RADIOLOGICAL/NUCLEAR INCIDENT EMERGENCY RESPONSE PLAN

JUNE 2011

TERRORISM AND OTHER INCIDENTS – Executive Summary

The Radiological/Nuclear Incident Emergency Response Plan identifies the actions to be taken by the state and local governments in preparing for, responding to, and recovering from a radiological/nuclear emergency. This plan is separate but concurrent with the State of Florida Comprehensive Emergency Management Plan (CEMP), Annex A, which covers events at nuclear power plants and during the launch of space vehicles carrying nuclear materials. This plan is concerned primarily with radiological/nuclear emergencies that may be accidental or man-made. It is specifically concerned with radiological dispersal devices, nuclear weapon detonations, and other radiological emergencies not encountered in CEMP, Annex A. This plan also establishes the planning and operational concepts involved in preparing for and responding to these radiological/nuclear emergencies. In addition, this plan refers to the State of Florida's Preventative Radiological/Nuclear Detection (PRND) initiative which is a program distinct from the response to the actual use of radiological/nuclear materials during a terrorism or other incident. The details of the implementation of these concepts are contained in state and county operational procedures.

The Division of Emergency Management, through the State Emergency Response Team, has overall responsibility for the coordination of a response to a radiological/nuclear emergency by federal, state, and local agencies. The Division of Emergency Management also has the overall authority and responsibility for updating and coordinating applicable plans with other response organizations.

The plan is divided into sixteen chapters and three attachments, as follows:

Chapter 1 - Purpose and Scope - provides a discussion of the purpose, scope, and planning assumptions on which this Plan was developed.

Chapter 2 - Organization and Responsibilities - identifies the various state, county, and federal response organizations and describes their responsibilities in the event of a radiological/nuclear emergency.

Chapter 3 Command and Control - describes the management of the emergency preparedness and response efforts at the state and county levels.

Chapter 4 - Emergency Classification System For Terrorism And Non Terrorism-Related Incidents Involving Radiological or Nuclear Materials - describes the four classes of emergencies and explains the general actions to be taken in response to each classification.

Chapter 5 - Notification and Activation - identifies the responsibilities and systems for alerting emergency personnel; activating emergency plans; obtaining assistance from other agencies; and warning the public.

Chapter 6 - Emergency Communications - describes the primary and backup in-place communications systems used by emergency responders and the appropriate state/local agencies.

Chapter 7 - Emergency Response Facilities and Equipment - identifies the state, local and emergency responder facilities and equipment that would be used to effectively manage a radiological/nuclear emergency.

Chapter 8 - Accident /Incident Assessment - establishes the procedures to be used during a radiological/nuclear emergency in order to assess the health and safety hazard to citizens. This chapter identifies the organizations responsible for assessing and recommending necessary protective actions. Also described is the federal assistance available to support state emergency operations and procedures for obtaining this assistance.

Chapter 9 - Public Information and Education - provides guidance for the timely and accurate collection, coordination, and dissemination of information to keep the public informed of potential hazards and emergency responses.

Chapter 10- Protective Response - provides guidelines for actions that can be taken to protect the public from significant releases of radioactive materials.

Chapter 11 - Radiological Exposure Control - establishes the means for controlling the radiological exposure of emergency workers and others.

Chapter 12 - Medical and Public Health Support - describes arrangements for emergency hospital and medical services and for transporting victims of radiological/nuclear emergencies to medical support facilities.

Chapter 13 - Recovery and Return Operations - outlines the general procedures to be used after a radiological/nuclear emergency has been brought under control to assure that persons are not allowed to return to a contaminated area until it is safe.

Chapter 14 - Exercises and Drills - outlines the requirements for periodic radiological/nuclear exercises and drills to evaluate the plan and the basic skills of emergency response personnel.

Chapter 15 - Radiological Emergency Response Training - provides assurances that emergency personnel are adequately trained to respond to a radiological/nuclear emergency.

Chapter 16 – Hospital Radiological Emergency Response Plan Template - provides a template for hospitals to develop their own radiological/nuclear emergency response plan.

Attachment A – Definitions

Attachment B- FAQ's

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Chapter 1 – Purpose and Scope

I. Purpose and Scope

This plan addresses the ability of the state and local governments to prepare for and respond to radiological/nuclear emergencies and defines responsibilities of state and local governments with regard to the Emergency Support Function approach to resources and operations.

II. Assumptions

Radiological/nuclear emergencies can be postulated as ranging from a minor emergency with no incident site effects to a major emergency that may result in an incident site release of radioactive materials. This may include terrorism acts associated with nuclear power plants, nuclear weapons detonations, radiological dispersal devices (RDD), radiation exposure devices (RED), various radiological accidents including those associated with transportation of radioactive materials, and incidents associated with industries using radioactive materials including hospitals, commercial food irradiators, and similar operations.

The overall objective of radiological/nuclear emergency response planning and preparedness is to minimize radiation exposure from a spectrum of emergencies that could produce incident site radiation doses in excess of protective action guides established by the Environmental Protection Agency. Minimizing radiation exposure will reduce the consequences of an emergency to persons in the area.

No specific emergency sequence can be isolated as the model for which to plan because each emergency could have different consequences, both in nature and degree. As an alternative to defining a specific emergency, this Annex identifies various parameters for planning, which are based upon knowledge of the possible consequences, timing, and release characteristics of a spectrum of emergencies. This plan will establish the appropriate response for each emergency class. Table 1 lists potential types of radiological/nuclear emergencies covered by this plan or refers to other appendices for those specific instances.

Table 1. List of Potential Types of Radiological/Nuclear Emergencies

- Nuclear Weapon Detonation
  - accidental
  - deliberate (terrorism) (Improvised Nuclear Device-IND)

- Nuclear Reactor
  - accident (see FLCEMP Annex A)

▪ hostile action such as crashing an airplane into the containment building or destruction/denial of plant safety equipment

- Radiological Material Dispersal
  ▪ accident such as a transportation mishap
  ▪ radiological dispersal device (RDD) “dirty bomb” (terrorism)
  ▪ radioactive material release/dispersal (non-explosive)

- Transportation of Radioactive Material
  ▪ accident (road/rail/air incident)
  ▪ sabotage (terrorism)

- Hospital
  ▪ teletherapy source stolen/lost
  ▪ brachytherapy source stolen/lost
  ▪ nuclear medicine materials stolen/lost

- Laboratory
  ▪ research incident/release
  ▪ referral lab for analysis of incident
  ▪ criticality incident

- Food/Materiel Irradiation Facility
  ▪ source stolen and dispersed
  ▪ exploded on-site

- Nuclear Fuel Reprocessing Facility
  ▪ stolen reactor fuel
  ▪ explosion (terrorism)
  ▪ explosion (criticality incident)

- Industrial Radiography Sources
  ▪ stolen
  ▪ lost

- Launch of Space Vehicle
  ▪ explosion at launch (see FLCEMP Annex A)
  ▪ reentry accident

- Military Use of Radioactive Materials
  ▪ accidents
  ▪ stolen

- Radiation Exposure Device (RED)
  - placed in uncontrolled location

A nuclear weapon detonation, either accidental or related to terrorism, would invoke an almost immediate federal government response due to the significant national and internationl ramifications of such an incident. The state and local authorities would initially guide response that may be quickly overwhelmed by the enormity of the situation and would soon be augmented by federal resources as they become available.

Radioactive material dispersion, either accidental or secondary to terrorist activity, will involve a local response initially with state backup and eventual federal response, especially if terrorism-related.

Hospitals and other organizations with radioactive materials will notify appropriate state and local authorities of accidents, loss, or theft of these materials.

Separate and distinct but aligned to a certain extent due to common staffing, is the Preventative Radiological/Nuclear Detection (PRND) initiative in Florida. The prevention of a radiological/nuclear incident is a primary concern for law enforcement and to a lesser extent health. Florida's PRND initiative has primarily concerned itself with motor vehicle, water-borne, and special event operations.

III. Emergency Operation Zones (EOZ)

Emergency Operation Zones are defined as the areas in which emergency action is needed to assure that prompt and effective interventions can be taken to protect the public in the event of a radiological/nuclear emergency. This term can be used as described in Annex A, pages 1-2, for nuclear power plant events (Emergency Planning Zone). The EOZ is a flexible term that can be used to describe the operational zone that is developed around a radiological/nuclear incident of any type. In a particular emergency, protective actions might well be restricted to a small part of the emergency operation zone. Although the radius of the emergency operation zone implies a circular area, the actual shape would depend on the type of incident that occurred as well as local conditions such as topography, land use characteristics, access routes, jurisdictional boundaries, and meteorological conditions.

NCRP 165 and "Planning Guidance for Response to a Nuclear Detonation" introduce concepts including severe damage zone, moderate damage zone, light damage zone, and dangerous fallout zone that should be used in developing operational protocols for responding to radiological/nuclear emergencies in order to be consistent with federal partner use of terminology and operational zone criteria.

A. Plume Exposure Pathway

For nuclear explosions, the plume would extend a great distance depending on the yield of the weapon and the prevailing weather conditions. The plume in a radiological

dispersal device would essentially be local to the site of the incident. However, if an explosive device is utilized for the dispersal of radioactive material, the plume may be somewhat more widespread depending on the characteristics of the explosive material, the amount and activity of radioactive material initially present, and the prevailing weather conditions.

The principal radiation exposure sources (other than the prompt radiation from the nuclear detonation) are direct external exposure to particulate and electromagnetic radiation from the plume and deposited material (e.g., ground shine) as well as internal exposure resulting from the inhalation/ingestion of radioactive material from the plume. Appropriate response actions will be determined by the ability to best reduce potential exposure under the specific conditions occurring during the radiological/nuclear emergency.

B. Ingestion Pathway (Emergency Operation) Zone (IPZ)

Annex A, page 1-2, describes an Ingestion Pathway Zone of 50 miles associated with a nuclear power plant accident. From a nuclear weapon detonation, depending on the construction and yield of the weapon as well as weather patterns, the Ingestion Pathway Zone could extend for hundreds of miles from ground zero. Smaller distances for the IPZ radius would be involved for radiological dispersal incidents depending on whether explosives were utilized.

The principal exposure source from this pathway would be from the ingestion of contaminated water or foods such as milk, fresh vegetables, or aquatic food stuffs. For this pathway, the planning effort involves the identification of potentially hazardous, radiologically contaminated food and water. Following identification, control measures will be used to minimize the danger to the public.

C. Ground Zero

This is the roughly circular region surrounding the location of a nuclear weapon/radiological dispersal device (RDD) detonation. The radius of radioactivity at ground zero will depend on the yield of the nuclear weapon used or the amount of explosive, the presence of buildings or other obstructions, and quantity and type of radionuclide used in the RDD. The Handbook for Responding to a Radiological Dispersal Device provides valuable information for emergency responders in dealing with an RDD.

From a nuclear weapon detonation, the principal exposure sources will be the direct blast, primary and secondary thermal effects, direct gamma/neutron/visible photonic radiation, and alpha and beta radiation found contaminating material/structures as well as from fallout. Similarly, blast effects and particulate radionuclides would be present after an explosive RDD incident.

NCRP Report # 165, “Key Response Planning Factors for the Aftermath of Nuclear Terrorism”, and “Planning Guidance for Response to a Nuclear Detonation” are excellent

publications detailing preparedness and response activities associated with a nuclear detonation.

IV. References

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- NCRP Report no. 165. Responding to Radiological and Nuclear Terrorism: A Guide for Decision makers. 2010. Available for purchase from: http://www.ncrppublications.org/Reports/

- U.S. EPA. Protective Action Guides. Available at website: http://www.epa.gov/rpdweb00/rert/pags.html

- State of Florida Preventative Radiological Nuclear Detection (PRND) Concept of Operations.

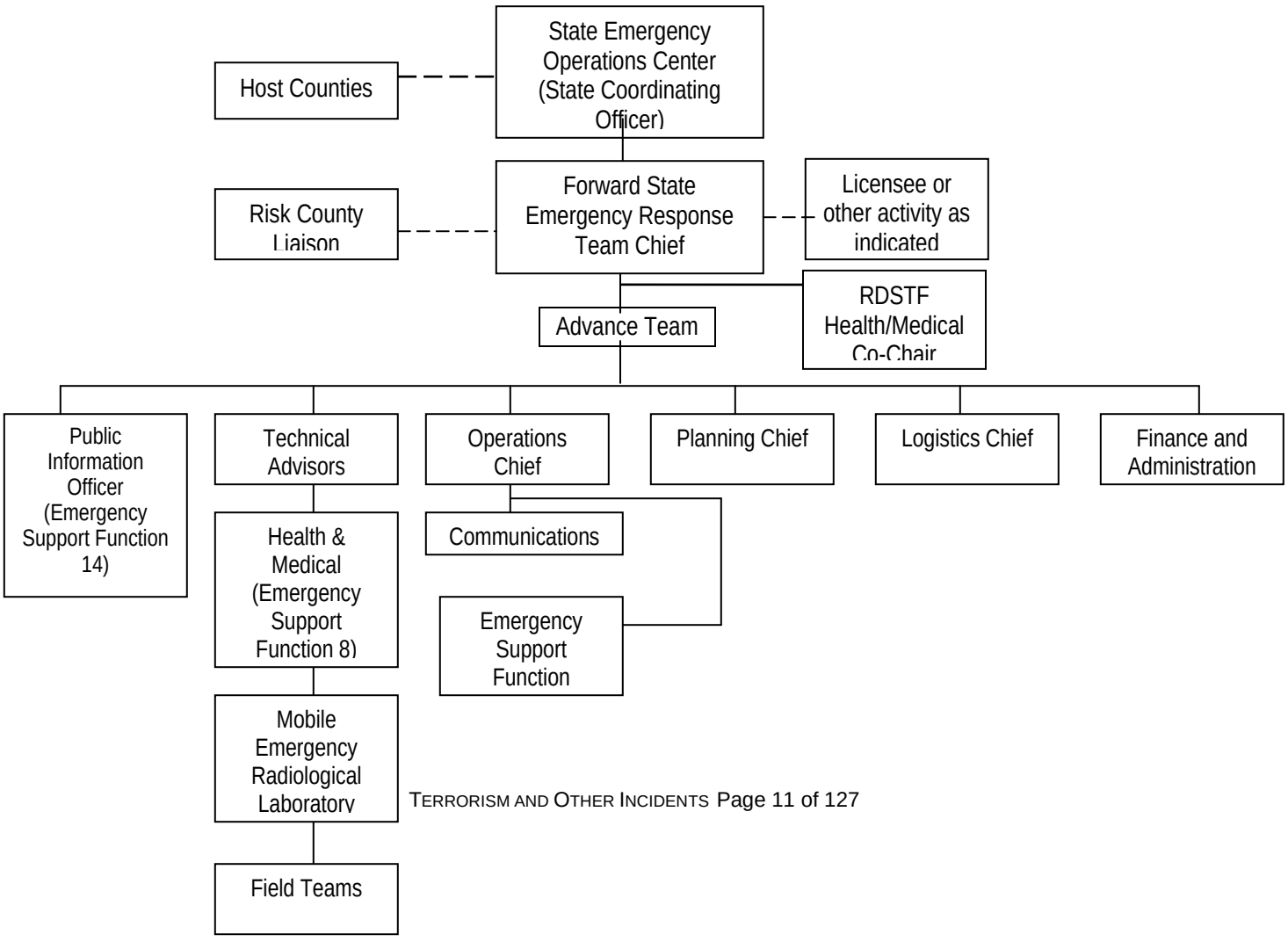
Chapter 2 - Organization and Responsibilities

