governor to evacuate specified areas.
 - b. If conditions are deteriorating rapidly, SCEMD may recommend The Governor evacuate selected areas, or the County Directors may coordinate a local evacuations.
- 3. Evacuation Zones
 - a. The purpose for identifying evacuation zones is to inform potentially affected residents that their homes may be inundated; establish what transportation nodes that may be impacted; and direct affected populations to evacuate in an organized manner, moving in one direction, to avoid confusion.
 - b. These zones must be:
 - Describable over radio/TV media to public
 - Based upon easily identifiable roadways or natural features for boundary identification
 - Generally based on the inundation areas

- c. Evacuation zone information can be found in the following dam Site Specific Plans:
- Lake Murray (Attachment C)
 - Santee (Attachment C)
 - Lake Wateree (Attachment A)
 - Pinopolis (Attachment C)
 - Cherokee Falls (Attachment A)
 - Lake Secession (Attachment A)
 - Lake Greenwood (Attachment A)

4. Traffic Management

- a. The County Sheriffs, in coordination with the SCDPS/ESF-16 (Emergency Traffic Management) and other law enforcement agencies, will coordinate traffic evacuation activities.
- b. Site Specific Plans contain pre-established evacuations zones, the Counties have established evacuation routes, and destination shelter or Reception Center locations for residents in each zone.
- (1) For pre-established evacuations zones, the SCDPS has pre-selected Traffic Control Points (TCP) along evacuation routes and at selected points to restrict movement into the inundation area.
- c. SCDOT/ESF-1 (Transportation) will determine routes around the inundation area and coordinate with SCDPS/ESF-16 (Emergency Traffic Management) to establish roadblocks and TCPs or Diversion Points to facilitate the flow of traffic and ensure traffic is routed correctly with a minimum of delay.
- d. 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.

5. Special Evacuation Requirements

- a. The affected Counties are responsible for identifying the need and providing transportation to evacuees lacking personal transportation or who require functional needs and special needs transportation.
- b. Priority of evacuation assistance will be given to facilities and populations located nearest the inundation areas.

- (1) Consideration will be given to evacuating schools in advance of a general population evacuation.
 - (2) Evacuation considerations may also be given to functional need and special need populations.
- c. Licensed medical/health care facilities are required to develop and coordinate evacuation plans with local government.
 - d. State and County corrections organizations will develop and coordinate plans with local government to relocate prisoners.
6. Re-Entry. See Section VI (Concept of Operations) of the SCEOP.

F. Sheltering

1. Considerations for emergency sheltering and evacuations will include additional populations (such as tourists, vacationers, and transients) in the State for the emergency response effort.
2. In the event of an evacuation for a dam failure, SCDSS and/or the American Red Cross (ARC) will open shelters in the affected County, outside of the inundation area, or in a neighboring (receiving) County if necessary.
3. The County, SCDSS, and ESF-6 (Mass Care) partners manages general population shelter operations in coordination with the Counties and ESF-6 (Mass Care).
4. DHEC manages Special Medical Needs Shelter (SMNS) operations in coordination with the affected or neighboring Counties and ESF-6 (Mass Care).
5. Sheltering procedures.
 - a. ARC/SCDSS will identify the sheltering requirement, the location, and scale upward if necessary to meet the demand for evacuees, outside of the impact zone, as needed.
 - b. DHEC will open SMNSs in the affected area or in designated ~~host~~ neighboring County (ies) as required.
 - c. The Governor, or appropriate local authority may order County schools located in the impacted or neighboring counties to be closed, and then designated and utilized as shelters.
 - d. SCDSS, ARC, and other ESF-6 (Mass Care) partners will manage feeding support to the sheltering operations.

6. Sheltering
 - a. Based on the evacuation zones and associated evacuation routes, neighboring counties may need to shelter some of the affected county evacuating public.
 - b. While specific dam failure shelters may have not been identified, any current designated shelters may be available for use.

