

ANNEX 7-Basic Plan
INGESTION PATHWAY EMERGENCY PLANNING ZONE (IPZ)
APPENDIX 2

I. INTRODUCTION

- A. Preventive protective actions are taken to either avoid or reduce the contamination of food, milk, or water and to isolate food to prevent its introduction into commerce. Protection of dairy animals and surveillance of fresh milk supplies and feed for dairies will command the highest priority early in the IPZ response. All human consumption foodstuffs (i.e., milk, meats, other livestock, poultry, fish, vegetation, eggs, tea, grains, honey, soft drinks, shellfish, etc.) including potable/non-potable water, will be sampled for radioactive contamination in the IPZ.
- B. For effective emergency response in the IPZ, samples of milk, food, or water will be obtained from all areas that may be contaminated. Following a radiological release, the impact on the IPZ will not be known until sample collection and analysis is completed. Once these samples have been analyzed, final protective measures will be determined and implemented.

II. PURPOSE

The purpose of this plan is to address preparedness, response, recovery and mitigation activities for the ingestion exposure pathway in the event of an accidental release of radioactive material from a Nuclear Power Plant (NPP) within or in close proximity to the state of South Carolina. Responsibilities for incident assessment, protective actions decision-making, notification, communication, and public information procedures are specified.

III. CONCEPT OF OPERATIONS

Offsite response to a radiological incident at a NPP is divided into three phases: the early emergency response phase, the intermediate phase, and the recovery phase.

A. Early Phase (Plume)

The early emergency response phase begins at the time the incident occurs at the NPP. It ends when the NPP situation has stabilized, there is no further radioactive release offsite, and all NPP-generated contamination has been deposited in the environment. The following concept of operations applies during this phase:

1. Emergency Plans

- a. The South Carolina Emergency Operations Plan (SCEOP) outlines lead and support functions for state agencies during a state declared emergency. The SCEOP, South Carolina Technical Radiological Emergency Response Plan (SCTRERP), and this plan outline responsibilities for protecting the public from ingesting radioactively contaminated food and water. These responsibilities are shared by many state agencies. The South Carolina Recovery Plan (SCRP) details many of the state, federal and voluntary organizations' policies, resources and

programs. The State Hazard Mitigation Plan provides guidance about appropriate mitigation measures to reduce effects of contamination. DHEC is the lead state agency for ingestion exposure pathway responses. SCEMD is responsible for overall state coordination of non-technical radiological resources under this plan and the SCEOP.

- b. Further, it is recognized that other state and federal agencies may also be involved in implementing protective actions to keep the public from consumption of contaminated foodstuffs, or in providing post-incident assistance to individuals, local governments, food producers, processors, or distributors under the Federal Radiological Emergency Response Plan (FRERP) and the National Response Framework (NRF).

2. Field Monitoring

- a. ESF 10 is responsible for coordination and implementation of all field monitoring and sampling activities in South Carolina, using staff from DHEC, SCDA, CULPH, CUCES, augmented by staff from Southern Mutual Radiological Assistance Plan (SMRAP) states, and FRMAC sampling teams when they arrive on scene.
- b. State and local staff rosters are maintained by each respective agency identified. Procedures for activating field teams are contained in SCTRRP and DHEC Radiological Emergency Response Standard Operating Procedures (SOPs).

3. Protective Actions

- a. To protect the public from external contact with or inhalation of radioactive materials, Protective Action Recommendations (PARs) are determined and presented to the Governor by ESF 10. Upon approval of PARs by the Governor, Protective Action Decisions (PADs) are transmitted to local governments by SCEMD. They are implemented through county emergency response agencies and public alert and notification systems.
- b. Actions to protect the public from the ingestion of radioactively contaminated food or water (e.g., embargo or disposal of contaminated food or animals, shutting down surface water intakes for public water supply systems, curtailment of hunting or fishing) will be determined and recommended by ESF 10 and jointly reviewed by appropriate state and county representatives before presentation to the Governor for final approval. They are implemented through state agency rules by state agency personnel and are announced to the public through the JIC.
- c. PARs are based on the analysis of field samples of air, soil, water, and vegetation at predetermined locations within the 10-mile emergency-

planning zone (EPZ). Environmental sampling outside the 10-mile EPZ will be directed by ESF 10 to define the limits of the area of radiological deposition and to begin defining levels of radioactive contamination in milk, foodstuffs, meat, other livestock, poultry and water. Additional information on sampling procedures and priorities are available in SCTRERP Appendices I and II, DHEC Radiological Emergency Response SOPs, and DHEC Radiological Laboratory sample collection and analysis procedures.

- d. DHEC, SCDA, CULPH and CUCES maintain records to facilitate the implementation of ingestion protective actions. Maintained within these records are the locations of major food producers, processors, distributors, dairies, and surface water systems within the IPZ for all NPPs affecting South Carolina. DHEC, in coordination with SCDA, CULPH and CUCES, is responsible for the development of procedures for utilizing this information to keep affected food producers, processors, and distributors informed about PARs and required post-incident response actions. This information is updated as necessary by SCDA, CULPH, and CUCES.
- e. Maps for recording information on the status of the emergency and for monitoring key land use and other ingestion-related data are developed and maintained by county agricultural or extension agents.