I. General

The organizational structure that the State of Florida will use in response to an all-hazards radiological/nuclear emergency is described in Section IV (Concept of Operations) of the State Comprehensive Emergency Management Plan. The State Emergency Response Team will operate from the State Emergency Operations Center in Tallahassee led by the Governor's appointed State Coordinating Officer, usually the Director of the Division of Emergency Management

This chapter of TERRORISM AND OTHER INCIDENTS specifically describes the operational concepts and organization to be used in the management of a response to a nuclear weapon detonation, a radiological dispersal device involving a terrorist incident, or other significant incident where radiological/nuclear materials could be dispersed. Figure 2.1 provides a schematic of the organizational response to an all hazards radiological/nuclear emergency.

Figure 2-1: State of Florida Forward State Emergency Response Team Organizational Chart for an All-Hazards Radiological/Nuclear Emergency



TERRORISM AND OTHER INCIDENTS is operationally consistent with the requirements of the National Incident Management System (NIMS). The National Incident Management System provides a consistent nationwide approach for federal, state, local governments, and other organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size or complexity. In addition, this Plan integrates with Annex B, The State of Florida Terrorism Incident Response Annex, of the State of Florida Comprehensive Emergency Management Plan.

The Concept of Operations (ConOps) in the State of Florida Preventative Radiological/Nuclear Detection (PRND) Implementation Strategy describes preventive actions in response to possible threats to motor vehicles, waterborne activities, and special events in our state. The ConOps explains the general scope of local, state, and federal activities for these PRND scenarios.

II. State Emergency Response Team

The State Emergency Response Team is comprised of Emergency Coordinating Officers who represent different state agencies and several voluntary organizations, and who are empowered to deploy the resources of their agency or organization to carry out missions that are assigned by function. The State Emergency Response Team is organized into 18 functional groups called Emergency Support Functions. Each emergency support function is comprised of a "primary" or lead agency and several support agencies.

Key to an understanding of the response roles is that counties affected by an emergency are responsible for directing the initial response to any emergency situation. These counties will coordinate and direct such actions through their emergency management organizations and other county emergency response agencies.

For a complete listing of the 18 Emergency Support Functions, see Section IV. A, of the State of Florida Comprehensive Emergency Management Plan. The primary emergency support functions and primary agencies that will be involved with a radiological/nuclear emergency disaster are:

A. Emergency Support Function 8 - Health and Medical

1. Department of Health (DOH), County Health Departments (CHD)

During any radiological/nuclear response, the County Health Departments (CHD) will be working to support their emergency management partners and the Florida Department of Health, Bureau of Radiation Control, which is the primary radiological

emergency response agency for assessment of health hazards from radiation emergencies, regardless of their severity. The basic support functions of the CHD's include:

- Provide overall coordination of interagency public health and medical services
- Advise, consult, and cooperate with other public agencies, affected groups and others on matters of health and safety including radiological/nuclear emergencies.
- Respond, as appropriate, to any emergency that involves possible or actual release of radiological/nuclear materials in order to protect health, safety, and property.
- Support Emergency Support Function 6 (Mass Care) in the coordination of overall reception and care responsibilities.
- Support local and state PRND activities, as necessary.

In addition the following actions, subdivided by approximate phases of a radiological/nuclear incident of any type, are specific parts of the CHD response plan:

Emergency (Early) Phase

Duration: Hours-Days

Description: Incident begins; source out of control; conditions likely worsening; ability to assess radiological conditions limited but federal and border states assets will be requested.

- Support the incident response effort in the EOC (ESF 8) or as requested by the incident commander.
- Coordinate with emergency management access to local medical and health services (and transport services, i.e., EMS) for victims and concerned citizens of radiological/nuclear emergencies.
- Assist in the distribution of radiation countermeasures, including potassium iodide, to emergency responders and/or the public, based on isotopic determination by the Bureau of Radiation Control and on the advice of the DOH BRC Operations Officer, and under the direction of the State Surgeon General or other appropriately licensed physician. .

- Support efforts such that contaminated response personnel are processed prior to being relieved from duty. The Bureau of Radiation Control will assist in providing personnel and equipment; however, medical centers with diagnostic radiology, radiation therapy, or nuclear medicine departments may already have equipment and personnel to assist in that process, if previously trained and exercised to perform this function.

- Support efforts such that all contaminated tools, clothing, equipment and other material that cannot be decontaminated are placed in plastic bags, tagged and placed in suitable containers for later disposition.

- Assist in environmental sampling as the DOH Bureau of Radiation Control directs, especially providing additional staff (Environmental Health Strike Teams), as available.

- Coordinate with Emergency Management to ensure Special Needs/vulnerable population shelters and supplies used during a radiological/nuclear incident are functional.

- Through the EOC and with appropriate training, be familiar with the public health criteria for entry and exit from exposure zones, as well as operations in any contaminated area, so that the public's questions can be answered.

- Be prepared to refer questions on the contamination and control of exposed/contaminated individuals to the relevant DOH Bureau of Radiation Control Standard Operating Procedures or other documents.

- Make contact with, and work within the protocols of any Federal Radiological Monitoring and Assessment Center (FRMAC) that may be established.

- Following the Guidelines in NCRP 161 or REAC/TS (Radiation Emergency Assistance Center/Training Site) treatment protocols—and only as surge capacity for REAC/TS—provide relevant treatment advice (if technically qualified) to physicians at medical facilities or community reception centers for medical treatment because of exposure to radiation or contamination with radioactive material.

- Provide impact assessment guidance regarding the public health effects of the incident when provided appropriate information on the specifics of the incident.

- Assist the Department of Children and Families or other agency in implementing behavioral health evaluations of the population affected by the incident.

- In coordination with the DOH BRC, the DOH Bureau of Laboratories, and federal radiological partners, create and monitor partnerships to ensure adequate laboratory response for processing of human biological specimens.

- Work with Emergency Management in coordination with the DOH BRC and DOH Office of Communications in preparing and relaying public health risk communications messages.

- Ensure that radiation exposed and/or radioactively contaminated team members are assessed and referred for treatment, with DOH BRC input, as appropriate.

- Through the EOC, and in coordination with the DOH, deploy the Strategic National Stockpile (SNS), as needed, to deal with radiological effects.

- Assist, as directed, in implementing Protective Action Guidelines.

- Coordinate any decontamination issues with the DOH BRC.

- Open, staff and run, in coordination with local emergency management as necessary, community reception centers (CRCs) for the monitoring of the public for radioactive contamination following a nuclear or radiological event. Models for the operation of the community reception centers are available from the Centers for Disease Control and Prevention. Environmental Health Strike Team members and Medical Reserve Corps Radiation Response Volunteer Corps staffing will be used to supplement county health department staffing for the operation of these centers.

- Implement locally (using pre-developed Centers for Disease Control and Prevention or other software) and provide tracking for a public exposure registry (population monitoring) complete with names, addresses, location and times in the exposure area-in coordination with the DOH BRC and other agencies potentially including the Nuclear Regulatory Commission, the Department of Energy, the Department of Defense, the Department of Homeland Security, the Department of Health and Human Services, the CDC, and others, as appropriate.

Intermediate Phase

Duration: Weeks-to months while protective actions are needed

Description: Sources & environmental releases under control; reliable environmental measurements available; may overlap emergency and recovery phases; ends when protective actions are no longer necessary.

- Radiologically contaminated food inspections will be conducted by the DOH BRC in conjunction with CHD environmental health inspectors and other state and federal agencies. Be familiar with current restrictions put in place by the Florida Department of Agriculture and Consumer Services in order to answer the public's questions.

- Continue to be informed on any updated Protective Action Guidelines to answer the public's questions.

- Continue and formalize treatment tracking for affected persons, insofar as is necessary and possible.

- Assist in monitoring responder's health, as required, secondary to a radiation exposure, if provided appropriate authority, resources, and training.

- Continue to operate CRCs as necessary

- Maintain the public exposure registry (population monitoring) in coordination with the DOH BRC and CDC.

- Perform all standard public health functions (disease control, medical support, etc.), as feasible, including staff assisting with radiological and behavioral health concerns, as possible.

Recovery (Late) Phase

Duration: Months-to Years

Description: Cleanup of environmental radiation; reduction of radiation in the environment.

- Long-term monitoring of the public health concerns of the population.

- Continue to be informed on status of cleanup and projected long term environmental impacts to be able to answer the public's questions.

2. Department of Health, Bureau of Radiation Control

The Department of Health, Bureau of Radiation Control is the primary radiological emergency agency for assessment of environment and health hazards during radiological emergencies, regardless of their severity. The agency is assigned this responsibility in Chapter 404, Florida Statutes. Among the services performed will be offsite monitoring, the collection and analysis of samples by the BRC field teams according to established operating procedures, evaluation of the extent of radiological contamination of the affected area, recommending protective actions for persons living inside the emergency operation zone (size of zone determined by the incident), and laboratory analysis of air, water and food samples from the ingestion pathway zone (size of zone determined by the incident, if any). Should the BRC need monitoring and

laboratory assistance, the Resources Coordinator will request the Division of Emergency Management to obtain federal assistance through the Department of Energy, Savannah River Operations. Also, assistance may be requested from other states through the Southern Mutual Radiation Assistance Plan and other mutual assistance compacts.

The BRC is the radiological technical leader of PRND activities in association with various state and federal agencies including the Florida Department of Transportation (DOT), and the U.S. Department of Energy.

Responsibilities of the Department of Health, Bureau of Radiation Control:

- Provide technical consultation and support to the Governor, the Division of Emergency Management, local governments, and CHDs regarding radiation and radiological health (e.g., determine levels of radiation, health hazards, and need for radiological decontamination) as the principal radiological assessment agency.
- Manage stocks of potassium iodide (KI) and assist the DOH State Pharmacy and DOH Division of Emergency Medical Operations in managing other potentially useful radiation countermeasures.
- Provide dosimetry equipment for emergency responders.
- Coordinate the distribution of radiological data to state and county response organizations.
- Determine the severity of radiological/nuclear emergencies when an actual release of radioactive materials occurs and make recommendations as the primary radiological assessment agency to the Governor, the State Coordinating Officer, and the emergency managers of Risk Counties on protective actions to be taken based on a technical analysis of the situation.
- Respond to all radiological/nuclear emergency situations by proceeding to the incident site and deploying the Mobile Emergency Radiological Lab (MERL).
- Maintain liaison with State agencies, local governments, nuclear power plants (NPP), and other users of radiological materials for planning and operational purposes.
- Provide criteria and technical support for the decision to relax protective actions and allow for recovery and reentry into the affected area.
- Collect samples from public and surface water supplies for radiological analysis in the event a radiological release occurs.
- Coordinate with the Department of Environmental Protection in collecting and analyzing air and water samples for radiological contamination.
- Provide staffing and equipment for special events PRND missions and the missions of other agencies, as feasible.

3. Department of Health, State Surgeon General

- Coordinate planning and operational support for the decision to relax protective actions and allow for recovery and reentry into the affected area.
- Assist in preparing and maintaining a list of medical facilities which have the capability to treat radiologically-contaminated individuals
- Develop a policy for the use and distribution of potassium iodide and other radiation countermeasures based on guidance from NCRP 161.

4. Department of Agriculture and Consumer Services, Commissioner

- Determine the needs of the agricultural industry in the state, as guided by the Department of Health recommendations, and make appropriate recommendations to the Governor and the State Coordinating Officer during a radiological/nuclear emergency.
- Declare an agricultural emergency with guidance from the Department of Health when a radiological/nuclear hazard is detected.
- In consultation with the Division of Emergency Management and the Florida Department of Health, draft and promulgate agricultural procedures that will be effective during a nuclear power plant and other types of radiological/nuclear emergencies.

5. Department of Agriculture and Consumer Service, Division Of Agricultural Environmental Services

- Coordinate with and assist the Department of Health in obtaining samples of animal food and water for radiological testing.
- With the augmentation of and in coordination with other state and local law enforcement agencies, establish and operate agricultural checkpoints to prevent the distribution of foods that are not fit for consumption.
- In coordination with the Department of Health, Bureau of Radiation Control, embargo and dispose of foods which are not fit for consumption.
- Other tasks, as required.

6. Department of Agriculture and Consumer Service, Division of Dairy Industry

- In coordination with the Department of Health, inspect dairy farms to enforce provisions of Chapter 502, Florida Statutes, as authorized.

- In coordination with the Department of Health, inspect milk plants, milk product plants, and plants engaged in the manufacture and distribution of frozen desserts and dessert mixes and enforce those provisions of Chapters 502 and 503, Florida Statutes.
- In coordination with the Department of Health, collect, test and analyze samples of milk, milk products, frozen desserts and frozen dessert mixes, and enforce those provisions of Chapters 502 and 503, Florida Statutes.
- Control and prevent distribution of contaminated milk and associated products during a radiological/nuclear emergency.