G. Public Information

1. See Annex 15 (Public Information) to the SCEOP for information on Public Affairs operations.
2. At a minimum; SCEMD, the affected Counties, and dam owners with the resources to do so, will provide public information personnel to staff the Joint Information Center (JIC).
3. Public Education
 - a. Federally regulated dam owners should develop a public information program to address potential hazards resulting from a dam failure, appropriate actions, self-protection, and reference State and local dam failure emergency response programs.
 - b. Federally regulated dam owners should provide this information via pamphlets, brochures, Company websites and social media. This information may include the following:
 - (1) Possible causes of dam failures and potential threats to the persons and property in the affected areas.
 - (2) Public alert and notification mechanisms.
 - (3) Means to keeping informed about dam failure.
 - (4) Appropriate actions for self-protection.
 - (5) Sources of additional information prior to, during, and following an emergency.
 - (6) If available, evacuation zones, routes, sheltering, and life-saving precautions.
 - (7) Information specifically relating to special needs and functional needs segments of the population.
 - c. Dam owners may disseminate preparedness information primarily through: print media, company website, and or social media.

- d. The dam owner should continue to provide additional public education information throughout entire incident.
4. For examples of EAS Messages and News Releases, see Site Specific Plans.

VIII. RESPONSIBILITIES

A. General

1. State agencies assigned specific missions as outlined in this Plan will develop specific procedures and checklists necessary to accomplish their assigned tasks.
2. A dam failure may evolve into a federally declared disaster, and State, County and local governments and agencies should track and document costs for possible future re-imbursement.

B. Regulated Dam Owners

1. Ensure compliance with regulatory guidance.
2. Develop, coordinate, test, and implement dam failure EAPs.
3. Provide EAPs to affected Local, County, and State Emergency Management, first responders, and all other stakeholders.
4. Participate in the development and update of Site Specific Plans for dams as required.
5. Ensure physical and cyber security at dams where applicable.
6. Inspect dams as required by regulatory guidance.
7. Conduct dam failure response training in accordance with State and Federal emergency regulations and response requirements. Participate in periodic drills and exercises of appropriate EAPs to ensure plans are accurate and feasible.
8. Maintain personnel and equipment in a state of readiness.
9. If applicable, install, operate, maintain, and periodically test siren system.
10. For federally regulated dams, coordinate with Counties and ESF-15 (Public Information), develop a public information program (i.e. pre-scripted news releases, public information materials).
11. Provide timely information and recommendations to the SWP/SEOC and affected Counties during both a “Failure is Imminent or Has Occurred” and “Potentially Hazardous Situation Developing” classification level events.

12. Ensure State and affected Counties are immediately notified if deteriorating conditions are detected or likely.
13. Initiate failure classification levels as detailed in respective EAP.
14. Provide timely situation updates to threatened jurisdictions and SWP/SEOC.
15. For federally regulated dams, provide authorized spokesperson to support public information activities at the JIC.
16. Prepare and disseminate public information through appropriate news media and in coordination with ESF-15 (Public Information).
17. Secure dam during either a “Failure is Imminent or Has Occurred” classification level or a “Potentially Hazardous Situation Developing” classification level event.
18. Continue to monitor dam and related flood emergency and as conditions at dam improves, or returns to “non-failure” conditions and report status to County and State Emergency Management or SEOC (if activated).
19. For federally regulated dams, notify affected NWS office.
20. Conduct evaluations of dam failure related damage and determine ways to mitigate future failure.

C. County Emergency Management

1. Preparedness
 - a. Maintain and review available EAPs for dams located in or whose failure would affect the county
 - b. In coordination with the regulatory agencies, dam owners and other stakeholders, develop pre scripted emergency alert messages or press releases to be included certain in EAPs or SSPs
 - c. Determine most efficient means to notify functional needs and special needs facilities.
 - d. Ensure functional need facilities such as schools, daycare centers, and related institutions located in the inundation area can be promptly notified.
 - e. Coordinate evacuation traffic management and if necessary develop evacuation zones.

- f. Identify special need and functional need who may have special transportation requirements. Develop corresponding plans to ensure timely evacuation.
 - g. Develop a mass care plan to identify shelter locations to support anticipated displaced populations.
 - h. Identify special medical need populations with special sheltering needs.
 - i. Identify and anticipate the need to use water distribution resources to support the population without water service.
 - j. Work with utilities and service providers determine a means to repair or restore essential services.
 - k. Develop acquisition and distribution plans for obtaining portable toilets to support the population without water/waste service.
 - l. Determine mass care and feeding requirements.
 - m. Develop debris removal and deposit plans.
 - n. Participate in dam failure training and exercises.
2. Response
- a. Support public information and if available, provide an authorized spokesperson to support public information activities at the JIC.
 - b. Ensure functional needs and special needs facilities are notified.
 - c. Activate traffic management and evacuation plans (including health care facilities/nursing homes).
 - d. Coordinate execution of shelter plans to include support for populations with special needs.
 - e. Assist with mass care, feeding, and water distribution.
 - f. Assist with transportation needs.
 - g. Support plans for portable toilets to support evacuated populations.
 - h. Coordinate recovery of un-interred human remains and determine which cemeteries have been affected.
 - i. Coordinate swift water rescue operations.