B. Intermediate Phase

The intermediate phase begins when the NPP situation has stabilized, there is no further radioactive release offsite, and all NPP-generated contamination has been deposited in the environment. It ends when the geographic limits of the contaminated areas have been fully identified and radiation levels within these areas have been initially determined. It is likely that most ingestion PADs will still be in effect at the beginning of the intermediate phase. Therefore, most ingestion response operations which occurred during the early emergency response phase will continue to apply. Additional responsibilities that will now also include but are not limited to:

1. Initiating or continuing the investigation of long-term livestock-poultry and agricultural land management practices (e.g., soil removal, crop rotation, tillage, etc.) which reduce future contamination of feed and food crops.
2. Beginning or continuing the identification of long-term impacts on the area's indigenous wildlife.
3. Beginning or continuing the evaluation of the potential for the spread of contamination due to wildlife migratory patterns.
4. Livestock and poultry assessment, condemnation and disposal.

5. Provide assistance to local governments and individuals about recovery operations including housing, employment, damage assessment and reimbursement of costs as outlined in the SCRP.

C. Late Phase (Recovery)

The Recovery phase begins when the geographic limits of the contaminated areas have been fully identified and radiation levels within these areas have been initially determined. It ends when all areas (which can be) are returned to their pre-incident state and all PARs (which can be) are removed. Some restricted zones may remain because of the presence of long-term or permanently, uncorrectable contamination at levels hazardous to public health. Humanitarian relief, short-term recovery efforts, and long-term recovery efforts will be conducted in accordance with the South Carolina Emergency Recovery Plan. The Concept of Operations in the recovery phase and changes that will be employed during the recovery phase include, but are not limited to, the activities identified in this section.

1. Radiological Assessment

- a. The investigation of long-term agricultural land management practices (e.g., soil removal, crop rotation, tillage, etc.) that reduce future contamination of feed and food crops will be continued during this phase.
- b. The identification of long-term impacts on the areas indigenous wildlife and the spread of contamination due to wildlife migratory patterns will be continued during this phase.
- c. The identification of long-term impacts on livestock and poultry.
- d. Recommend appropriate mitigation measures to reduce or eliminate the effects of contamination.

2. Decontamination

- a. A decontamination and restoration plan will be established with coordination from affected counties, DHEC, SCDA, CULPH, CUCES, SCEMD, and federal response resources. The decontamination and restoration plan can address citizen decontamination points, decontamination of homes, buildings and structures, decontamination of agricultural properties, and disposal of contaminated materials.
- b. Decontamination points shall be established in the buffer zone with coordination from the affected counties, DHEC, SCDA, South Carolina Air National Guard and augmented with resources from the U.S. Department of Energy (DOE). NOTE: CULPH will cooperate with ESF-10 and appropriate responding agencies. They will also assist with any issues related to animal disease, decontamination of agricultural properties and disposal issues as noted in 2a.

- c. Decontamination point traffic control and access will be coordinated with ESF 16/SCHP before establishment.
 - d. Decontamination points will be used to ensure that citizens identified as contaminated at a food or traffic control point are properly decontaminated before re-entry into a non-restricted zone.
 - e. The decontamination and restoration of buildings and structures will be conducted in accordance with county critical facilities priorities and coordinated with local, state and federal partners.
 - f. Evaluation of decontamination activities will be conducted by ESF 10 with assistance from federal response agencies.
3. Re-entry Phase
- A. The period of time associated with this phase is somewhat arbitrarily defined as the period from four days after termination of an uncontrolled atmospheric release until one year after the event occurs. In the literature, this is generally referred to as the reentry phase of accident response.
 - B. Prior to this period, protective actions will have been implemented based upon plume and ingestion pathway exposure guidelines. During the reentry phase, decisions will be made as to whether particular areas or properties will be decontaminated and reoccupied, or condemned and the occupants permanently relocated. Guidance for those actions is contained in later sections of these guidelines.
 - 1) Re-entry will be recommended by ESF 10 and authorized by the Governor.
 - 2) Limited non-emergency worker entries into access-controlled areas (restricted zones) will be permitted for the performance of emergency services, and to provide food and water to livestock within the area. No re-entry will be permitted if a radioactive material release is ongoing.
 - 3) Decisions to relax protective measures and allow recovery and re-entry into an evacuated area require a continuous assessment of the radiological situation. The assessment is accomplished by the analysis of radiological monitoring data from air samples, milk, water, and direct radiation measurements. Re-entry will be recommended when projected doses fall below 20% of the appropriate PAG and when surface contamination is reduced below the limits in SCTRERP, Appendix 1. ESF 10 will determine the feasibility of re-entry into evacuated areas and recommend the appropriate actions to the Governor.