7. Department of Agriculture and Consumer Service, Divisions of Fruit and Vegetable Inspection

- Carry out technical duties prescribed under the arsenical spray provisions of Chapter 601, Florida Statutes, and such other technical duties as may be prescribed by the Department.
- Coordinate with the Department of Health and provide samples, as necessary, to determine the degree of radiological contamination of food products.
- In coordination with the DOH Bureau of Radiation Control, embargo and dispose of foods which are not fit for human consumption.
- Provide a Department of Agriculture and Consumer Service liaison to all affected county emergency operations centers. It will be the duty of the liaison personnel to ensure information flow between the Department of Agriculture and Consumer Service personnel in the State Emergency Operation Center and field personnel involved in recovery operations, and to assist in the resolution of problems arising within the Department of Agriculture and Consumer Service emergency operations. While other counties may be affected, it is felt that these emergency operation centers will most likely be in operation.

8. Department of Agriculture and Consumer Service, Division of Food Safety

- Coordinate with the County Health Department to determine minimal food and water sampling required for analysis.
- Other tasks, as required.

9. Department of Agriculture and Consumer Service, Division of Forestry

- Assist the Division of Fruit and Vegetables in providing liaison and communications to county emergency operations centers.

- Through an intergovernmental agreement with the Department of Health, provide aircraft and pilots for radiation surveys, and transportation of emergency personnel and environmental samples.
- Provide other assistance, as necessary.

10. Department of Environmental Protection, Division of Waste Management, Bureau of Waste Clean-up

- Cooperate with the Department of Health in conducting chemical analysis of water samples taken from public water supplies.
- Restrict consumption of surface water supplies in the event of a release of significant concentrations of radioactive material into those supplies.
- Coordinate with other state and county agencies to provide safe water supplies at population reception shelter facilities.

B. Emergency Support Function 16 – Law Enforcement and Security

1. Florida Department of Law Enforcement

- Coordinate, integrate, and implement law enforcement planning and activities for the use of mutual aid and state resources.
- Maintain a list of special law enforcement equipment, specially trained personnel, and all regular, auxiliary, and reserve law enforcement personnel and equipment within the state.
- Coordinate the organizations and direction of the law enforcement services of the Florida Mutual Aid Plan.
- Maintain liaison with state law enforcement agencies in order to coordinate and integrate plans for traffic control and the participation of the agencies in law enforcement emergency operations.
- Maintain liaison with the Governor, state departments and agencies, and local law enforcement officials in order to achieve close coordination and cooperation in planning and operations in trouble areas.
- Facilitate the flow of law enforcement information from state organizations to local law enforcement officials.
- Coordinate planning response with Regional Domestic Security Task Force Public Health & Medical co-chairs in the seven FDLE regions.
- Assist PRND activities, as needed, in this state.
- Deploys the Florida National Guard for security issues
- Under the direction of the Governor, activate the Florida National Guard to aid the law enforcement authorities whenever the civil authorities are unable to

contain the emergency.

2. Department of Highway Safety and Motor Vehicles, Division of Highway Patrol

- Assist other law enforcement agencies in the movement of traffic during a radiological emergency, as required.
- Assist other law enforcement agencies in the state in policing the disaster area.
- Provide security and assist in staffing roadblocks to support county personnel who are involved in radiological emergency response operations.
- Provide communications assistance, as required.
- Upon request, assist in the transportation of samples for analysis when necessary.
- Support county law enforcement officials, and other law enforcement agencies, with security.
- Provide communications assistance, as required.
- Provide staff for PRND missions, as necessary.
- Provide early detection of radiological incidents and identification of radioactive material during incidents in areas of the state where hazardous materials transit times are long.
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3. Fish and Wildlife Conservation Commission

- Conduct warning and evacuation of shallow waterways in and around nuclear power plants or other facilities or sites during radiological/nuclear emergency operations.
- Coordinate patrol activities with county and state law enforcement officials.
- Cooperate with the Department of Health in collection of biota samples, as required.
- Conduct warning and evacuation in deep waterways and around nuclear power plants or other facilities or sites during radiological/nuclear emergency situations.
- Support the Florida Highway Patrol, county law enforcement officials, and other law enforcement agencies with security.
- Provide communications assistance, as required.
- Provide staff and equipment for PRND missions, as needed.

4. Florida Department of Environmental Protection, Division of Law

Enforcement

- Conduct warning and evacuation in state parks and recreation areas around nuclear power plants during radiological/nuclear emergency operations.
- Provide communications assistance, as required.
- Lead for the Emergency Response Team which can assist with detection and decontamination in a defensive nature. They are not trained to enter radiologically contaminated sites.

5. Florida Department of Agriculture and Consumer Services, Division of Law Enforcement

- Cooperate with the Department of Health in collection of biota samples, as required.
- Provide assistance with the enforcement of embargo orders.

C. Emergency Support Functions 1 and 3 Transportation and Public Works

1. Department of Transportation

- Coordinate activities between public and private agencies on matters relating to public transit.
- Provide public transportation services where emergency services are required.
- Support county highways/road departments in securing and installing barricades, signs, and other necessary equipment needed for traffic control.
- Support traffic management activities in and around the affected areas.
- Support movement of emergency resources to and from the designated area.

D. Emergency Support Function 13 - Military Support

1. Department of Military Affairs- Florida National Guard

- Under the direction of the Governor, activate the Florida National Guard to aid the civil authorities whenever the civil authorities are unable to contain the emergency.
- Support state agencies and local governments on a mission type basis during a radiological/nuclear emergency operation.
- Activate 44th and 48th Civil Support Teams (CST) to assist in response to all weapons of mass destruction incidents.

E. Emergency Support Function 6 - Mass Care

1. Florida Department of Business and Professional Regulation

- Ensure the coordination of sheltering activities.
- Ensure the coordination, establishment, and operation of mass feeding in impact areas, to include: mobile feeding routes, fixed feeding sites, base camps, and comfort stations.

III Risk Counties

Risk counties are those counties with nuclear facilities such as nuclear power plants (see The State of Florida Comprehensive Emergency Management Plan: Annex A (Chapter 2) but also include counties with significant placements of radioactive materials. Because a terrorist incident involving radioactive materials could occur in any county in Florida, and using this expanded definition, essentially any county could become a risk county.

IV. Host Counties

Host counties are those counties adjacent to risk counties that would be used to assist if a radiological emergency occurred in that risk county. Because a terrorist incident involving radioactive materials could occur in any county in Florida, and using this expanded definition, essentially any county could become a host county. Host counties may have to:

A. Prepare procedures to receive and shelter evacuees from Risk counties with assistance from the state Emergency Support Functions 6 and 8.

B. Provide for monitoring and decontamination of evacuees from Risk counties at community reception centers and/or shelter locations.

C. Provide emergency medical services for evacuees.

D. Provide security for evacuees.

E. Provide and obtain current information reports from the State Emergency Operations Center.

F. Provide for the dissemination of information to evacuees regarding recovery and reentry.

G. Ensure for the distribution of radiation countermeasures, as needed and necessary.

V. Ingestion Pathway Counties

Ingestion pathway counties are any county down wind of a significant release of radioactive material into the atmosphere.

Ingestion pathway counties would provide county resources to assist applicable state Emergency Support Functions in the implementation of their responsibilities, and support the collection, monitoring and control of potentially contaminated food and other ingestible products associated with NPP, nuclear weapon, or other significant incidents involving the release of radiological/nuclear materials.

VI. Federal Organizations and Responsibilities

Federal assistance provided to state and local governments in response to and recovery from a radiological/nuclear incident will follow guidelines as established in the Nuclear/Radiological Incident Annex to the National Response Framework (NRF).

In general, the response to a radiological/nuclear incident or event is the responsibility of:

1) the appropriate utility if the release is from a nuclear power plant and is confined within the site boundaries of the plant;

2) local government; or,

3) the state if capability of the local government is overwhelmed and an emergency declaration has been signed by the Governor.

The exceptions are if there is contamination resulting from a space launch, a nuclear weapon has been detonated, or the capabilities of the state and local government can no longer handle the incident. The federal government has the right to declare an area (no matter where it is in the continental U.S.) a "national security area". Once this is done, they are responsible for the quarantine and security of the area.

In the event of terrorist use of a radiological/nuclear material, it becomes a federal response for the law enforcement part, headed by the Department of Justice, with the FBI in charge of the investigation.

The federal government will never be "in charge" of the response. Rather, a unified command will make decisions that reflect the nature of the incident, the needs of the affected community, and the requirements for public health and safety.

The Nuclear/Radiological Incident Annex of the NRF defines the coordinating federal agency (CFA) for radiological/nuclear incidents and events. No matter which federal agency is the CFA, the Department of Energy (DOE) provides the Federal Radiological Monitoring and Assistance Center (FRMAC) and the Consequence Management Home Team. The FRMAC divides their response in phases: 1) consequence management home team; and, 2) consequence management response team phase I, II, and III. Each phase brings more assets. The DOE may or may not be the CFA. The Environmental Protection Agency (EPA) takes over management of the FRMAC when the response phase of the incident is over and the recovery phase has begun. This is not a unilateral decision but worked out with input from all stakeholders, including the local government(s).

A. U.S. Nuclear Regulatory Commission (NRC)

- Upon receipt or notification of an emergency from the licensee or other activity under its purview, the Nuclear Regulatory Commission will notify appropriate federal agencies and initiate response activities, as appropriate.
- Manage federal response actions onsite and coordinate these actions, when necessary, with offsite emergency response organizations.
- Assess licensee, state and local recommended protective action and/or develop federal protective action recommendations.
- Serve as a source for information of a technical nature regarding the onsite incident conditions and the potential or real offsite radiological effects.

B. Federal Emergency Management Agency (FEMA)

- Upon receipt of notification of an emergency from the Nuclear Regulatory Commission, Department of Energy or other appropriate federal organization, the Federal Emergency

Management Agency will notify participating federal agencies.

- Coordinate the provision of federal assistance to state and local government agencies.
- Promote the coordination of response activities of federal agencies.
- Serve as an information source for providing a summary of the total federal response to the White House.

C. Department of Energy (DOE)

- Coordinate the offsite radiological monitoring, assessment, evaluation and reporting of all federal agencies during the initial phases of a radiological emergency.
- Maintain liaison and a common set of offsite radiological monitoring data with the licensee and state and local agencies with similar responsibilities.
- Provide offsite radiological monitoring data and its interpretation of the licensee and appropriate federal, state and local agencies, and assist in the development of protective action recommendations through plume modeling and ground deposition measurements.
- Assist in PRND missions, as feasible.

D. Environmental Protection Agency (EPA)

- The EPA is specifically responsible for environmental hazards. Decontamination of individuals however, is the responsibility of state, tribal and local governments through ESF-8
- Coordinate the offsite radiological monitoring, assessment, evaluation and reporting of all federal agencies during the recovery phase of a radiological emergency.
- Maintain liaison and a common set of offsite radiological monitoring data with the licensee and State and local agencies with similar responsibilities during the recovery phase.

E. Federal Bureau of Investigation (FBI)

Overall coordination of all actual and potential terrorist incidents, including terrorist incidents involving nuclear materials.

F. Department of Homeland Security (DHS)

Assist in Preventative Radiological Nuclear Detection (PRND) missions, as feasible (Domestic Nuclear Detection Office [DNDO]).

VII. References

- CDC. Population Monitoring in Radiation Emergencies. August 2007. Available online at website: http://emergency.cdc.gov/radiation/pdf/population-monitoring-guide.pdf
- Federal Emergency Management Agency. National Response Framework – Nuclear/Radiological Incident Annex. Available at website: http://www.fema.gov/pdf/emergency/nrf/nrf_nuclearradiologicalincidentannex.pdf
- Florida CEMP, Annex A, "Radiological Emergency Management Plan. Available at website: http://www.floridadisaster.org/documents/CEMP/REP2004/Annex%20A/AnnexAtbc.htm
- Florida CEMP Annex B "Terrorist Incident Response Plan". Available at website: http://www.floridadisaster.org/EMTOOLS/Terrorism/Summit/tlbcontannexB.PDF
- Florida Department of Health Bureau of Radiation Control Standard Operating Procedures 1- 19 and annexes. (available only on DOH Intranet)
- Florida Incident Field Operations Guide (FOG). Available at website: http://www.myfloridacfo.com/sfm/sfm-fog-2006.htm
- REAC/TS (Radiation Emergency Assistance Center/Training Site). Department of Energy. Available at website: http://www.orau.gov/reacts
- NIMS. National Incident Management System. Available at website: http://www.fema.gov/emergency/nims/index.shtm
- State of Florida Preventive Radiological Nuclear Detection (PRND) Concept of Operations..

Chapter 3 – Command and Control

I. General

This chapter describes the all-hazards coordination and management of the emergency response between state and local governments for a radiological/nuclear emergency. The organizational chart reflecting the functional relationships between state agencies and local governments for a radiological/nuclear emergency is shown in Annex A, Chapter 2, Figures 2-1 and 2-2**.** Annex A, also provides specific information regarding nuclear power plant and space vehicle launch accidents.

II. Concept of Operations

A. Local Government Role

Local governments have the primary role in implementing protective actions to reduce risks to the general public from a radiological/nuclear emergency. The risk and host counties are responsible for directing the initial response to a radiological/nuclear situation. These counties will coordinate and direct such actions through their emergency management organizations and other county emergency response agencies.

As the emergency situation progresses, the county emergency manager may recommend that the chair of the county commission declares a local state of emergency and makes a formal request for state assistance. The request is forwarded to the Governor's Office through the Division of Emergency Management or the State Emergency Response Team, depending on the State Emergency Operation Center's level of activation. In support of the State Emergency Response Team, the Division of Emergency Management drafts an Executive Order which recommends that the Governor declare a state of emergency, as warranted.

Refer to Chapter 4 of this Plan for a complete description of the Radiological Incident Classification System.