- j. Provide the SEOC with reports to include status of dam, evacuation, support services, deaths, injuries, and damages.
 - k. Coordinate with SEOC for resources not available or needs beyond the County's capabilities.
 - 3. Recovery
 - a. Coordinate traffic management re-entry plans for evacuees to include re-entry of populations with transportation needs.
 - b. Support displaced populations.
 - c. Assist water distribution to populations without water service.
 - d. Assist with portable toilets to support the population without water/waste service.
 - e. Identify long-term effects to human life, critical infrastructure, personal property, and the affected tributary or river basin and accordingly, develop plan to saves lives and protect property.
 - 4. Mitigation
 - a. Support mitigation actions as required.
 - b. Establish and conduct dam failure mitigation and awareness public education programs.
- D. South Carolina Emergency Management Division
 - 1. Monitor potentially threatening conditions affecting South Carolina that may cause deteriorating conditions to dams, and coordinate appropriate warning and response actions.
 - 2. Use Geographic Information System (GIS) and other mapping systems to display maps to assess, and present emergency information about the dam failure.
 - 3. Assist affected Counties and dam owners in developing Site Specific Plans.
 - 4. Analyze dam inundation maps to determine and respond to the threat to infrastructure both downstream and upstream.
 - 5. In coordination with the affected Counties, SCDPS and DOT, develop evacuation zones based on the inundation maps.
 - 6. Assist dam owners and other agencies with dam safety training, public information and education.

7. Participate in exercises to test State and Local consequence management plans are valid.
 8. Support County emergency operations during dam emergencies.
 9. Advise the Governor, State agencies, local government officials, and, if necessary, Federal agencies of severity and magnitude of the dam failure emergency/disaster situation.
 10. Coordinate with County, dam owner or representatives, and NWS to release consistent emergency information through ESF-15 (Public Information).
 11. Coordinate, response for, and resource deployment to areas which have been isolated by damaged infrastructure as a result of a dam failure.
 12. As required/requested, assist with obtaining/distributing water to support populations without water service.
 13. Maintain and review copies of available Dam EAPs and ensure consistency with State and local protocol.
 14. Maintain, update, and distribute this plan on an annual basis.
- E. Department of Health and Environmental Control
1. Bureau of Water (Dam Safety)
 - a. Regulate South Carolina state DHEC dams under DHEC's regulatory purview.
 - b. Mandate (per DHEC guidelines) owners of "High Hazard" and "Significant Hazard" dams develop EAPs, and review and update annually.
 - c. Ensure County Emergency Managers and have easy access to state regulated dam Emergency Action Plans within their respective counties.
 - d. Inspect DHEC regulated dams on the following schedule:
 - "High Hazard" dams - Bi-annually
 - "Significant Hazard" dams - Every three (3) years
 - Although "Low Hazard" dams are not required to submit an EAP, DHEC will survey the dams every five (5) years to determine any change in their hazard level.
 - e. Conduct statewide dam safety public information and education.

- f. Coordinate with Federal, State and local agencies to assist in supporting dam safety training.
 - g. Monitor precipitation forecasts that may contribute to dam failures.
 - h. Observe river and stream conditions and forecasts.
 - i. Monitor statewide dam related activities, occurrences, losses, and cause factors. Send dam safety inspectors, if necessary.
 - j. During failure(s), provide DHEC Dam Safety representative during SEOC operations.
 - k. Following a dam failure:
 - Assess damage and determine mitigation methods to improve dam
 - Provide licenses to repair existing dams
 - Provide licenses to erect new dams
 - Provide permits for repairing, altering or removing existing dams
 - l. Initiate directives, including emergency orders, non-emergent repair orders, and notice of violations, in accordance with state DHEC dam regulations.
2. Office of Public Health Preparedness
- a. Plan for, establish and operate SMNS as needed.
 - b. Identify impacted health care facilities and nursing homes, review effected health care facilities and nursing home evacuation plans and verify notification mechanisms.
 - c. Assist in developing plans to recover deceased victims of the dam failure.
3. Division of Emergency Response Bureau of Environmental Health Services
- a. Identify hazardous waste facilities in the inundation area.
 - b. Develop system to notify affected regulated hazardous materials treatment, storage and disposal facilities in the effected inundation area.