- 4) Traffic control points will be established and enforced through ESF 16 procedures. They will be used to control all movement into or within a restricted zone. Normally, they will be established in or outside the buffer zone. Non-emergency workers who do not evacuate access-controlled areas must exit through the traffic control points.
- 5) Food control points will be established by SCDA and CUCES and co-located with the traffic control points. They will operate under the technical direction of SCDA. They will be used to restrict the flow of all livestock, poultry, foodstuffs and commercial products from a restricted zone. To ensure all non-commercial items (personnel, pets, household items, etc.) leaving a restricted zone meet the established state acceptable contamination release limits, food control staff will perform direct radiation surveys of all items leaving the restricted zone.
- 6) Individuals entering the access-controlled area will be limited to the dose limits in Section VII of this plan. Each individual will be issued an appropriate personal dosimeter at the appropriate county Emergency Operations Center (EOC) prior to entry. They must be given a brief explanation of the hazards within the area and, if practical, escorted within the area by an emergency worker provided by ESF 10, CUCES, SCDA and/or FRMAC. CULPH will cooperate with appropriate responding agencies and would assist with any issues related to animal disease or disposal. ESF 10 will maintain permanent dosimeter records for the individuals entering access-controlled areas using the Radiation Exposure Record Form, Attachment A. Appropriate county EOCs must forward controlled- access dosimeter records for each individual entering the restricted area to ESF 10 Dose Assessment Center daily for review and storage.

4. Re-entry Phase Actions

- a. Coordinate emergency worker entry into restricted zones with local officials.
- b. Ensure that emergency workers receive an appropriate safety briefing, be provided dosimetry, KI, and protective clothing prior to entry into the relocation zone.
- c. Ensure that emergency workers receive radioprotective drugs and respiratory protection prior to entry into the relocation zone. This will be coordinated by ESF 10 and ESF 8.
- d. Working with federal assets, monitor relocation zone boundaries in order to detect the spread of contamination. Take required actions to prevent the spread of contamination.

- e. Estimate the total population dose received during the atmospheric release period following the accident.

5. Restoration Phase

- a. The period of time following a nuclear accident when actions are taken to reduce radiation levels so that previously implemented protective actions could be withdrawn is referred to as the restoration phase. It can last from several months to many years.
- b. Decontamination of affected areas will be accomplished during this phase. A decontamination plan will be utilized to direct restoration activities. It is a part of the overall recovery plan. Prior to its implementation, the plan must be approved by DHEC. A license will be issued upon approval of the decontamination plan.
- c. Exposures in the restoration phase can be both external and internal. External exposure would result from deposited radioactive materials, and internal exposure from re-suspended radioactive materials.
- d. After the relocation zone is established and areas of radiological contamination defined, the process of restoring it to unrestricted use can begin. During this phase, people may enter the zone for a number of reasons, including recovery operations, security patrol, operation of vital services, and retrieval of property.
- e. A detailed contamination survey will be performed within the zone. The radiation safety principle 'as low as reasonably achievable' (ALARA) precautions will apply whenever a contamination survey is to be performed.
- f. Survey results will form the basis for decontamination and the ultimate release for unrestricted use (return phase), or the long-term relocation of persons from the area, dwelling, and/or building. An area will be considered as exceeding return exposure guidelines if environmental monitoring results and/or laboratory analysis of radionuclides show that direct exposure and inhalation of re-suspended particles will result in a combined dose greater than 2 rem during the first year, 500 mrem during the second year, or an integrated 0-50 year dose in excess of 5 rem.
- g. Ingestion estimate summed with whole body external dose calculations will be used for estimation of first and second-year whole body and inhalation exposures, 0-50 year integrated dose, and skin beta dose conversion factors for a one year exposure. An environmental monitoring and sampling program will be established to verify the accuracy of the projections.

- h. During this phase, area residents and local workers may be allowed to briefly reenter the relocation zone under controlled conditions. Permission to enter the relocation zone will be obtained from the applicable county EOC. DHEC will make appropriate recommendations to affected counties regarding this type of entry. Entry by residents into the relocation zone will be through an Emergency Worker Center or a manned access control point. Contamination control team members will provide necessary briefings and dosimetry, as well as required exit monitoring.

6. Restoration Phase Actions:

DHEC is responsible for performing many tasks during the restoration phase. To the extent that DHEC resources are available, they will be used. When restoration actions exceed the capability of DHEC, outside assistance will be requested. The manager of DHEC or the Recovery Manager is responsible for providing oversight and coordination of these resources. The following tasks are the responsibility of DHEC, however, outside resources may assist with the performance of any or all of them.

- a. Provide guidance to the Recovery Committee regarding health physics, radiation safety, decontamination methods and materials, exposure limits, regulatory requirements associated with radioactive materials, and disposal of radionuclides.
- b. Review the recovery decontamination license conditions, as necessary, for its performance.
- c. Ensure that decontamination plan and license conditions are met.
- d. Determine areas, buildings, equipment, etc. that need to be decontaminated.
- e. Assure monitoring and decontamination (as necessary) of persons, vehicles, and equipment leaving the relocation zone.
- f. Assure decontamination of essential facilities and their access routes. Perform periodic contamination checks and decontaminate as needed.
- g. Require that radioactive waste be packaged, stored, shipped, and disposed of in accordance with applicable regulations. Inspect as necessary to ensure compliance.
- h. Perform post-decontamination surveys as appropriate. Use the results to determine if return phase exposure guidelines and decontamination plan requirements are met.