It is anticipated that with a declared Pre-Radiological Incident classification, the local governments will maintain primary responsibility for coordinating any emerging response. Most local governments should be able to maintain control of a Minor Radiological Incident without significant state assistance except for the need to have Department of Health, Bureau of Radiation Control intervention. With a Moderate Radiological Incident classification, or higher, an Executive Order will be drafted and may be signed declaring a State of Emergency and designating a State Coordinating Officer. The county emergency operations center serves as the central clearinghouse for information collection and coordination of response and recovery resources within the county. During a major emergency in Florida, non-impacted counties may also be requested by the Division of Emergency Management to activate their emergency operations centers to provide emergency assistance. The role of state government at these emergency classes will be to

support local government operations and to coordinate the operation of the State Emergency Response Team.

B. State Government Role

The role of state government in response to a radiological/nuclear emergency is to support local government operations unless the scope of the emergency warrants increased state action. State government response is coordinated by the Division of Emergency Management from the State Emergency Operations Center as spelled out in Section IV (Concept of Operations) of the State of Florida Comprehensive Emergency Management Plan.

As the primary agency of Emergency Support Function 8, the Department of Health, through the Bureau of Radiation Control, will provide radiological monitoring and assessment support to the local governments for all levels of an emergency. Increased state actions may be warranted for emergencies which involve multi-jurisdictions or, when local governments believe the emergency is beyond the capabilities of local resources. These conditions could occur at any radiological emergency class during an incident, but it is anticipated that they will most likely occur when a Moderate or Major Radiological Incident is declared allowing for enhanced state assistance coordination from the State Emergency Operations Center. The Division of Emergency Management will also escalate the activation of the State Emergency Response Team and the State Emergency Operations Center to the appropriate level.

III. References

- Florida CEMP "Method of Operations". Available at website: http://floridadisaster.org/documents/CEMP/Florida_State%20Unified%20Logistics%20Plan.pdf

- Florida CEMP, Annex A, "Radiological Emergency (nuclear power plants and space launch vehicles)". Available at website: http://floridadisaster.org/documents/CEMP/REP2004/Annex%20A/AnnexAtbc.htm

Chapter 4 - Emergency Classification System for Terrorism and Non Terrorism-Related Incidents Involving Radiological or Nuclear Materials

I. General

Radiological/nuclear emergency classes in increasing order of significance are: Pre-Radiological Incident and Radiological Incident. This radiological/nuclear emergency classification system will normally, but not necessarily, develop sequentially; gradation is provided to ensure adequate emergency management preparations for more serious incidents.

All preventative radiological /nuclear detection (PRND) activities should not be under this classification system unless there is a specific, credible threat, in which case, a "Pre-Radiological Incident" may be declared.

II. Emergency Classes

These classes of emergencies could develop sequentially; however, the possibility exists that the first indication of a problem could result in immediate declaration of any one of the Radiological Incident emergency classes. Declaration of the appropriate emergency class will depend on the type of radiological/nuclear emergency encountered. The availability of specific law enforcement intelligence would also affect the emergency class declared depending on the particular scenario.

A. Pre-Radiological Incident

Class Description:

Pre-Radiological Incidents are situations that are in the process of occurring which would indicate a potential for the release of, or exposure to, radioactive material in a particular location or locations. Determination of this class would typically occur secondary to law enforcement or other types of intelligence indicating that radiological material may be used in an unlicensed or unlawful manner.

Release Potential:

No releases of radioactive material requiring response or monitoring are immediately expected unless further degradation of safety/security occurs.

Purpose:

The purpose of this emergency class is to provide local, regional, state, or national notification of a possible impending incident involving radiological material so that appropriate warnings and preparations can be implemented.

B. Radiological Incident (three subclasses)

1. Minor Radiological Incident

Class Description:

An incident has occurred that involves an actual release of, or exposure to, minor quantities of radioactive material at a site or sites in a local or regional context.

Release Potential:

Any releases of radioactive materials are expected to be limited to small fractions of the Environmental Protection Agency Protective Action Guide exposure levels and will not significantly impact affected areas.

Purpose:

The purpose of this classification is to assure that local and regional radiological emergency response personnel are readily available and capable of responding to the incident. If the situation becomes more serious or more detailed confirmatory radiation monitoring is required, a Moderate Radiological Incident may be declared.

2. Moderate Radiological Incident

Class Description:

An incident has occurred that involves the actual release of, or exposure to, moderate quantities of radioactive material at a site or sites in a local, regional or statewide context. A Radiological Dispersal Device (RDD) incident would at least be in this class and may be immediately at a higher class if explosives are used.

Release Potential:

Any releases of radioactive materials are not expected to exceed Environmental Protection Agency Protective Action Guide exposure levels except within incident site boundaries.

Purpose:

The purpose of the Moderate Radiological Incident declaration is to assure that local, regional, and statewide radiological emergency response personnel are readily available and capable of responding to the incident. Monitoring teams would be available and other staff could be called upon to assist in evacuations and to provide updates to the public regarding the Moderate Radiological Incident.

3. Major Radiological Incident

Class Description:

An incident has occurred that involves the actual release of, or exposure to, major quantities of radioactive material at a site or sites in a local, regional, statewide, or national context. A nuclear weapon detonation would always be in this category.

Release Potential:

Releases of radioactive material would significantly exceed Environmental Protection Agency Protective Action Guide exposure levels in the affected area.

Purpose:

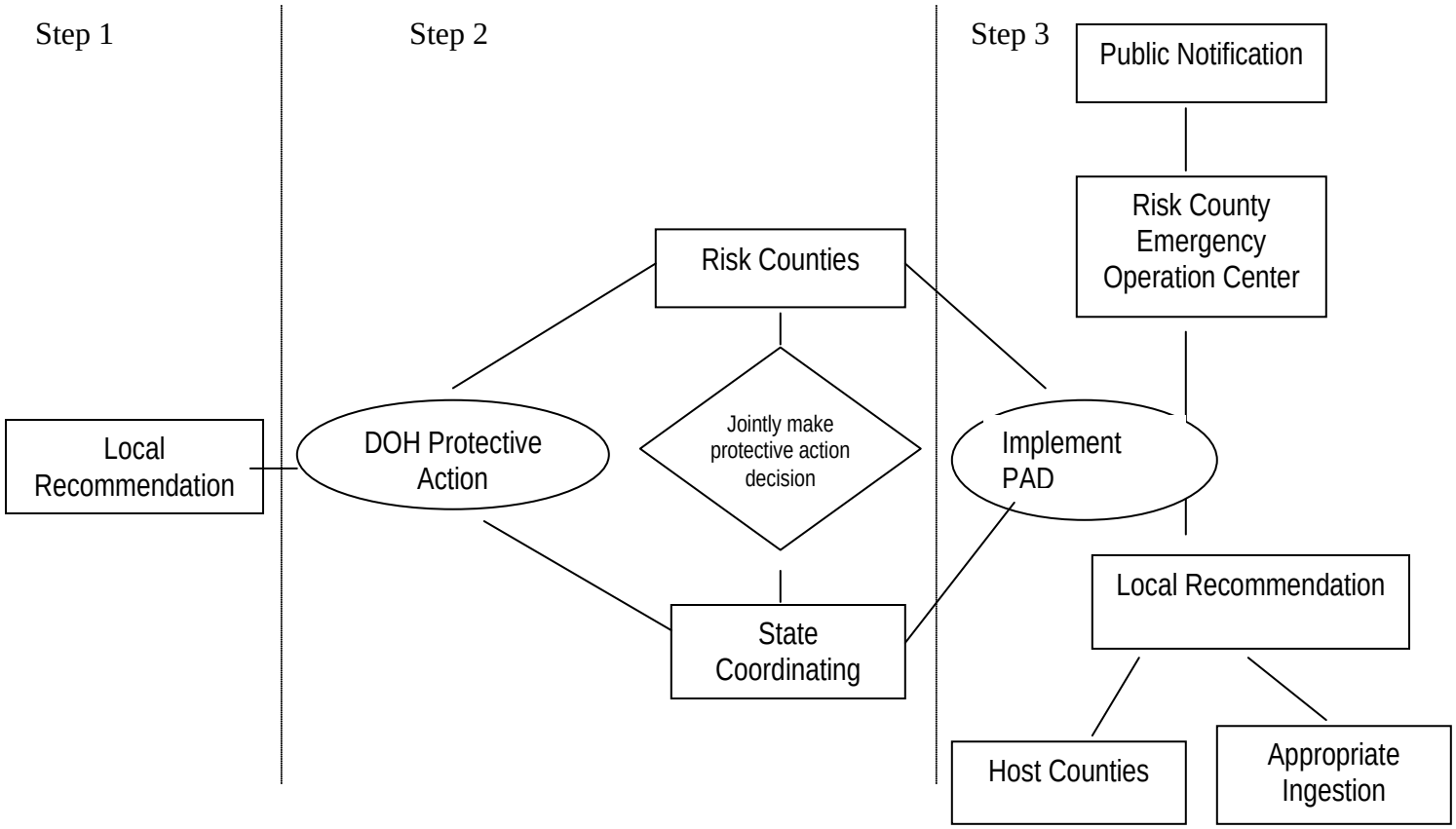
The purpose of the Major Radiological Incident declaration is to assure that local, regional, statewide, and national radiological emergency response personnel are readily available and capable of responding to the incident. This would involve a major mobilization of personnel and materials to the vicinity of the radiological incident. Extensive radiological monitoring will be required over large geographic areas. Protective actions for the public would need to be implemented including informed, phased evacuations of large numbers of individuals. Long term recovery efforts would be extensive.

III. Emergency Action

Based on extant conditions, appropriate local, regional, or statewide authorities will designate and make notification of the appropriate emergency classification level, i.e., Pre-Radiological Incident or any of three subclasses of a Radiological Incident, and make protective action recommendations, if required. In a Minor Radiological Incident, when the local county emergency management center is not operational or operating at a low level, the risk county(ies) will maintain primary responsibility for coordinating emergency response with the State Emergency Operations Center and the location of an incident.

However, for Moderate and Major Radiological Incidents once the Governor has signed an Executive Order an emergency notification will require joint state and local emergency action. In addition, federal actions may be required. The state and local actions will be determined through the three step decision process as diagramed in Figure 4-1.

FIGURE 4-1: PROTECTIVE ACTION DECISION FLOW CHART AT THE EMERGENCY OPERATION FACILITY



Step 1: The local authorities will make a Protective Action Recommendation to the Risk counties and the State Coordinating Officer or designee at the Emergency Operation Facility (if operable), based on current conditions.

Step2: The Risk counties and the State Coordinating Officer or designee at the Emergency Operation Facility (if operable), in consultation with the Department of Health, will assess the local authorities recommendation and formulate a joint Protective Action Decision.

Step3: The Risk counties will make contact with their respective emergency operation centers for implementation and public notification concerning the Protective Action Recommendation(s). The State Emergency

Operations Center will contact the Host counties and all other counties in the State.

IV. References

- Executive Office of the President, Office of Science and Technology Policy. Planning Guidance for Response to a Nuclear Detonation, 2nd ed., Homeland Security Council, The Executive Office of the President, Office of Science and Technology Policy, Washington, DC). Available at: http://www.usuhs.mil/afrri/outreach/pdf/planning-guidance.pdf

- The State of Florida Comprehensive Emergency Management Plan (FLCEMP). Available at website: http://floridadisaster.org/documents/CEMP/2010/2010%20State%20CEMP%20Basic%20Plan.pdf

- U.S. EPA. Protective Action Guides. Available at website: http://www.epa.gov/rpdweb00/rert/pags.html

- State of Florida Preventative Radiological Nuclear Detection (PRND) Concept of Operations.

Chapter 5 - Notification and Activation

I. General

Through the State Watch Office, the Florida Division of Emergency (Division) is responsible for: receiving notification of an emergency from anywhere in the state; verifying information contained in the notification messages; and, alerting key state, local, and federal emergency response personnel. The Division is also responsible for assisting local governments in providing warning and instructions to the general public. The Division may receive initial warning of an incident or classification from the Florida Fusion Center, the Federal Emergency Management Agency National Warning Center, county or municipal government, or the news media. If a determination that an incident or other emergency has occurred, or is imminent, the State Watch Office will notify the appropriate counties, key Division personnel, Regional Domestic Security Task Force co-chairs, the Florida Department of Law Enforcement (FDLE), and other state agencies. The Florida Department of Law Enforcement (FDLE) has the operational authority to coordinate and direct the law enforcement resources and other resources of any and all state, regional and local governmental agencies that the FDLE may designate to take the precautions needed to protect the State of Florida (F.S. 943.03101). The Federal Bureau of Investigation (FBI) has the ultimate responsibility and authority in response to actual or potential terrorist threats and incidents. The FDLE will always be in support of the FBI in this instance.

The Emergency Coordinating Officers will be responsible for alerting and activating necessary personnel within their respective emergency support functions. This will ensure the States ability to respond to an emergency situation on a 24-hour basis. The state will function under the following levels of activation:

Levels of Activation:

Level III - Monitoring Activation - Level III is typically a "monitoring" phase as indicated in Section IV.H (Activation of Emergency Facilities), of the State of Florida Comprehensive Emergency Management Plan. In the event of a threat of a terrorism act associated with nuclear power plants, nuclear weapons detonation, radiological dispersal devices, radiation exposure devices, incidents involving the transportation or industrial use of radioactive material, or other incidents as determined by the Division, the State Emergency Operations Center will remain at a Level III monitoring.

Level II - Partial Activation of the State Emergency Response Team - Level II is a limited agency activation as indicated in Section IV.H (Activation of Emergency Facilities), of the State of Florida Comprehensive Emergency Management Plan. In the event of a credible threat of a terrorism act associated with nuclear power plants, nuclear weapons detonation, radiological dispersal devices (RDD), radiation exposure devices, incidents involving the transportation or industrial use of radioactive material, or other incidents as determined by the Division, the State Emergency Operations Center may be activated to this level.

Level I - Full Scale Activation of the State Emergency Response Team - Level I is full scale activation as indicated in Section IV.H (Activation of Emergency Facilities), of the State of Florida Comprehensive Emergency Management Plan. In the event of an actual terrorism act associated with nuclear power plants, nuclear weapons detonation, radiological dispersal devices, radiation exposure devices, incidents involving the transportation or industrial use of radioactive material, or other incidents determined by the Division, the State Emergency Operations Center will be activated to this level.