F. SC Department of Transportation

1. Coordinate with SCDPS/ESF-16 (Emergency Traffic Management) to support evacuation operations.
2. Coordinate with SLED/ESF-13 (Law Enforcement) to support security for the inundation area.
3. Coordinate procedures to evaluate road structure integrity.

G. SC Department of Public Safety

1. Coordinate with local law enforcement authorities to develop, coordinate and implement evacuation and traffic management plans, and plans for routing traffic around inundation area and larger metropolitan areas.
2. Coordinate with DNR to develop plans to clear upstream lakes and downstream waterways in inundation area.
3. Coordinate with Air Branch for aviation support for evacuation (including public address system, rescue, and security operations).

H. SC Law Enforcement Division

1. In coordination with ESF-13 (Law Enforcement), develop plans to assist local law enforcement authorities with security in the inundation area.
2. Provide or coordinate specialized support assets to include:
 - Forensic support
 - Investigative and crime scene services should the breach be determined to be by intentional means (terrorist acts)
 - Coordination of additional assets through activation of the State Law Enforcement Mutual Aid Plan (SLEMAP)

I. SC Department of Natural Resources

1. In conjunction with ESF-13 (Law Enforcement) and ESF-16 (Emergency Traffic Management), develop plans to clear the upstream areas and downstream waterways affected by the inundation area.
2. Patrol the lake and recreational areas to prevent access downstream from the dam.
3. Provide DNR Hydrologists to support the Plans Section in the SEOC.

J. SC Department of Corrections

1. Develop procedures to relocate prisoners if they are located within inundation areas.

- 2. Assist local governments with prisoner transport.
- K. South Carolina National Guard (pending a Governor's State of Emergency Declaration)
 - 1. Provide aviation support for Search and Rescue, reconnaissance, and security operations in coordination with SCDOT, ESF-1/Air Branch etc., as requested.
 - 2. Provide assistance to SC DPS/ESF-16 for traffic management as requested.
 - 3. Provide assistance to SLED/ESF-13 for establishing security operations as requested.
- L. SC Department of Social Services

In conjunction with affected Counties, ARC and The Salvation Army, identify shelters and develop plans to support shelter and mass feeding operations.
- M. State Fiscal Accountability Authority, Division of Procurement Services, Materials Management Office

Develop contracts to obtain bulk and bottled water to support the population without water service.
- N. Office of Regulatory Staff
 - 1. Coordinate with Counties to develop plans for supporting populations without electrical service.
 - 2. Coordinate with Counties to develop plans for supporting populations without water service.
- O. Department of Labor, Licensing, and Regulation

Support Search and Rescue operations to include Swift Water Rescue operations.
- P. The American Red Cross

Support Mass Care operations.
- Q. The Salvation Army

Support Mass Care operations.
- R. Federal

1. Federal Emergency Management Agency (FEMA)
 - a. Depending on the magnitude of the dam failure, deploy Incident Management Assist Teams (IMAT).
 - b. During a federal disaster declaration, coordinate Temporary and Long-term Housing for displaced persons needing shelter beyond 30 days. Temporary housing locations will be coordinated between SERT and FEMA or Joint Field Office (JFO), if activated, and the local Emergency Managers.
2. Federal Energy Regulatory Commission
 - a. Regulate dams under their purview.
 - b. In accordance with FERC guidelines, ensure dam owners develop EAPs and conduct drills and exercises on a scheduled or as warranted basis.
 - c. Ensure EAPs are reviewed and updated per FERC guidelines.
3. US Army Corps of Engineers

Regulates dams, dikes, and locks under their purview.
4. National Parks Service

Regulates Star Fort Dam at Ninety-Six National Park and provide technical advice and offsite recommendations.
5. National Oceanic Atmospheric Administration (NOAA)
 - a. National Weather Service

Provide technical advice and weather forecasts
 - b. Southeast River Forecast Center

Provide daily River Gauge Summaries and Forecasts
6. US Geological Survey (USGS)

Deploy rapid deployment gauges
7. US Coast Guard (USCG)

Assists with port security

IX. ADMINISTRATION, FINANCE AND LOGISTICS

- A. Administration and Finance
 - 1. See the SCEOP Basic Plan.
 - 2. Dam Owner
 - a. Dam owners are ultimately liable for damages resulting from a failure at one of their dams.
 - b. During a Federally declared disaster, dams may be eligible for reimbursement for some types of repairs through the FEMA Public Assistance program under Category D - Water Control Facilities.
- B. Logistics. See Attachment A (South Carolina Logistics Plan) to the SCEOP Basic Plan.