- i. Release areas, buildings, equipment, etc. to unrestricted use when DHEC and decontamination plan license requirements are met.
 - j. Recommend release of portions of the relocation zone to unrestricted use when return phase exposure guidelines and decontamination plan license requirements are met.
 - k. Advise county officials regarding the temporary return of area residents and local workers to relocation zone.
 - l. Monitor worker performance to assure compliance with radiation work permit requirements, exposure limits, and radiation safety.
 - m. Periodically monitor areas adjacent to restricted zones in order to determine the effectiveness of contamination control measures to the environment.
 - n. Establish a long term environmental sampling and monitoring program. Assure that monitoring points selected provide sufficient data to enable an accurate exposure mapping of affected areas to be performed.
 - o. Continue media center operations in order to assure that affected persons receive periodic information updates.
 - p. Coordinate actions with the Recovery Committee.
7. Return Phase
- a. Exposures in this phase can be both external and internal. External exposure would result from deposited radioactive materials, and internal exposure from re-suspended radioactive materials.
 - b. Return phase exposure guidelines express limits in terms of dose commitment. An area or building is considered to meet return exposure guidelines if environmental monitoring results and/or laboratory analysis of radionuclides show that direct exposure and inhalation of re-suspended particles during continuous occupancy will not result in a dose greater than 2 rem during the first year, 500 mrem during the second year, or a 50-year dose commitment in excess of 5 rem.
 - c. A comprehensive long-term monitoring program will determine actual environmental exposure levels. Results of the monitoring will be used to estimate exposure of occupants and verify dose projections. They may also provide the basis for additional protective actions.
 - d. Some areas or buildings may not meet return phase exposure guidelines for unrestricted occupancy. Should this occur, occupancy or use restrictions will be necessary.

8. Return Phase Actions

DHEC is responsible to assist with the return of persons to former relocation zone areas. To the extent that state resources are available, they will be used. Use of outside resources during this phase is anticipated. The DHEC Administrator or the Recovery Manager is responsible for providing oversight and coordination of these resources. While the following tasks are the responsibility of DHEC, outside resources may assist with the performance of any or all of them.

- a. Calculate first, second, and fifty year dose commitments for each building or area to be occupied. Use the calculated values to determine if area and/or building exposures are within return phase exposure guidelines. NOTE: Worker exposure calculations should take into account anticipated building or area occupancy factors. Such factors should not be applied to residential areas because there is reasonable means available for controlling the percentage of time that individuals may remain in their homes.
- b. Provide guidance to the Recovery Committee regarding the return of persons to former relocation zone areas. Recommend limitations as appropriate to meet return phase exposure guidelines.
- c. Ensure that use restrictions are posted in the relocation zone and other affected areas. Update restrictions when conditions change.
- d. Monitor areas adjacent to remaining relocation zones in order to determine if contamination is being spread beyond zone boundaries. Require decontamination as necessary to maintain exposures within return exposure guidelines and ALARA.
- e. Monitor occupied areas and buildings to verify dose projections and determine the need for additional protective action recommendations.
- f. Continue news center operations in order to assure that affected persons receive periodic information updates.
- g. Ensure that all return phase elements assigned to DHEC in the recovery plan and decontamination plan license are performed. Coordinate actions with the Recovery Committee.
- h. Relaxation of PADs will be recommended jointly by county, state, and federal agencies and authorized by the Governor, using the Recovery Committee as the vehicle to accomplish this action.
- i. Human services assistance and financial assistance for individuals and businesses will be conducted in accordance with the South Carolina Recovery Plan.

- j. Recommend appropriate mitigation measures to reduce or eliminate the effects of contamination.

9. Relocation Phase

- a. The period of time following a nuclear accident when it has been determined that further decontamination of certain buildings and/or areas is not possible or at the least impractical, is referred to as the relocation phase. This phase can last from several months to years.
- b. During this phase, area residents and local workers may be allowed to briefly reenter the relocation zone under controlled conditions to retrieve property. Permission to enter the relocation zones will be obtained from the applicable county EOC. DHEC will make appropriate recommendations to affected counties regarding this type of entry.
- c. Entry by residents and local workers into the relocation zone will be through manned access control points. Contamination control team members will provide necessary briefings and dosimetry, as well as required exit monitoring. Escorts may be provided as appropriate.
- d. Areas found to exceed return phase exposure guidelines will be maintained as relocation zone areas. Contaminated buildings will be handled on a case-by-case basis, with entry into the building(s) restricted. Periodic surveys of areas and buildings within the relocation zone will be performed, as both weathering and radioactive decay will reduce contamination levels. Access control will be removed when area and building exposure levels do not exceed return phase exposure guidelines.

10. Relocation Phase Actions

- a. When decontamination efforts fail to reduce exposure levels below the return phase exposure guidelines, short term or long term relocation may be required. To the extent that state resources are available, they will be used. Outside resources may be required to accomplish some required tasks.
- b. The Recovery Manager is responsible to provide oversight and coordination of DHEC and outside resources.
- c. Recommendations for restricted zones will be jointly developed by county, state, and federal agencies and authorized by the Governor.
- d. Human services assistance and financial assistance for individuals and businesses will be conducted in accordance with the South Carolina Emergency Recovery Plan.