The State Watch Office Operations Officers are on duty on a 24-hour basis.

II Notification and Activation

The sequences for notification and activation of Emergency Support Functions for each emergency class are discussed below. Specific details of notification and activation are contained in state and county standard operating procedures.

Notification of an Incident or Event

The State Watch Office is responsible for: 1) receiving notification of an emergency from anywhere in the State of Florida; 2) verifying information contained in the notification messages; and, 3) alerting key state, local, and federal emergency response personnel. The Division is also responsible for assisting local governments in providing warnings and instructions to the general public.

Timing and Transition of Unified State Command

Several factors, such as the level of response activities and the threat of additional attacks, determine the transition of the Unified State Command from the Incident Commander to the State Coordinating Officer (SCO). At this point, consideration should be made to transition operational command from the Incident Commander to the SCO. Law enforcement investigations will continue, but the primary duties of the state will be to assist the local government to recover from the incident/attack, both short and long term.

Support the Extended Response to Local Incident Command

Local incident or unified command requests for resources not pre-assigned to an RDSTF, or RDSTF resources from another region, will be coordinated through the appropriate Emergency Support Function and the State Emergency Operations Center (SEOC). The SEOC will advise the local task force of resource availability and mission assignments.

Notification – Crisis/Prevention:

Commencement of a prevention effort by the Florida Fusion Center will primarily be communicated by way of intelligence and investigative information from local, state, or federal law enforcement. Based upon the threat level, the regional plan should provide for an escalating range of actions that will be implemented for prevention. Each Regional Domestic Security Task Force should take into account the variety of conditions and resources present within its region when performing these missions. Each region should develop a notification procedure for Task Force members.

Notification – Consequence/Response:

When a jurisdiction is affected by a local emergency, the incident or unified command structure will request additional assistance from their local Emergency Operations Center (EOC). When the county EOC appears at risk of exhausting all local resources or determines local responders need additional resources, a request for additional assistance will be made through the county EOC to the state EOC.

III. Notification of the Public

The public notification system may be activated for a pre-radiological incident. It will be activated for an actual radiological incident in a timely manner upon the decision by the county commission chairperson of each affected county, or their designee, in order to implement protective actions.

The Division will coordinate with affected counties, provide assistance as needed, and provide periodic status updates to the general public. Means of providing notification to the general public will include the activation of the Public Notification System which may include existing siren systems (fixed and mobile) in those counties having such systems, the Emergency Alert System, the National Oceanic and Atmospheric Administration Very High Frequency Radio Network, participating local radio and television stations, and route alerting.

The state EOC will notify the Florida Fusion Center, who in turn will notify their Regional Operations Center(s) to notify the regional task force(s) and place them on alert.

The Regional Domestic Security Task Force's primary role in the response phase is to coordinate the use of the Regional Domestic Security Response Teams. Its mission is to support the local incident command structure and not to assume command and control of the incident. However, if the affected jurisdiction having authority over the incident requests such command and control support, then the Task Force may coordinate the activation of a separate overhead Incident Command System team. This team will handle these operations in coordination with the state EOC. These teams will be made up of emergency response personnel trained in the ICS positions needed to assume command and control operations. Figure 1 demonstrates the informational flow patterns to be utilized during an incident.

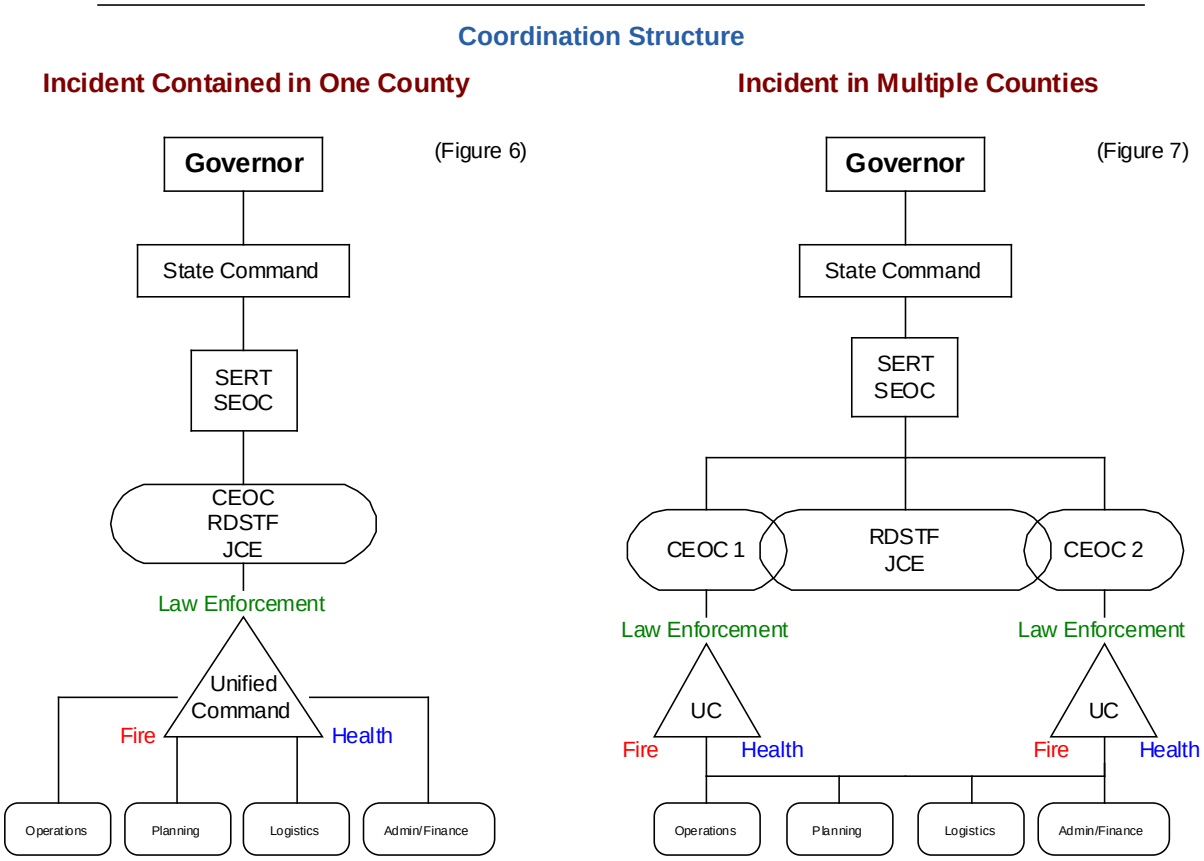
IV. References

- Department of Homeland Security Working Group on Radiological Dispersal Devices (RDD) Preparedness – Medical Preparedness & Response Subgroup. Available at website: http://www.orau.gov/hsc/RadMassCasualties/content/resources/Radiologic_Medical_Countermeasures_051403.pdf

- Florida Comprehensive Emergency Management Plan. Available at website: http://floridadisaster.org/documents/CEMP/floridaCEMP.htm

- Florida State Warning Point. Available at website: http://www.floridadisaster.org/response/operations/swp.htm

Figure 1
Communications within Coordination Structure



CHAPTER 6 – Emergency Communications

The communications systems that can be used during a radiological/nuclear emergency are described in Chapter 6 (Emergency Communications) of Annex A (The State of Florida Radiological Emergency Management Plan).

CHAPTER 7 – Emergency Response Facilities and Equipment

I. General

In order to effectively coordinate, local, state, federal and potentially private resources during a radiological/nuclear emergency, it is preferable that emergency response support/facilities be available at the state, regional, and local levels. This has been the case in Florida because of the presence of nuclear power plants and the infrastructure that was developed in their support. Refer to Annex A for emergency facilities and equipment needs for nuclear power plants. This chapter describes the emergency response support/facilities available for a radiological/nuclear emergency, identifies the supplies and equipment designated for emergency response, and identifies the key personnel and organizations that are anticipated to respond to such emergencies.

Impact assessments of all radiological emergencies will be performed by the Department of Health, Bureau of Radiation Control, in accordance with the Bureau of Radiation Control's Standard Operating Procedures (refer to the References section of this chapter).

II. Florida Emergency Response Facilities

The Division of Emergency Management is responsible for providing and staffing the State Emergency Operations Center and providing specialized equipment to augment county equipment.

State Emergency Operations Center

The State Emergency Operations Center is the location for the coordination of the state response for any major emergency or disaster. For a more detailed discussion of the State Emergency Operations Center, please refer to Section IV.B of The State of Florida Comprehensive Emergency Management Plan.

In response to a radiological/nuclear emergency the State Emergency Operations Center serves as the coordination center for a state response. The State Emergency Operations Center is partially activated (Level II) to support county emergency operations upon declaration of a Minor Radiological Incident Emergency classification. Upon declaration of a Moderate or Major Radiological Incident, the State Emergency Operations Center is fully activated (Level 1) to coordinate all operations undertaken by the state; however, full activation may take place at any time during a rapidly escalating situation or as other conditions warrant. A State Emergency Response Team Liaison, typically a Division of Emergency Management Area Coordinator, is dispatched to the local emergency operations facility until the arrival of the Advance Team. At that point the Area Coordinator will be dispatched to the affected county (ies) Emergency Operations Center(s) to function as the State Emergency Response Liaison. Pre-designated state personnel located in the general area of the emergency will be dispatched to their normal workstations to implement emergency directives.

Staff for a Level II Activation will include, but will not be limited to:

1. State Coordinating Officer
2. State Emergency Response Team Chief
3. Operations Section Chief
4. Information and Planning Section Chief
5. Communications Supervisor
6. State Warning Point Communications Operator(s)
7. Core State Emergency Support Functions Personnel including Department of Health, Bureau of Radiation Control, personnel

County Emergency Operations Centers

Each county affected by a radiological/nuclear emergency may staff their Emergency Operations Center to coordinate the emergency response. Key county officials may report to the County Emergency Operations Center (EOC) at the time of an emergency.

County Emergency Operation Centers, at a minimum, are partially activated upon the declaration of a Minor Radiological Incident Emergency classification and may be partially activated during a Pre-radiological Incident at the discretion of the county. Full activation of County Emergency Operation Centers takes place upon declaration of any Moderate or Major Radiological Incident; however, full activation may take place at any time during a rapidly escalating situation or as other conditions warrant.

Staff may include, but not be limited to:

1. County emergency management director, or designee
2. County emergency response agency representatives
3. Additional staff in accordance with county procedures for emergency operations
4. A State Emergency Response Team Liaison
5. A representative from the Department of Health, Bureau of Radiation Control, who will dispatch a liaison to the affected counties to interpret/explain information regarding plant/facility/local conditions, radioactive material releases, plume projections, monitoring needs, and additional information, as appropriate to the particular situation.

III. Transportation to Emergency Operations Sites

The Advance Team will travel by the most expeditious manner from Tallahassee to the Emergency Operation Facility/county emergency operations center depending on the characteristics of the radiological emergency. Department of Health personnel are

assigned to response positions as per Bureau of Radiation Control, SOP 1, Table 2-1. Personnel will be activated as needed and travel to the affected area as per procedures. Orlando Bureau of Radiation Control staff will bring the mobile lab, sample preparation vehicle, and field team vehicles, as required.

IV. Radiological Response Equipment

Laboratory Support

The Florida Department of Health has a radiochemistry laboratory in Orlando with a full range of capability for analysis of environmental media, including; air, fauna, milk, soil, vegetation, and water.

The Florida Department of Health also maintains a Mobile Emergency Radiological Laboratory (MERL) that may be dispatched to the vicinity of the radiological emergency at the time of an incident. The MERL provides a wide range of capability for analysis of environmental media. The mobile laboratory is self-contained and may be operated without support services, when necessary. Implementation of the major analytical systems is explained in the Department of Health's Bureau of Radiation Control Standard Operating Procedures.

Incident Monitoring Equipment

Incident monitoring equipment is available for the Department of Health's field teams. In addition, personnel and radiation emergency response kits are maintained in the Department's offices in Orlando, Lantana, Winter Haven, Tallahassee, Fort Lauderdale, Tampa, Ft. Myers, Pensacola, Jacksonville and Miami.. Additional radiation survey instruments used in ongoing program activities are located in the Department's offices in Pensacola, Tallahassee, Ft. Myers, Tampa, Jacksonville, Miami, Orlando, Ft. Lauderdale, Lantana, and Winter Haven. Department of Health personnel will maintain inventories of incident monitoring equipment. Means for equipment calibration, maintenance, and equipment operations are explained in Department of Health Bureau of Radiation Control's Standard Operating Procedures

References

- The State of Florida Comprehensive Emergency Management Plan (FLCEMP). Available at website: http://floridadisaster.org/documents/CEMP/2010/2010%20State%20CEMP%20Basic%20Plan.pdf

- Florida Department of Health, Bureau of Radiation Control, Standard Operating Procedures 1-20 and Annexes. (available on DOH Intranet only)

Chapter 8 – Accident/Incident Assessment

I. General

This chapter describes responsibilities for assessing the impact of a radiological/nuclear emergency from a terrorist incident or accidents involving radioactive materials, and their effects on the health and well-being of the residents and visitors of Florida. The state's capability for making rapid assessments and the detection and measurement of radionuclides in the field is described and carried out according to the Department of Health Bureau of Radiation Control's Standard Operating Procedures.

Terrorist incidents will be handled per Annex B: **Terrorist Incident Response**, with notification of the appropriate law enforcement authorities at the local, state, and federal levels.

II. Initial Assessment

The Department of Health, Bureau of Radiation Control, will provide accident/ incident assessment and protective action recommendations to the affected county (ies) and state emergency response organizations. The results of the assessment will be reported to State and local organizations in accordance with Chapter 5 (Notification and Activation) of Annex A.