X. GOVERNING FEDERAL AND STATE REGULATIONS AND REFERENCES:

A. **AUTHORITIES AND REFERENCES.** See Attachment C (Authorities and References) to the SCEOP Basic Plan.

B. **ACRONYMS AND GLOSSARY.**

- 1. FEMA P-148, Federal Guidelines for Dam Safety, Glossary of Terms
- 2. See Attachment B (Acronyms and Glossary) to the SCEOP Basic Plan.

C. **SUPPORTING PLANS AND DOCUMENTS.**

Tab 1 – Federally Regulated Dams Affecting South Carolina

Tab 2 – Hazard Potential Classification Systems for Dams Affecting South Carolina

Tab 3 – Emergency Levels for Dams Affecting South Carolina

Tab 4 – Planning Exercise Requirements from Regulatory Agencies.

XI. SITE SPECIFIC PLAN LISTING (Under Separate Cover)

- A. Lake Murray Site Specific Plan December - 2004 (Revised) - Tab A (Lake Murray Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.
- B. Santee Dam Site Specific Plan, December - 2007 - Tab B (Santee Dam Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Preparedness Emergency Plan) to the SCEOP.
- C. Wateree Dam Abbreviated Site Specific Plan - 2008 - Tab C (Wateree Dam Abbreviated Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.
- D. Pinopolis Dam Site Specific Plan, April, 2008 - Tab D (Pinopolis Dam Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.
- E. Cherokee Falls Abbreviated Site Specific Plan – April 2009 - Tab E (Cherokee Falls Abbreviated Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.
- F. Lake Secession Abbreviated Site Specific Plan – March 2010 - Tab F (Lake Secession Abbreviated Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.
- G. Buzzards Roost (Lake Greenwood) Abbreviated Site Specific Plan - April 2010 - Tab F (Buzzards Roost (Lake Greenwood) Abbreviated Site Specific Plan) to Appendix 4 (South Carolina Dam Failure Emergency Response Plan) to the SCEOP.

Tab 1 – Federally Regulated Dams Affecting South Carolina

<u>Owner</u>	<u>Dam</u>	<u>Counties/NWS Stations Affected</u>
City of Abbeville, SC	Lake Secession Dam (Rocky River Dam)	Abbeville County <i>GSP NWS</i>
City of Augusta, GA	Augusta Canal	Edgefield County Aiken County <i>Columbia NWS</i>
City of Columbia/Lockhart	Columbia Canal	Richland County <i>Columbia NWS</i>
Cube Hydro Carolinas	Falls Dam High Rock Dam Narrows Dam Tuckertown Dam	Chesterfield County Marlboro County Darlington County <i>Columbia NWS</i> <i>Wilmington NWS</i>
Duke Energy	Blewett Hydro Station	Marlboro County Chesterfield County <i>Columbia NWS</i>
	Bad Creek Hydro Station	Oconee County <i>GSP NWS</i>
	Bridgewater Hydro Station	York County Chester County Lancaster County Fairfield County Kershaw County Richland County Sumter County <i>GSP NWS</i> <i>Columbia NWS</i>
	Cowans Ford Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County Richland County Sumter County

	Calhoun County Clarendon County Orangeburg County <i>Columbia NWS</i> <i>GSP NWS</i>
Fishing Creek Hydro Station	Lancaster County Chester County Fairfield County Kershaw County <i>Columbia NWS</i> <i>GSP NWS</i>
Gaston Shoals Hydro Station	Cherokee County York County Union County <i>GSP NWS</i> <i>Columbia NWS</i>
Great Falls/Dearborn Hydro Station	Lancaster County Chester County Fairfield County Kershaw County <i>Columbia NWS</i> <i>GSP NWS</i>
Jocassee Hydro Station	Pickens County Oconee County Anderson County Abbeville County McCormick County Edgefield County Aiken County <i>GSP NWS</i> <i>Columbia NWS</i>
Keowee Hydro Station	Pickens County Oconee County Anderson County Abbeville County McCormick County Edgefield County Aiken County Barnwell County Allendale County