- e. Advise county officials regarding the temporary return of area residents and local workers to relocation zone areas.
- f. Ensure that use restrictions are posted in affected areas. Update restrictions when conditions change.
- g. Ensure local residents and local workers are provided dosimetry and appropriate protective clothing (if necessary) when entering the relocation zone, and that all persons entering the zone receive a briefing on radiological conditions prior to entry. Escorts should be provided if available.
- h. Monitor persons, vehicles, and other items leaving the relocation zone. Ensure that appropriate decontamination is performed prior to release.
- i. Monitor relocation zone areas and buildings periodically in order to determine when access control is no longer warranted.
- j. Monitor areas adjacent to the relocation zone in order to determine if contamination has spread beyond zone boundaries. Require decontamination, as necessary, to maintain exposures in these areas within return exposure guidelines and ALARA.
- k. Continue news center operations in order to assure that affected persons receive periodic information updates.
- l. Ensure that all relocation-phase elements assigned to DHEC in the recovery plan are performed. Coordinate actions with the Recovery Committee.

11. Termination

Activities of the formal recovery organization may be terminated once the following conditions have been met.

- a. The relocation zone has been surveyed.
- b. Work under the decontamination plan has been completed to a point where continued effort does not appear to be cost effective.
- c. Long term exposures have been calculated for residences and places of employment where some significant potential for exposure continues to exist.
- d. Occupancy or use limitations have been posted for all buildings and areas where continued restrictions are necessary.

- e. Residents and workers have been afforded the opportunity to return to all areas for which restrictions have been lifted.
- f. Relocation to permanent or long term temporary facilities has been accomplished for those persons who could not be allowed to return following completion of work under the formal decontamination plan.
- g. Access control to the relocation zones may be a continuing requirement, and environmental monitoring activities are likely to continue for many years following a major release of radioactive materials. Periodically, as a result of weathering and radioactive decay, additional portions of the relocation zone will be eligible for release to unrestricted use. As this occurs, portions of the recovery organization may be temporarily reactivated on an as needed basis.

IV. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. SCEMD

SCEMD coordinates radiological emergency response operations to protect the public from the ingestion of contaminated food and water resulting from an NPP incident. SCEMD is a co-participant in the protective action decision-making process for human food, animal feed and water. SCEMD has the following IPZ related responsibilities:

1. Maintain a 24-hour notification system with the NPP, impacted counties, ESF 10, state radiological emergency response organizations, and federal agencies.
2. Based upon recommendations from ESF 10 that the ingestion impact of the emergency is likely to extend beyond the 10-mile EPZ, SCEMD will notify the impacted counties and request a limited activation of their EOCs for emergency management, public information, and rumor control purposes.
3. Inform the affected counties that the incident is likely to have an impact on individuals, local governments, human food, animal feed, and water in their counties and that state personnel will contact food producers, processors, and distributors in their counties to collect samples. Also, inform the counties periodically of the progress of the sampling process, the potential impact of the incident, and the protective actions that are being recommended.
4. In consultation with appropriate state agencies, adjacent states and federal agencies, where appropriate, develop and recommend protective actions and mitigation techniques, for humans, human food, livestock, poultry, animal feed, surface waters, public water supplies, fish and wildlife in the affected area and their periodic revision, throughout the term of the emergency.
5. In coordination with ESF 10, SCDA, CULPH, CUCES and DNR, jointly develop public information advisories to local governments concerning actions that they should take to protect the public in the affected area.

6. Coordinate the emergency printing and distribution of ingestion pathway public information brochures for the affected area.
7. Coordinate the development of ingestion-related information from state agencies for use at the JIC and media center. Provide ingestion status updates through JIC news statements and/or directly to county emergency management officials for distribution to the local media.
8. In conjunction with local, state, CULPH and federal agencies, coordinate the compilation of information on the physical and economic impact of the incident.
9. Work with federal, state, and local agencies to determine the time for final relaxation of PADs and other restrictions on the production, processing, distribution, and consumption of human food, animal feed, and water in the affected area and disseminate this information to the public.
10. Provide information, technical expertise and advocacy to support the request for a Federal Disaster Declaration as outlined in the SCRP. When a disaster is declared, implement Individual Assistance, Public Assistance and Hazard Mitigation Grant programs in accordance with the SCRP.
11. Provide coordination of short and long-term recovery priorities and needs assessments in counties with the South Carolina Recovery Task Force (SCRTF) as detailed in the SCRP.
12. Work with counties, American Nuclear Insurers, voluntary organizations, and state and federal agencies to leverage all assistance available to individuals as detailed in the SCRP.

B. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL (DHEC)

DHEC is the lead state agency for directing the assessment of the radiological impact of an NPP incident within the IPZ and is a co-participant in the protective action decision-making process for human food production, animal feed and water. ESF 10 has the following IPZ related responsibilities:

1. Coordinate radiological monitoring, sample collection and analysis dose assessment, and dose projection.
2. Coordinate state and federal accident assessment activities through the FRMAC when federal agencies arrive on the scene.
3. Based upon dose assessment results and initial PARs, jointly consult with SCDA, CUCES, CULPH, CURPSP, DNR, adjacent states and federal agencies, where appropriate, on the development and recommendation of protective actions for human food, livestock, poultry, animal feed, surface waters, public water supplies, fish, and wildlife in the affected area and their periodic revision

throughout the term of the emergency. Depending upon seasonal and other concerns, consider and if necessary, issue appropriate advisories regarding:

- a. Removing lactating dairy animals and livestock from pasture, sheltering them, and placing them on uncontaminated feed and water when an incident reaches the Site Area Emergency classification.
 - b. Holding and/or disposal of milk and perishable foods.
 - c. Covering open wells and water storage tanks and preventing their contamination from surface runoff.
 - d. Prohibiting the use of public water supplies.
 - e. Prohibiting immediate use of growing vegetables, field crops, and forage.
 - f. Prohibiting or limiting hunting and/or fishing.
 - g. Monitoring poultry (particularly egg-producers) if they are kept out-of-doors.
 - h. Washing, brushing, scrubbing, or peeling fruits and vegetables to remove surface contamination.
 - i. Recommending Nuclear Regulatory Commission (NRC) or utility disposal of highly contaminated produce, structures, soil, and other materials.
 - j. Coordinating, in conjunction with SCDA, **CURPSP** and CUCES, for long-term soil or agricultural management practices and CULPH for livestock-poultry issues.
 - k. Revising or relaxing of existing PADs.
4. Request through the State Emergency Operations Center (SEOC) that ESF 16 establish a traffic control plan for areas designated as evacuated, restricted, re-entry, and return zones.
 5. Identify the need for additional field monitoring, sample collection, and sample analysis resources. Request assistance from the FRMAC and/or other states and utilities. Coordinate all state/federal sampling activities.
 6. Develop and coordinate a sampling plan for collection, analysis, and evaluation of environmental samples.
 7. Maintain a DHEC Technical Liaison at any activated county EOC within the affected area.

8. With SCEMD, SCDA, CUCES and DNR, jointly develop instructions or advisories to local governments, businesses, and industries to protect the public in the affected area.
9. Coordinate and direct the periodic reading and evaluation of dosimeters used by IPZ field monitoring and sampling personnel in accordance with DHEC Radiological SOPs.
10. Assist SCEMD, SCDA, CULPH, **CURPSP** and CUCES staff with the development of ingestion related information for the JIC, the media, local officials, and the public. This information should focus on the public health impacts of ingestion contaminated food and any preventive or protective actions that ESF 10 has taken.
11. Respond to inquiries from decision makers relating to ingestion hazards.
12. Provide periodic briefings to the Governor, SCEMD Director, and SEOC staff on the status of the incident and offsite response efforts.
13. Assist with the development of information for public information officers and media contacts regarding DHEC's anticipated long-term responsibilities and response efforts.
14. Publish radiological impact data summaries and consult with other state and local agencies and public officials regarding re-entry and recovery concerns.
15. Work with the EPA and NRC to establish long-term monitoring systems to ensure public safety.
16. Work jointly with federal, state, and local agencies to identify the time for final relaxation of PADs and other restrictions on the production, processing, distribution, and consumption of human food, animal feed, and water in the affected area. Determine recovery, re-entry, return, and restricted areas through sample analysis and data collection.
17. Coordinate sample collection, processing, evaluation, and the public release of sampling data.
18. Request SCDA to evaluate, implement, and coordinate food control points in conjunction with traffic control points.

C. SOUTH CAROLINA DEPARTMENT OF AGRICULTURE (SCDA)

SCDA has a major support role in radiological emergency response operations to protect the public from the ingestion of contaminated food and is a co-participant in the protective action decision-making process for human food and animal feed. SCDA has the following IPZ related responsibilities:

1. Upon request of the ESF 10 Emergency Response Coordinator (ERC), provide DHEC and other state agencies with information about the IPZ needed to initiate ingestion-sampling activities. This information shall include the location of farmers markets and other food producers, food processors, and distributors.
2. At the request and direction of the ESF 10 ERC, activate sampling personnel to assist with sampling at specified locations within the IPZ. These activities will be coordinated with CUCES, CURPSP and CULPH when possible.
3. Participate in the accident assessment process by providing information on the condition of the human food, livestock-poultry and animal feed supply in the IPZ, the status of production (e.g., state of the growing season, crop maturation dates, perishability, impact of processing, supply of locally stored feed, access to and cost of outside feed sources, etc.) and the implications of short- and long-term protective actions on these. (This is a continuing process throughout the term of the emergency.)
4. For those areas of agency responsibility, monitor the implementation of PADs by state and local government agencies, agricultural, business, industrial, volunteer organizations, and the general public. Provide periodic briefings to the ESF 10 ERC.
5. If the emergency persists, work with appropriate federal agencies to identify outside sources of animal feed and assist local farmers with re-supply.
6. Assist ESF 10 and SCEMD with the development of ingestion related information for the JIC, the media, local officials and the public. This information should focus on PADs relating to human food or animal feed.
7. Work with ESF 10, CULPH, CURPSP and CUCES to provide periodic information on the status of the incident and offsite response efforts to state and federal elected officials who represent the affected area.
8. In conjunction with federal agencies and SCEMD, assist with the collection of information on the physical and economic impact of the incident.
9. Work jointly with federal, state, and local agencies to identify the time for final relaxation of PADs and other restrictions on the production, processing, distribution, and consumption of human food, animal feed, and water in the affected area.
10. Upon consultation with ESF 10, jointly recommend protective actions, such as the issuance of embargos, condemnations and destroy orders for agricultural products to the Governor as required.
11. Coordinate the establishing of food control points at or near traffic control points.
12. Continue to perform responsibilities identified in the SCEOP.