III. Field Monitoring

A. Resources and Capabilities

Field monitoring within the radiologically affected area is provided by environmental specialists from the Department of Health, Bureau of Radiation Control, and county health departments. Laboratory support and equipment available for use by field monitoring teams is identified in Chapter 8 (Emergency Facilities and Equipment) of Annex A**.** The specific systems and methods for gross radioactivity measurement, location and tracking of the radioactive plume, radionuclide concentration measurement, estimating integrated dose from actual and projected dose rates, are outlined in established Department of Health, Bureau of Radiation Control standard operating procedures. Also, the Department of Health's' Mobile Emergency Radiological Laboratory (MERL) will serve as the sole point for receiving samples for analysis during the initial phase of the emergency response.

B. Activation of Field Teams

Upon receipt of notification of an emergency, the Bureau of Radiation Control duty officer (on duty 24 hours daily) will contact the State Warning Point for verification and then contact the appropriate county emergency operation centers to determine what, if any, protective actions have been implemented. The duty officer will use existing information, in accordance with established procedures, to evaluate the potential for offsite exposure and to determine the adequacy of protective actions. Based upon the evaluation, the duty officer will determine whether to activate emergency field teams and/or the Mobile Emergency Radiological Laboratory.

C. Coordination of Assessment and Monitoring Activities

The coordination of field assessment and monitoring activities is defined in Chapter 2 (The Radiological Response Organization) of Annex A**.** Specifically-trained personnel from county health departments may be used to assist the Bureau of Radiation Control in any assessment and monitoring activities.

D. Local Government's Role

Prior to the arrival of the Bureau of Radiation Control team, local HAZMAT, other first response teams, and with the possible assistance of county health department staff, will isolate the affected area and implement medical and lifesaving procedures in a manner consistent with county emergency response plans.

E. Other State Government Agency Roles

A number of agencies within the state have developed PRND capability. Some State agencies, particularly the Florida Highway Patrol and the Fish and Wildlife Commission have statewide distribution of trained officers with personal radiation detectors. For incidents that happen in remote areas of the state, FHP or FWC assets may the closest resource with radiation detection equipment and training. While they are not trained to do response, they are trained for detection of radioactive material and can provide the necessary notifications for proper response to be started.

IV. Additional Assessment and Monitoring Support

A. Emergency Management Assistance Compact

When it is determined that an accident or incident cannot be adequately controlled with resources available to State radiological response personnel, a request will be forwarded to the State Emergency Operations Center by ESF-8, Bureau of Radiation Control, for the additional resources needed. The request will contain the following information:

1. Description of the problem.
2. Type of resources needed.
3. Which state has the resources, if known?
4. Where the resources need to be delivered.
5. Clear direction to assembly point or point of delivery.
6. Estimated time the resources will be needed.
7. If resources include people, what arrangements have been made for housing, etc.

B. National Response Framework/Nuclear/Radiological Incident Annex

The provisions of the Nuclear/Radiological Incident Annex of the National Response Framework will be used for interagency coordination for radiological/nuclear emergency response within the Department of Energy, Region III.

Activation of the National Response Framework/Nuclear/Radiological Incident Annex will occur when the Department of Energy has been notified that a significant radiological emergency has occurred and that federal assistance has been requested by an authorized person. Authorized persons are the Bureau of Radiation Control Operations Officer for radiological monitoring and laboratory assistance and the State Coordinating Officer in the State Emergency Operations Center. The request for federal assistance will specify the federal resources requested and the expected time of arrival at the affected area, as provided for in the Nuclear/Radiological Incident Annex to the National Response Framework.

The following personnel and equipment resources are available and will be provided on request:

1. Radiological monitoring and environmental specialists with supporting equipment.
2. Aerial radiological monitoring equipment.
3. Fixed and mobile laboratory support.
4. Remote handling equipment.
5. Technical assistance in predicting the dispersion of radioactivity into the environment.
6. Medical consultation on the treatment of injuries complicated by radioactive contamination.
7. Technical support for emergency public information.

Department of Energy, Savannah River Operations, will provide personnel and equipment to ensure liaison, coordination, and communications between federal agencies and appropriate state/local officials at the scene.

C. The Southern Mutual Radiation Assistance Plan (SMRAP)

The Southern Mutual Radiation Assistance Plan (SMRAP) provides mutual assistance in responding to radiation incidents upon request. States included in the plan are: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Arkansas, Louisiana, Oklahoma, Texas, Virginia, and Missouri.

D. 44th and 48th Civil Support Team

The 44th and 48th Civil Support Teams are full-time Florida Army National Guard units that can provide assistance to state and county responders in a radiological/nuclear emergency.

V. References

- Federal Emergency Management Agency. National Response Framework – Nuclear/Radiological Incident Annex. Available at website: http://www.fema.gov/pdf/emergency/nrf/nrf_nuclearradiologicalincidentannex.pdf

- Florida CEMP Annex B "Terrorist Incident Response Plan". Available at website: http://www.floridadisaster.org/documents/CEMP/2010/TERRORISM%20ANNEX.pdf

- Florida Department of Health Bureau of Radiation Control Standard Operating Procedures 1- 20 and annexes. (available only on DOH Intranet)

- Southern Mutual Radiation Assistance Plan (SMRAP) Website: http://www.sseb.org/wp-content/uploads/2010/05/2010-FINAL-SMRAP1.pdf

Chapter 9 – Public Information and Education

I. General

This chapter provides guidance for keeping the public informed about:

- Potential hazards present at a radiological/nuclear incident including a radiological dispersal incident, after a nuclear weapon detonation, or other incident involving radioactive materials;
- Emergency responses required for handling these type of radiological/nuclear incidents; and,
- Protective measures that can be taken to minimize or alleviate adverse public health effects.

This chapter is to be used in concert with Appendix XIV (Emergency Support Function 14 – External Affairs - Public Information**)** and Annex A (The State Of Florida Radiological Emergency Management Plan) Chapter 7, to the State of Florida Comprehensive Emergency Management Plan.

The scenarios constituting an intentional nuclear/radiological emergency include, but are not limited to the following (see Chapter 1, Table 1):

1. Use of a stolen military nuclear weapon or an improvised nuclear device (IND) and includes any explosive device designed to cause a nuclear yield. Depending on the type of trigger device used, either uranium or plutonium isotopes can fuel these devices. While "weapons-grade" material increases the efficiency of a given device, materials of less than weapons-grade can still be used. A nuclear weapon that explodes without nuclear fission would be classified similarly to a radiological dispersal device (RDD).

2. Use of a RDD includes any explosive device utilized to spread radioactive material upon detonation. Any improvised explosive device (IED) could be used as an RDD by placing it in close proximity to any radioactive material.

3. Use of a simple RDD that spreads radiological material without the use of an explosive. Any radioactive material (including medical isotopes or waste) can be used in this manner.

The plan for emergency public information identifies specific methods (channels) to notify the public that an incident may or has occurred, directs their actions, and keeps them informed as the situation progresses. Early, adequate sheltering and delayed, informed evacuation are key actions that may need to be communicated to the public as rapidly as possible. Continuous updates will be required giving information about when sheltering is no longer required or an evacuation order is rescinded.

The purpose of Emergency Support Function 14, External Affairs - Public Information, in this venue, is to establish a mechanism that efficiently provides and disseminates, with "one voice", information to the public when a significant radiological or nuclear emergency occurs with or without warning. It begins with the fundamental objectives of reducing risk to the public with current and credible information and enables those affected to understand the scope of the problem and make informed decisions for themselves and their families.

The public information and education program should be viewed as a process of sharing information between response experts and the public through effective communications channels including the

various types of news and social media (TV, radio, Internet, Facebook, Twitter, texting, etc.), as well as local response communications systems, e.g., 211, Reverse 911, etc. It must not permit the release of information that might further jeopardize the safety of the public or response personnel. In addition, an emergency of this nature could involve criminal activity such as terrorism or theft, in which case emergency response must be coordinated with criminal investigation and response. Communication and cooperation with law enforcement agencies and other response organizations is required to reduce confusion and increase the effectiveness of the response.

In case of a terrorist or criminal threat, the party receiving the threat immediately notifies local law enforcement, which contacts the Florida Department of Law Enforcement (FDLE)/Florida Fusion Center, and the State Warning Point to engage the Florida Department of Health's Bureau of Radiation Control which is responsible for assessing such threats.

II. Public Information Spokesperson and Establishment of a Joint Information Center

The Executive Office of the Governor, Office of Communications, will direct all Emergency Support Function 14 operations, led by the Governor's Communications Director, through the Division of Emergency Management's Lead Public Information Officer, or his or her designee.

Emergency Support Function 14 staff will operate on a 24-hour basis to facilitate the flow of public information and will be located in the State Emergency Operations Center in Tallahassee until and unless an alternative location is needed. The earliest establishment of a Joint Information Center (JIC) may be completed when multiple agencies are involved in the response. The JIC will expand to include additional local, state, cross-border, and federal agencies as they become involved. The JIC Director is from the lead organization who serves as State Coordinating Officer. JIC leadership can transition as various response elements arrive on the scene. The JIC would be co-directed by lead local, state, and federal public information officials to ensure cooperative strategic planning and information sharing.

Upon activation of the JIC, the lead Public Information Officer or designee will report as a member of the Advance Team to the designated Incident Command Post through an integrated response system with responsibilities and authorities clearly assigned and coordinated. The response should be directed from a central location near the scene as soon as possible.

A spokesperson will be available from each of the major organizations involved in the response. These may include:

1. County commissioners of affected counties.

2. County emergency management directors of affected counties.

3. Department of Health, State Surgeon General, and designees from the Bureau of Radiation Control.

4. County health department (CHD) directors/administrators of affected counties.

5. Regional Domestic Security Task Force Chairs of the affected region.

6. State Coordinating Officer.

7. Florida Department of Law Enforcement and local law enforcement agencies

8. Deputy State Coordinating Officer (Forward State Emergency Response Team Chief).

9. Lead Federal Agencies (LFA).

Since the media are often the primary source of public information during an emergency, provisions should be in place to respond to the public and the media concerns effectively during an actual radiological/nuclear emergency or if an incident is perceived by the public or media as a radiological/nuclear emergency.

The following objectives should be accomplished:

1. Upon declaration of an emergency or receipt of significant inquiries from media concerning a possible emergency, arrange to immediately activate a JIC (either virtual or onsite) to coordinate all information from sources viewed by the public as official (government agencies and the facility, if appropriate). This should include:

   i. Issuance of a news release identifying the contact information for the onsite JIC that serves as the official source of information for the state's unified emergency response agencies that are represented in the JIC and the time and location for daily media briefings.

   ii. Remind all agencies/response partners to refer all media inquires to the JIC.

   For significant incidents a JIC should be established near the location of the emergency that will be the only location disseminating official information. Security should be provided for the JIC along with a system for confirming the credentials of media personnel, as well as provision for and issuance of official facility media badges. If possible, arrange in advance a location to serve as the JIC where facility, local, state and national officials can provide regular media briefings.

2. Provide the public with information on the potential risk and protective actions following a warning of an emergency and again following an actual incident. Identify sources of additional information in the instructions provided to the public. Arrange to provide information to the public outside the emergency operations zone (outside the area where protective actions are being recommended) on what actions they should or should not take and why.

3. Monitor news and social media information and promptly respond to misleading, inaccurate, or confusing information through the use of approved Media Monitoring and Rumor Control Standard Operating Guidelines (SOG's). Arrange to identify inappropriate reactions by the public during an emergency and provide information through appropriate types of media to help alleviate the situation. Address incorrect or misleading information promptly whether local, regional, statewide, national, or international.

4. Prepare public health messaging materials, i.e., news release, fact sheet, frequently asked questions, etc., in advance that address the public's likely questions and concerns during an emergency (see Appendix 3 to this Plan). Arrangements should be made to revise these messaging materials as needed, and send through the JIC's formalized approval process before release during an emergency.

5. Have a pre-determined agreement with all 67 county health departments for deploying trained public information officers/teams to assist local officials responding to a radiological/nuclear emergency.

6. Arrange, after the declaration of an emergency, to brief trusted members of the local community, including health professionals, teachers, religious leaders, and activist groups.

7. Provide information to members of the media at the scene on risks, restrictions, and precautions they should take for their own protection. Pending appropriate direction, members of the media could be considered emergency workers (because they are needed to provide trusted information to the public) and, if so, should be included in the arrangements for providing radiation protection and long term medical monitoring.

8. Provide emergency responders who will have direct contact with the public (e.g., population monitoring teams) with instructions on how to interact with the public and media.

9. Promptly provide the public with information regarding radiation monitoring, sampling or other activities directly involving them, their homes, community, or workplaces.

III. Public Information Officers

Public Information Officers are those persons authorized by their organizations to:

1. Release news and background information to the media for dissemination to the public as appropriate.

2. Monitor incidents and summarize information for distribution to responding organizations and the media.

3. Coordinate and verify public health messaging and information with all participating organizations, either in virtual or onsite JIC.

4. Assure timely notification of information to the public.

5. Assist designated public information spokespersons, i.e., local, state, federal officials, other public information officers, etc..

6. Maintain records of new releases and public information, i.e., monitor news broadcasts, news articles, social media, blogs, etc.

7. Coordinate all news conferences and media briefings

State Public Information Officer

At the direction of the Governor's Communications Office, or Division of Emergency Management Public Information Office, state agency communications offices will provide staff and support to Emergency Support Function 14 operations. The State Public Information Officer will:

1. Collect, edit, and release information to the media.

2. Establish contact with wire services, newspapers, radio, television and social media as appropriate.

3. Assist news media personnel in the performance of their function including accreditation, identification, and obtaining interviews.

4. Coordinate the release of information with the County Public Information Officers.

5. Brief the news media as conditions warrant.

6. Keep concerned staff informed through “in-house” news summaries via Intranet and e-mail venues.

7. Establish a format for managing and staffing of the Florida Emergency Information Line before (as appropriate), during, and after a disaster

8. Assign public information staff that will work from the Incident Command Post or the State Emergency Operations Center

County Public Information Officers

Each county will provide a Public Information Officer to represent the county (ies) during a radiological/nuclear incident.

IV. Emergency News Facilities

The Division of Emergency Management will provide space and equipment (i.e., telephone and data line access, etc.) at the State Emergency Operations Center in Tallahassee for media representatives for the dissemination of information during an emergency.

1. Emergency Support Function- 14 Public Information

Emergency Support Function 14 (at the State Emergency Operations Center) serves as the primary location for news and information releases until activation of the county (ies) media center.