	<i>GSP NWS</i> <i>Columbia NWS</i>
Mountain Island Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County <i>Columbia NWS</i> <i>GSP NWS</i>
Ninety-Nine Islands Hydro	Cherokee County York County Union County <i>GSP NWS</i> <i>Columbia NWS</i>
Oxford Hydro Station	York County Lancaster County Chester County <i>Columbia NWS</i> <i>GSP NWS</i>
Rocky Creek/Cedar Creek Hydro	Lancaster County Fairfield County Kershaw County <i>Columbia NWS</i> <i>GSP NWS</i>
Tillery Hydro Station	Marlboro County Chesterfield County <i>Wilmington NWS</i> <i>Columbia NWS</i>
Wateree Hydro Station	Kershaw County Richland County Sumter County <i>Columbia NWS</i>
Wylie Hydro Station	York County Lancaster County Chester County Fairfield County Kershaw County Richland County Sumter County Calhoun County

Dam Failure Emergency Response Plan

		Clarendon County Orangeburg County <i>Columbia NWS</i>
Enel Green Power North America	Cherokee Falls Hydroelectric Project	Cherokee County <i>GSP NWS</i>
	Upper Pelzer Hydroelectric Project	Anderson County Greenville County <i>GSP NWS</i>
	Ware Shoals Hydroelectric Project	Laurens County Greenwood County <i>GSP NWS</i>
Greenwood County	Buzzard's Roost (Lake Greenwood Dam)	Newberry County Saluda County Greenwood County Lexington County Richland County <i>Columbia NWS</i> <i>GSP NWS</i>
Lockhart Power Company	Lockhart Hydro Station	Union County <i>GSP NWS</i>
Georgia Power	North Georgia Hydroelectric Project	Oconee County <i>GSP NWS</i>
Santee Cooper	Pinopolis Dam	Berkeley County Charleston County <i>Charleston NWS</i>
	Santee Dam	Berkeley County Clarendon County Williamsburg County Georgetown County Charleston County <i>Charleston NWS</i> <i>Columbia NWS</i> <i>Wilmington NWS</i>
SCE&G	Fairfield Pumped Storage Facility	Newberry County Fairfield County Lexington County

Dam Failure Emergency Response Plan

		Richland County <i>Columbia NWS</i>
	Parr Hydroelectric Plant	Newberry County Fairfield County Lexington County Richland County <i>Columbia NWS</i>
	Saluda Hydroelectric Facility (Lake Murray Dam/Dreher Shoals Dam)	Lexington County Richland County Calhoun County <i>Columbia NWS</i>
	Stevens Creek Hydroelectric Facility	Edgefield County Aiken County <i>Columbia NWS</i>
<u>Owner</u>	<u>Dam</u>	<u>Counties/NWS Stations Affected</u>
National Parks Service (Ninety-Six National Historic Site)	Star Fort Dam	Greenwood County <i>GSP NWS</i>
<u>Owner</u>	<u>Dam</u>	<u>Counties/NWS Stations Affected</u>
U.S. Army Corps of Engineers (Charleston District)	St. Stephen Hydro Facility	Berkeley County Williamsburg County Georgetown County Charleston County <i>Charleston NWS</i>
U.S. Army Corps of Engineers (Savannah District)	Clemson Upper/Lower Diversion Dams	Pickens County Oconee County <i>GSP NWS</i>
	Hartwell Dam	Anderson County Abbeville County <i>GSP NWS</i>
	J. Strom Thurmond Dam	McCormick County Edgefield County Aiken County Barnwell County Allendale County Hampton County Jasper County

Dam Failure Emergency Response Plan

		<i>Columbia NWS</i>
	New Savannah Bluff Lock and Dam	Aiken County <i>Columbia NWS</i>
	Richard B. Russell Dam	Abbeville County McCormick County <i>GSP NWS</i>

Tab 2 – Hazard Potential Classification Systems for Dams Affecting South Carolina

I. FERC

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally Limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