D. CLEMSON UNIVERSITY LIVESTOCK- POULTRY HEALTH (CULPH)

CULPH has a major role in radiological emergency response operations to protect the public from the ingestion of contaminated food and is a co-participant in the protective action decision making process for human food produced from animals and products of animals raised for food. CULPH has the following IPZ related responsibilities:

1. Upon request of the ESF 10 ERC, provide DHEC and other state agencies with information about the IPZ needed to initiate ingestion-sampling activities. This information shall include the location and type of all meat and livestock-poultry producers and processors.
2. At the request and direction of the ESF 10 ERC, activate sampling personnel, if available, to assist with sampling at specified locations within the IPZ beyond 10 miles of the NPP.
3. Participate in the accident assessment process by providing information on the condition of human food supply in the IPZ, the status of production (e.g., impact of processing, etc.) and the implications of short and long-term protective actions on these. (This assessment process continues throughout the term of the emergency.)
4. Upon consultation with ESF 10, jointly recommend protective actions, such as the issuance of embargoes, limiting the movement of animals and agricultural products out of the affected area, and condemnations and destroy orders for agricultural products to the Governor as required.
5. Assist ESF 10 and SCEMD with the development of ingestion related information for the JIC, media, local officials, and the public. This information should focus on PADs relating to animals raised for food and their products.
6. Work with ESF 10, CUCES, CURPSP and SCDA to provide periodic information of the status of the incident and offsite response efforts to state and federal elected officials who represent the affected area.
7. In conjunction with federal agencies and SCEMD, assist with the collection of information on the physical and economic impact of the incident.
8. Work jointly with federal, state, and local agencies to identify the time for final relaxation of PADs and other restrictions on the production, processing, distribution and consumption of animals raised for food and their products in the affected area.
9. Continue to perform responsibilities identified in the SCEOP.

E. CLEMSON UNIVERSITY COOPERATIVE EXTENSION SERVICE (CUCES)

CUCES has a support role in radiological emergency response operations to protect the public from the ingestion of contaminated food and is a co-participant in the protective action decision-making process for human food and animal feed. CUCES has the following IPZ related responsibilities:

1. Upon request of the ESF 10 ERC, provide DHEC and other state agencies with information about the IPZ needed to initiate ingestion-sampling activities. This information shall include the location of dairy farms and other food producers, food processors, and distributors.
2. At the request and direction of the ESF 10 ERC, activate sampling personnel to assist with sampling at specified locations within the IPZ beyond 10 miles of the NPP.
3. Participate in the accident assessment process by providing information on the condition of the human food and animal feed supply in the IPZ, the status of production (e.g., stage of the growing season, crop maturation dates, perishability, impact of processing, supply of locally stored feed, access to and cost of outside feed sources, etc.), and the implications of short- and long-term protective actions on these. (This is a continuing process throughout the term of the emergency.)
4. For those areas of agency responsibility, monitor the implementation of PADs by state and local government agencies, agricultural, business, industrial, volunteer organizations, and the general public. Provide periodic briefings to the ESF 10 ERC.
5. If the emergency persists, work with appropriate federal agencies to identify outside sources of animal feed and assist local farmers with re-supply.
6. Assist ESF 10 and SCEMD with the development of ingestion-related information for the JIC, the media, local officials, and the public. This information should focus on PADs relating to human food, animal feed, or farm animals.
7. Work with ESF 10 and SCDA to provide periodic information on the status of the incident and offsite response efforts to state and federal elected officials who represent the affected area.
8. In conjunction with federal agencies and SCEMD, assist with the collection of information on the physical and economic impact of the incident.
9. Work jointly with federal, state, and local agencies to identify the time for final relaxation of PADs and other restrictions on the production, processing, distribution, and consumption of human food, animal feed, and water in the affected area.
10. Continue to perform responsibilities identified in the SCEOP.

F. SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (DNR)

DNR has a major support role in radiological emergency response operations to protect the public from the ingestion of contaminated food and water and is a co-participant in the protective action decision making process for human food and water. DNR has the following IPZ related responsibilities.

1. Upon request of the ESF 10 ERC, provide DHEC and other state agencies with information about the IPZ needed to initiate ingestion-sampling activities, recreational surface waters, and recreational fishing, hunting, and wildlife areas.
2. At the request of the ESF 10 ERC, activate fish, game, and water sampling personnel, and assist with sampling at specified locations within the IPZ.
3. Participate in the accident assessment process by providing information on the condition of fishing, hunting, and wildlife in the IPZ (e.g., condition of current status of hunting and fishing restriction, wildlife activity or migratory patterns, etc.), and the implications of short- and long-term protective actions on these. (This assessment process continues throughout the term of the emergency.)
4. For those areas of agency responsibility, monitor the implementation of PADs by state and local government agencies, agricultural, business, industrial, and volunteer organizations, and the general public.
5. Assist SCEMD and ESF 10 with the development of ingestion related information for the JIC, the media, local officials, and the public. This information should focus on PADs relating to public water supply, fishing, hunting, and wildlife.
6. Work with SCEMD to provide periodic information on the status of the incident and offsite response efforts to state and federal elected officials who represent the affected area.
7. In conjunction with federal agencies and SCEMD, assist with the collection of information on the physical and economic impact of the incident.
8. Work jointly with federal, state, and local agencies to identify the time for final relaxation of PADs and other restrictions on hunting, fishing, and recreational water use.
9. Continue to perform responsibilities identified in the SCEOP.