2. Emergency News Center at the State Emergency Operations Center

The Emergency News Center serves as the focal point for news and information releases during emergencies. From this location public information staff (including technical experts) from the state and counties will issue news releases. Periodic news conferences will be conducted, as needed, at the Emergency News Center. A spokesperson from each organization will be present at each news conference. Office work space will also be provided for the public information offices to develop, discuss, and coordinate the release of news and information.

Each affected county will designate an individual who will be responsible for the overall management and coordination of the Emergency News Center activities.
This individual will provide:

1. Adequate physical accommodations, including space and equipment.

2. Schedules for briefings.

3. Provision of background information (to include press kits).

4. Notice of situations such as evacuations or other noteworthy occurrences.

5. Security (to include identification procedures).

6. Periodic updated releases to wire services.

V. Coordination of News Releases

The dissemination of information to the news media and public will be coordinated by the JIC. Each public information officer working as a member of the JIC will collect information regarding emergency operations and recommended protective actions from their respective personnel in emergency operations centers. The accuracy and validity of this information will be verified orally, by email, by facsimile hard copy, or other means. Upon verification of the information the public information officers will ensure that the information and overarching message of each release is not in conflict with information and messages previously released or embargoed for release. The State Coordinating Officer, or designee, and the Department of Health are responsible for reviewing information and determining its validity and accuracy prior to the release of public information by the state.

1. Pre-radiological Incident

Due the nature of conditions during this emergency class, a release of information to the media or public regarding emergency operations or protective actions is dependent on the characteristics of the particular situation. State and local emergency response agencies will monitor conditions until the incident escalates or terminates.

2. Minor Radiological Incident

Upon declaration of a Minor Radiological Incident, the public information officers will be notified in accordance with agency procedures and placed, at a minimum, on standby status. Public information plans, and implementing procedures will be reviewed by the public information officers and an Emergency News Center manager to the Emergency News Center, as appropriate to the incident.

3. Moderate and Major Radiological Incidents

With the occurrence of a Moderate or Major Radiological Incident, Emergency Support Function 14 will activate the Florida Emergency Information Line. The State Emergency Operations Center will serve as the primary source for information releases until activation of the affected county's media center, if possible. Upon activation of the county's media center, the State Public Information Officer and support staff will be deployed.

VI. Rumor Control

The Division of Emergency Management operates the 24-hour Florida Emergency Information Line (FEIL) to handle residents and visitors inquiries during emergency/disaster situations. During a full-scale emergency, other state agency personnel will be used to supplement the DEM staff. The management of rumor information and coordination of rumor trends will be handled according to the FEIL Standard Operating Procedure. The FEIL telephone number and Telephone Device for the Deaf number will be released to the public upon activation of the State Emergency Operations Center and/or the affected county's Emergency News Center.

Each affected county will activate similar information lines to answer public inquiries. These telephone numbers will be released to the public upon activation of their media center. The coordination of rumor trends between the state and affected county (ies) will occur with calls between representatives of the rumor control personnel for the Florida Emergency Information Line, the media center, and the surrounding counties.

VII Public Education

Through the JIC, public information officers will provide useful, timely, truthful, consistent, and appropriate information to the public in a radiation emergency. They will respond to incorrect information and rumors and to requests from the public and from news and information media.

The affected county (ies) will coordinate and work with state agencies, including the Department of Health, the Division of Emergency Management and others, to assure the provision of information and materials to advise residents within the affected area of appropriate protective measures to take during the radiological/nuclear emergency.

Prepared general statements have been developed by the Department of Health, Bureau of Radiation Control and others in advance of any incident to be available for quick access during an emergency. Information on radiation emergencies can also be found on the Centers for Disease Control and Prevention website (http://www.emergency.cdc.gov/radiation/).

1. The following statement is for use when there is a possibility of radiological exposure to the public. Local fire personnel, law enforcement, or other specified authority would normally release it.

   In the interest of public safety and law enforcement requirements, the area around (name of the incident site) is being monitored and a barrier (is being)/(has been) established around it. Radioactive material may have been released, so there is a possibility of radiation exposure in the controlled area. This area is also a crime scene.

   It is important that the movement of people into and out of the controlled area be strictly limited. For the time being, only members of emergency services including local, state, and federal response forces are being allowed inside the area. The public should stay away to reduce the possibility of radiation exposure from this incident and to facilitate response efforts.

2. The following statement is for use when there is a possibility of radiation exposure to the public and sheltering/evacuation is recommended.

In the interest of public safety and law enforcement requirements, the area around (name the incident site) is being monitored and a barrier (is being)/ (has been) established around it. Radioactive material may have been released so there is a possibility of radiation exposure material may have been carried downwind beyond the established perimeter of the restricted area.

As a precaution, the public is advised to [take shelter in (location]/[evacuate the following areas…). We will continue to monitor the incident to determine whether there could be (any risk)/ (any further risk) to the public.

It is important that the movement of people into and out of the controlled area is strictly limited. Only members of the emergency services including local, state, and federal response forces are being allowed inside the area. The public should stay away to reduce the possibility of radiation exposure from this incident and to facilitate response efforts.

3. The following statement is for use when radiation release has been confirmed.

   A release of radioactive material has been detected. The highest levels of contamination are expected to be within the controlled area, which is also a crime scene. However, radioactive material my have been carried downwind beyond the perimeter of the controlled area.

   As a precaution, the public is advised to [take shelter in (location)]/[evacuate the following areas…]. We will continue to monitor the incident to establish the extent of contamination and determine the risk to the public.

   It is important the movement of people into and out of the controlled area is strictly limited. Only members of emergency services including local, state, and federal response forces are being allowed inside the area. The public should stay away to reduce the possibility of radiation exposure from this incident and to facilitate response efforts.

4. Local emergency response personnel will normally issue public safety statements advising precautions to be taken against potential exposure to radiological materials. For cases in which the Incident Commander has determined that there has been a release of significant amounts of radioactive materials, the following information should be released to persons in affected areas as soon as possible after the incident.

   Until the amount of radiological contamination is determined, the following precautionary measures are recommended to minimize risk to the public.

   - Remain inside and minimize opening doors and windows.
   - Children should stay indoors and not play outdoors.
   - Fruit and vegetables grown in the area should not be eaten.
   - Turn off fans, air conditioners, and forced air heating units that bring in fresh air from the outside. Use them only to re-circulate air already in the building.

   The inhalation of radioactive material is not an immediate medical emergency.

   Trained monitoring teams will be moving through the area wearing special protective clothing and equipment to determine the extent of possible radiological contamination. The dress of these teams should not be interpreted as indicating any special risk to those indoors. If you are outside,

proceed to the nearest permanent structure. If you must go outside for critical or lifesaving activities, cover you nose and mouth and avoid stirring up and breathing any dust. It is important to remember that your movement outside could cause you greater exposure and possibly spread contamination to those already protected.

Local, state, and federal personnel are responding to the (terrorist)/ (potential terrorist) incident.

In the interest of public safety and to assist emergency response teams, authorities request that individuals within the vicinity (define) stay inside, with doors and windows closed, unless advised to do otherwise by authorities.

Further statements will be made when there is more information. Please listen for announcements on local radio/television (name stations and frequencies). Check the Internet at (web site).

5. Potential Key Messages

During a disaster response, there are important messages that emergency responders may take for granted and are often overlooked. They are important themes that need to be emphasized. Examples are provided below.

Safety

- The health and safety of this community is our first priority.
- Trained local, state, and federal civilian and military personnel are responding to this emergency.
- Please stay away from the controlled area for your safety and so that we can work efficiently.
- It is very important that we prevent additional injuries and death.

Sympathy

- We deeply regret this incident has occurred.
- Our thoughts and condolences go out to families and friends of the victims.

Cooperation

- We are working closely with all involved local, state, and federal organizations.
- Experienced federal and civilian specialists with the most advanced equipment are responding to this emergency.
- We want to understand your concerns.

Disclosure

- We are here to coordinate the initial response.
- We will give you information as soon as it becomes available.
- We want to answer your questions.
- We do not have all the answers.

Disaster Assistance

- Procedures will be established to handle requests for disaster assistance.

Radiation and Health Risk

- Radiation exposure can have short- and long-term consequences to human health.

Health effects depend on the radiation dose received and many other factors including length of time that you were exposed, your distance from the radiation source, and the ways in which you were protected through shelter or clothing worn during the time of exposure. Therefore, an individual's health risk from radiation exposure during this incident may be uncertain.

- Children exposed to radiation can be more at risk than adults.
- Radiation exposure, like exposure to the sun, is cumulative.
- Exposure to radiation may cause cancer in the long term. Exposure to a very high dose of radiation can cause death in the short term.
- If someone exposed to radiation from this incident eventually develops cancer, medical and scientific personnel will not be certain that this exposure caused the cancer.
- There is no more effective or necessary screening for cancer than existing medical methods (mammograms, pap smears, colon cancers tests). People potentially at risk of developing cancer in the future due to radiation exposure resulting from this incident should see their physicians for an annual physical.

Much is known about:

- How to minimize human exposure to radiation.
- How to treat people exposed to radiation.
- How to decontaminate people exposed to radiation.
- How to decontaminate animals exposed to radiation.
- How to clean up property contaminated with radioactive materials.

Changing and varying information:

The process of providing information is complicated by the complex nature of health effects associated with radiation. It is also complicated because the information is based upon estimation techniques and scientific monitoring of radiation levels that will vary in different locations and will change over time due to weather conditions and other variables.

VIII. Potential Question/Answers

Those responsible for public information can anticipate certain types of questions involving technical information because of a radiological disaster. Many of these questions are provided in Attachment B to this Plan. When possible, suggested answers are also presented. Some recommended answers (e.g., definitions of radiation quantities and units) are intended for public release and should not be used for rigorous scientific purposes.

Information is also available through the Florida Poison Information Network, which is staffed by nurses, pharmacists, and physicians with extensive training and certification in toxicology. This includes radiation health effects, triage, external decontamination, assessment of radiation exposure risk, and the use of potassium iodide and the isotope chelating agents. Many of the senior staff have trained at the Oak Ridge Training Laboratory. The poison center can be used as

an information resource for both the public and health care providers. Florida's Poison Control Centers can be reached at 800.222.1222.

VII. References

- CDC. Emergency Preparedness and Response. Radiation Emergencies. Available at website: http://emergency.cdc.gov/radiation/
- NCRP Report No. 138. Management of Terrorist Events Involving Radioactive Material. 2001.
- NCRP Report No. 165. Responding to Radiological and Nuclear Terrorism: A Guide for Decision Makers. 2010.
- National Response Plan, Nuclear/Radiological Incident Annex. Available on-line: http://www.fema.gov/pdf/emergency/nrf/nrf_nuclearradiologicalincidentannex.pdf

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Chapter 10 – Protective Response

I. General

The purpose of this Chapter is to establish the range of protective actions that are available to state and local governments for the protection of the public and to include ingestion pathway exposure in the event of an accidental or intentional release of radioactive material from a facility housing radioactive material, a radiological dispersal device, a nuclear weapon detonation, or other radiological incident.

II. Protective Measures

A. Plume Exposure Pathway (PEP)

The principal exposure sources for the plume exposure pathway zone include whole body external exposure to gamma radiation and inhalation exposure from the passing radioactive plume. For the plume exposure pathway, NCRP 165 "recommends that the initial public protective action for both radionuclide dispersion incidents and nuclear detonation be early, adequate sheltering followed by delayed, informed evacuation. Until the level and extent of contamination can be determined, efforts should be made to avoid being outdoors in potentially-contaminated areas. Considerations would have to be made regarding the time length of the sheltering, the means of notification to evacuate as well as regarding ending the evacuation and returning the evacuees to the area of the incident. The possible administration of the thyroid blocking agent potassium iodide, if the source includes radioactive iodine, to affected populations as well as other radiation countermeasures would also need to be considered.

B. Ingestion Pathway Zone (IPZ)

The geographical area covered in the Ingestion Pathway Zone will vary depending on the type of radiological/nuclear incident. The principal exposure source will be from the ingestion of contaminated water or foods. For planning purposes, the zone may have a radius up to 50 miles for a nuclear power plant incident or, depending on the construction and yield of the device, from a nuclear weapon detonation. However, for a radiological dispersal device (RDD) the zone may be much less than five miles depending on the activity of the radioactive material, the amount of explosive used, if any, and weather conditions. Protective Action Guides have been adopted by the Department of Health and are consistent with federal guidance contained in the Federal Food and Drug Administration's document: Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies, August 13, 1998.

The ingestion pathway, in general, represents a longer term problem. Maps for recording survey and monitoring data, key land use data, dairies, food processing plants, water sheds, water supply intake, treatment plants, reservoirs, etc. will be maintained by appropriate state agencies.

III. Concept of Operations

The response to a radiological/nuclear incident is divided into three phases: the early emergency response phase; the intermediate phase; and, the late (recovery) phase.

A. Early Emergency Response Phase

The early response phase may last from hours to a few days as stability is returned to the affected radiological/nuclear emergency area.

1. Emergency Plans

a. The State of Florida Comprehensive Emergency Management Plan outlines lead and support functions for the state agencies during a declared emergency. These responsibilities are shared by many state agencies. The Department of Health is the lead state agency for exposure pathway responses. The Division of Emergency Management is responsible for overall state coordination of non-technical radiological resources under this Plan.

b. It is recognized that other state and federal agencies may also be involved in implementing protective actions to keep the public from consuming contaminated foodstuffs, or in providing post-incident assistance to food producers, processors, or distributors under the National Response Framework. Federal assistance may include the establishment of a Federal Radiological Monitoring and Assessment Center (FRMAC) near the site of the radiological/nuclear emergency.

2. Field Monitoring

a. The Department of Health Bureau of Radiation Control Emergency Operations Officer will be responsible for coordination and implementation of all field monitoring and sampling activities. Decisions as to where sampling will occur will be made jointly involving staff from the Department of Health, the Department of Agriculture and Consumer Services, and the Department of Environmental Protection.

b. If a FRMAC is needed and becomes operational, the Department of Health will dispatch a management representative along with the Department of Health's Mobile Emergency Radiological Laboratory and field teams to the FRMAC. State and federal monitoring teams will be integrated and analytical data from field sampling and monitoring will be sent to the appropriate emergency operations centers, as the situation warrants.

c. State and local staff rosters are maintained by each respective agency.