II. USACE

- A. DSAC Class I (Very High Urgency) – Dams where progression toward failure is confirmed to be taking place under normal operations and the dam is almost certain to fail under normal operations within a time frame from immediately to within a few years without intervention; or, the combination of life or economic consequences with probability of failure is extremely high.
- B. DSAC Class II (High Urgency) – Dams where failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public safety; or, the combination of life or economic consequences with probability of failure is very high.
- C. DSAC Class III (Moderate Urgency) – Dams that have issues where the dam is significantly inadequate or the combination of life, economic, or environmental consequences with probability of failure is moderate to high.
- D. DSAC Class IV (Low Urgency) – Dams are inadequate with low risk such that the combination of life, economic, or environmental consequences with a probability of failure is low and the dam may not meet all essential USACE engineering guidelines.
- E. DSAC Class V (Normal) – Dams considered adequately safe, meeting all essential agency guidelines and the residual risk is considered tolerable

III. National Parks Service

Classification	Lives in Jeopardy	Economic Loss
Low	0	Minimal (Undeveloped agriculture, occasional uninhabited structures, or minimal outstanding natural resources)
Significant	1-6	Appreciable (rural area with notable agriculture, industry, or worksites, or outstanding natural resources)
High	More than 6	Excessive (urban area including extensive community, industry, agriculture, or outstanding natural resources.

IV. SCDHEC

- A. **High Hazard** – Dams whose failure or mis-operation will threaten human life or serious damage to home(s), industrial and commercial facilities, important public utilities, major roads or railroads.
- B. **Significant Hazard** – Dams whose failure or mis-operation results in no known threat to human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. These dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
- C. **Low Hazard** - Dams whose failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner’s property.

Tab 3 – Emergency Levels for Dams Affecting South Carolina

I. Federally Regulated Dams: FEMA P-64 recommends that plain language terms be used when reporting dam failures for easier recognition and synchronization with the federal National Incident Management System guidelines.

A. Definitions:

1. **High Flow**- indicates that flooding is occurring on the river system, but there is no apparent threat to the integrity of the dam. This level is used by the dam owner to convey to outside agencies that downstream areas may be affected by the dam's release.
2. **Non-Failure**- appropriate for an event at a dam that will not, by itself, lead to a dam failure, but requires investigation and notification of internal and/or external personnel.
3. **Potential Failure**- indicates that conditions are developing at the dam that could lead to a dam failure. Potential Failure should convey that time is available for analyses, decisions, and actions before the dam could fail. A failure may occur, but predetermined response actions may moderate or alleviate failure.
4. **Imminent Failure**- indicates that time has run out, and the dam has failed, is failing, or is about to fail. Imminent Failure typically involves a continuing and progressive loss of material from the dam. For the purposes of evacuation, emergency management authorities may assume the worst-case condition that failure has already occurred.

II. SC DHEC:

A. No standard dam failure classification exists for state regulated dams

Tab4 - Planning and Exercise Requirements for Regulated Dams

- I. All Federally regulated dams require an Emergency Action Plan (EAP).
- A. The primary federal guideline for Emergency Action Plan development for Dams is FEMA P-64. The purpose of this document is to provide guidelines for the preparation of an Emergency Action Plan (EAP) to facilitate the development of plans that are comprehensive and consistent. FEMA P-64 can be found here:
http://www.damsafety.org/media/Documents/FEMA/508_FEMA_P-64_Fed_Guidelines_for_Dams.pdf
- II. FERC, USACE, NPS, and SCDHEC each have more specific governing documents.
- B. Federal Energy Regulatory Commission (FERC) Guidelines for EAPs can be found here:
<http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide/chap6.pdf>
- C. The US Army Corps of Engineer Guidelines for EAPs and exercise and training guidance can be found in Chapter 16 here:
http://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/ER_1110-2-1156.pdf
- D. The National Parks Service follows the U.S. Department of the Interior's Bureau of Reclamation guidance and can be found here:
http://www.usbr.gov/recman/temporary_releases/factrmr-60.pdf
- E. The SC Department of Health and Environmental Control Dam does NOT mandate an exercise or training program however, dam owners having a hazard potential rating of "High" and "Significant" are required to maintain EAPs. Dam owners with a hazard potential rating of "Low" are not required to submit EAPs, however DHEC conducts an investigation every five years to determine if their hazard levels necessitates a classification change. Details on SC DHEC Regulated Dams for planning can be found here:
<https://www.scdhec.gov/environment/WaterQuality/DamsReservoirs/LawsRegulations/>
<https://www.scdhec.gov/Environment/docs/r72-1.pdf>