G. SC LAW ENFORCEMENT DIVISION (SLED)

SLED has a major support role in radiological emergency response operations to protect the public from IPZ related exposures and is a co-participant in the protective action decision making process for IPZ related activities. SLED has the following IPZ related responsibility under ESF 13:

1. Coordination of general law enforcement activities, including but not limited to providing security of all evacuated areas, shelters and reception centers.
2. Continue to perform responsibilities identified in the SCEOP.

V. RADIOLOGICAL EXPOSURE CONTROL

A. General Principles

1. Radiological exposure control for the emergency phase is contained in Annex 6 of this plan.
2. Once the emergency phase has ended, radiological exposure controls are based upon occupational exposure standards, as listed below.
3. ESF 10 will make the determination that the emergency phase has ended and will notify the SEOC. Emergency workers will be notified of the transition to the intermediate phase and recovery phases through the SEOC.

B. DHEC Protective Action Guides

The PAGs for response during the intermediate and recovery phases of an incident are summarized in Table A. The PAG is expressed in terms of the sum of the Effective Dose Equivalent (EDE) from external radiation and the Committed Effective Dose Equivalent (CEDE) incurred from exposure and intake of radioactive materials. The sum of the EDE and the CEDE is the Total Effective Dose Equivalent (TEDE).

Table A Guidance on Dose Limits for the Intermediate and Recovery Phases of a Radioactive Release

Category	Guidance	Dose (rem)
Occupational Worker	Maximum acceptable annual dose for normal occupational exposure.	5
Emergency Worker	Maximum acceptable total accumulated dose for emergency workers during the intermediate and re-entry phase of a radioactive release.	0.5
General Public	Maximum acceptable annual dose for the general population from all sources except those due to routine (chronic), non-incident, exposure.	0.1

Administrative exposure limits for occupational and emergency workers are summarized in Table B. Individuals monitor their external dose using a direct or self-reading dosimeter. Limiting the external dose to these administrative limits provides reasonable assurance that after including the internal dose, the TEDE will not exceed the relevant dose limit.

Table B Administrative Exposure Limits for Occupational Workers, Emergency Workers, and the General Public.

Category	Guidance	Dose (R)
Occupational Worker	Maximum acceptable annual dose for normal occupational exposure.	4
Emergency Worker	Maximum acceptable total accumulated dose for emergency workers during the intermediate and re-entry phase of a radioactive release.	0.4
General Public	Maximum acceptable annual dose for the general population from all sources except those due to routine (chronic), non-incident, exposure.	0.08

RADIATION EXPOSURE RECORD

NAME _____

AGE _____

HOME ADDRESS _____

SOCIAL SECURITY NUMBER _____

AGENCY/ORGANIZATION NAME _____

DATE	DOSIMETRY SERIAL NUMBER	INITIAL READING	FINAL READING	TOTAL SHIFT EXPOSURE

DATE _____

TOTAL EXPOSURE _____

SIGNATURE _____

FORMS SHOULD BE COMPLETED AND TURNED INTO THE SUPERVISOR AT THE END OF THE SHIFT. THE COUNTY COORDINATOR WILL FORWARD THE FORMS TO STATE ESF 10 AT THE SEOC.

V AUTHORITIES AND REFERENCES

- A. SC Stat. Ann. Section 44-55-20, Definitions.
- B. SC Stat. Ann. Section 44-55-60, Commissioner to issue emergency order where imminent hazard to public health exists.
- C. SC Stat. Ann. Section 39-25-20, Definitions.
- D. SC Stat. Ann. Section 39-25-100, Food deemed adulterated.
- E. SC Stat. Ann. Section 39-25-60, Procedure for embargo and condemnation of adulterated or misbranded article; condemnation of poisonous perishable foods.
- F. SC Stat. Ann. Section 47-4-70, Quarantine of livestock or poultry; violation; penalty; segregation of animals; liens; abandoned animals.
- G. SC Stat. Ann. Section 47-4-80, Condemned and destroyed livestock or poultry; indemnification of owner.
- H. SC Stat. Ann. Section 47-4-90, Inspection of livestock in transport for proper documentation.
- I. SC Stat. Ann. Reg. Section 27-1012, Definition and authority for animal-poultry quarantines.
- J. SC Stat. Ann. Section 47-17-10 through 150, Inspection of meat production and processing.
- K. SC Stat. Ann. Section 47-19-10 through 180, Inspection of poultry production and processing.
- L. FEMA Guidance Memorandum IN-1, "The Ingestion Exposure Pathway."
- M. South Carolina Emergency Recovery Plan, September 2001, as amended.