3. Protective Actions

a. To protect the public from exposure to or inhalation/ingestion of radioactive materials, protective action recommendations will be developed and implemented according to the protective action decision process given in Chapter 4 of this Plan. These protective action recommendations are then implemented through county emergency response agencies.

b. Early phase protective action recommendations are generally based on conditions at the site of the radiological/nuclear emergency and projected (calculated) doses. Field measurements (i.e., the analysis of field air samples and beta/gamma measurements) within the Emergency Operation Zone are compared with calculated doses to verify (depending on the type of radiological emergency) plume location and site conditions and to confirm the presence or absence of particulates and/or radionuclides.

B. Intermediate Phase

The Intermediate Phase begins when the radiological/nuclear emergency has been stabilized, there is no further radioactive release from the site of the incident, and all reliable environmental measurements are available for use as a basis for decisions on additional protective actions, especially those involving ingestion. It extends until these additional protective actions are terminated. This phase may overlap the early and late phases and may last from weeks to many months.

1. Response

Any precautionary ingestion protective actions implemented during the early phase will still be in effect at the beginning of the intermediate phase. Additional responsibilities include but are not limited to:

a. Citizen decontamination, registration, and evacuee monitoring points shall be established in the affected (risk and adjacent host) counties in accordance with procedures found in local emergency plans. The Department of Health, Department of Agriculture and Consumer Services, the CDC, and the United States Department of Energy will assist.

b. Environmental sampling within the Emergency Operations Zone and the Ingestion Pathway Zone, as appropriate, will be directed by staff at the FRMAC and/or the Unified Command to define the limits of the area of radiological deposition and levels of radioactive contamination in milk, foodstuffs, and water. Additional information about sampling procedures and priorities are available in Department of Health, BRC, Standard Operating Procedures.

c. The Division of Emergency Management maintains records giving locations of major food producers, processors, distributors, dairies, and surface water systems within the Ingestion Pathway Zone. The Department of Health, in

coordination with the Department of Agriculture and Consumer Services, is responsible for the development of procedures for utilizing this information to keep affected food producers, processors, and distributors informed about protective actions and required post-incident response actions.

d. Maps for recording information on the status of the emergency and for monitoring key land use and other ingestion-related data will be developed and maintained by county emergency management.

e. Initiating or continuing the investigation of long-term agricultural land management practices (e.g., soil removal, crop rotation, tillage, etc.) which reduce future contamination of feed and food crops.

2. Re-entry

a. Re-entry operations will be coordinated with the affected counties by the State Coordinating Officer or designee.

b. Limited non-emergency worker entries into access limited areas (controlled zones) will be permitted for the performance of emergency services, and to provide food and water to livestock within the area.

c. 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. The Department of Health, BRC, will determine the feasibility of re-entry into evacuated areas and recommend the appropriate actions to the State Coordinating Officer or designee.

d. Access control points will be established and enforced by the counties. They will be used to control all movement into or within a restricted zone. Normally, they will be established in uncontaminated areas.

e. Food control points will be established by the Department of Agriculture and Consumer Services and co-located with the access control points. They will be used to restrict the flow of all food stuffs and commercial products from a restricted zone. To ensure all non-consumable items (personnel, pets, household items, etc.) leaving the 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.

f. Individuals entering the access controlled area will be issued personal dosimetry (direct reading and dosimeter badges) at the appropriate county Emergency Operations Center/Facility 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 the Department of Health.

g. Actions to protect the public from the ingestion of radioactive contaminated food or water (e.g., embargo and/or disposal of contaminated food or animals, shut down of surface water intakes for public water supply systems, curtailment of hunting or fishing) will be determined and recommended by the Department of Health, BRC, and jointly reviewed by appropriate state and county representatives before presentation to the State Coordinating Officer or designee for final approval.

C. Late Phase (Recovery Phase)

The Recovery Phase begins when recovery actions designed to reduce radiation levels in the environment to acceptable levels for unrestricted use are commenced, and ends when all recovery actions have been completed. This period may extend from months to years. Some restricted zones may remain because 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 State of Florida Comprehensive Emergency Management Plan.

1. Radiological Assessment

   a. The investigation of long-term agricultural land management practices (e.g., soil, removal, crop rotation, tillage, etc.) which reduce future contamination of feed and food crops will be continued during this phase.
   b. The identification of long-term impacts on indigenous and migratory wildlife.
   c. The determination of human doses due to ingestion, living on contaminated land, etc.

2. Decontamination

   a. A decontamination and restoration plan will be established with coordination from affected counties, the Department of Health, the Department of Agriculture and Consumer Services, the United States Environmental Protections Agency, and other federal response resources. The decontamination and restoration plan will address citizen decontamination points, decontamination of buildings and structures, decontamination of agricultural properties, and disposal of contaminated materials.

   b. The decontamination and restoration of buildings and structures will be conducted with priority given to essential basic services (i.e., general government, fire, law enforcement, utilities, hospitals, public health, etc.)

   c. Evaluation of decontamination activities will be conducted by the Department of Health, BRC, with assistance from the United States Environmental Protections Agency, and other federal response resources.

3. Return

   a. Relaxation of protective action decisions will be recommended jointly by county, state, and federal agencies and authorized by the State Coordinating Officer.

b. Human services assistance and financial assistance for individuals and businesses will be conducted in accordance with the State of Florida Comprehensive Emergency Management Plan.

4.. Relocation

a. Recommendations for restricted zones will be jointly developed by county, state, and federal agencies and authorized by the State Coordinating Officer.

b. Human services assistance and financial assistance for individuals and businesses will be conducted in accordance with the State of Florida Comprehensive Emergency Management Plan.

IV. Protective Action Guides

The decision to implement recommended protective actions will be based on the comparison of numerous incident parameters (e.g., incident duration and magnitude, weather conditions, etc.) to established protective action guides.

The Operations Officer for the Department of Health, BRC, in coordination with appropriate county and state agencies such as the Department of Agriculture and Consumer Services, Florida Department of Law Enforcement, and the Department of Environmental Protection as well as federal agencies present, will recommend to the State Coordinating Officer or designee protective actions based on projected dose to the population in the impacted counties. The State Coordinating Officer or designee and the impacted counties will then make and implement joint protective action decisions. In circumstances where there is an immediate release of radioactive material, the State Emergency Response Team Chief present in the State Emergency Operations Center, or the senior government official in the county emergency operations center, can implement protective action decisions

V. Sheltering-in-place

The National Council on Radiation Protection (NCRP) recommends that the initial public protective action for both radioactive material dispersion incidents and nuclear detonations be early, adequate sheltering followed by delayed informed evacuation. Until the plume of radioactive material has passed and the level and extent of contamination can be determined, efforts should be made to avoid being outdoors in potentially contaminated area. Sheltering-in-place can be used to assure that a population is positioned so that communication with the public can be carried out expeditiously. Consideration of the length of time for sheltering needs to be evaluated rapidly as the course of the response unfolds. Alternate plans to sheltering-in-place or plans to assist those sheltered need to be considered during the initial phase of the response.

VI. Evacuation

The optimal time for evacuation depends on the physical characteristics at the incident site (e.g., presence and construction of buildings), routes of exit from the Emergency Operations Zone, and other factors. Authorities will inform the public regarding when to evacuate.

Evacuation will normally be initiated after plume passage. Consideration for the length of time of the evacuation should be discussed with appropriate authorities.

Maps showing evacuation routes, evacuation areas, pre-selected decontamination/monitoring points, relocation centers and shelters in designated host areas, and population distributions should be part of the local emergency management plan. Additional information contained in each local plan should include: means for notifying all segments of the resident and transient population, relocation routes, plans for protecting mobility-impaired persons, and traffic capacities and evacuation time estimates. Each county will use existing day to day means for dealing with potential impediments to evacuation and means for controlling access to evacuation areas.

VII. Radiation Countermeasures

In those situations where evacuation has been determined to not be an acceptable protective action for populations difficult to evacuate (e.g., inmates of penal institutions, patients in nursing homes or hospitals, or others with impaired mobility), pre- and post-exposure radiation countermeasures may be used as described in Chapter 11, Section VI, of this Plan.

VIII. References

- Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies. U.S. Food and Drug Administration. August 13, 1999. Available on-line athttp://www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM094513.pdf

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National Council on Radiation Protection. Management of Terrorist Events Involving Radioactive Material. NCRP no. 138. 2001.

-NCRP. Key Elements of Preparing Emergency Responders for Nuclear and Radiological Terrorism. NCRP Commentary no. 19. 2005.

-NCRP Report No. 165. Responding to Radiological and Nuclear Terrorism: A Guide for Decision makers. 2010. Available for purchase from: http://www.ncrppublications.org/Reports/

Chapter 11 - Radiological Exposure Control

I. General

This chapter establishes the means and responsibilities for controlling radiological exposures to emergency personnel, patients, health care staff, and the general public involved in a radiological/nuclear incident. Emergency response organizations and other agencies will be responsible for controlling radiation exposure to individuals affected during such an incident by:

- Limiting the amount of time spent in radiation areas.
- Limiting entry into radiation areas to the maximum extent possible.
- Reducing radiation levels prior to entry into an affected area.
- Issuing appropriate radiation countermeasures to responders as well as the general public when internal radioactive material incorporation is expected or detected as per the Florida Department of Health's Bureau of Radiation Control (BRC), Operations Officer in consultation with appropriate medical experts.
- Knowing if the exposure is or will be internal or external.
- Understanding the characteristics of the radiation or radioactive material involved, i.e., alpha, beta, gamma, x-ray, or neutron emissions.

II. Radiation Exposure Potential to Emergency Responders, Patients, and Staff

The following radiation exposure concepts are presented:

- NCRP Commentary No. 19 uses the term emergency responders to refer to those individuals who in the early states of an incident are responsible for the protection and preservation of life, property, evidence and the environment. These individuals are then subject to occupational dose limits. Some key disciplines who could be classified as emergency responders includes:
  -Law enforcement
  -Emergency medical services
  -Fire services
  -Hazardous materials
  -Public works
  -Governmental administration
  -Public safety communications
  -Health care
  -Public health.

- Emergency responders, patients, and the general public could be exposed to several different sources of radiation as a result of a radiation incident. Emergency response actions will depend on the source of exposure.

- External Exposure – In this scenario an individual has been exposed to a source of radiation external to the body. This individual is not radioactive and others that interact with this person do not become radioactive. Concern may exist if the amount of radiation dose received from an external source(s) is large.

- Contamination Exposure – In this form of exposure, radioactivity is residing in or on the individual. External radioactive contamination may be spread from person-to-person. Internal uptake occurs when contamination is inhaled, ingested, or absorbed through a cut or abrasion. Radiation exposure from a contamination incident is rarely life-threatening. Removing the outer clothing of a contaminated individual can reduce this form of exposure by as much as 80 - 90%.

- Internal Exposure (Incorporation) – Incorporation refers to the uptake of radioactive materials by body cells and tissues such as bone, liver, thyroid or kidney. In general, radioactive materials are distributed throughout the body based on their chemical properties. Generally, incorporation cannot occur unless contamination has occurred in a living individual or animal.

- Absorbed doses in the range of 2 to10 Gy (200 to 1000 rad) are the most important for immediate medical intervention. Individuals exposed to large absorbed doses of radiation > 2 Gy (>200 rad) may exhibit the following symptoms:

    - Nausea
    - Vomiting
    - Fatigue
    - Weakness
    - Psychological stress

- Symptoms will vary from individual to individual. Time of onset and severity of symptoms are related to the total absorbed dose. Based on a century of radiological experience, a good predictor of survival is the time from exposure to nausea/vomiting. Anyone who vomits within two hours of a radiation exposure has received a significant, potentially fatal, radiation dose.

- Lymphocyte counts can be used to determine doses only if the total dose has exceeded several Gy (several hundred rad). Generally, if the lymphocytes have decreased by 50% AND are < 1000 cells/μL within 24 to 48 hours post-incident, and no other medical conditions could have caused this decrease, the patient has received a moderate absorbed dose of radiation. Patients with severe burns and/or trauma to more than one system often have decreased lymphocytes and this must be accounted for in any medical evaluation.

III. Radiation Protection Guidelines

The three major tenets of radiation protection include the variables of time, distance, and shielding. Each can have a significant impact on accumulated radiation dose.

Time: The shorter the time an individual stays in a radiation field, the less the radiation exposure. Working quickly and efficiently, perhaps using a rotating team approach can be used to keep individual radiation exposures to a minimum.

Distance: The further a person is from a source of radiation, the lower the radiation dose. Do not touch radioactive materials. Use shovels, brooms, etc., to move materials to avoid physical contact.

Shielding: Although not always practical in emergency situations, shielding, offered by barriers, can reduce radiation exposure (e.g., consider using fire trucks or large construction machines).

A. Radiation Guidance for Emergency Responders

Exposures during emergency incidents are difficult to predict and may involve expedited decision-making. Partly due to this unpredictability, limits are being reevaluated for emergency responders performing actions during the early phase of an emergency. Justification of the exposure and methods to further reduce exposure come into play during all phases of an emergency. NCRP 165 recommends that when the cumulative absorbed dose to an emergency responder reaches 50 rad (0.5 Gy), a decision should be made on whether or not to withdraw the emergency responder from the Hot Zone (see below). The NCRP considers the 50 rad (0.5 Gy) cumulative absorbed dose a *Decision Dose* and not a Dose Limit. In addition, NCRP 165 does not recommend an exposure limit on emergency responders performing time-sensitive, mission-critical activities such as life-saving. Instead, exposure limits and decision points should be established by the Incident Commander based on operational awareness and mission priorities.

A summary of emergency response guidance to radiation incidents is presented in Table 1 below, (this guidance is subject to change).

Table 1

Suggested Radiation Exposure Guidance for Emergency Actions

Action	**Guidance or Suggested Trigger Levels**
First response (emergency work)	500 mSv (50 rem) TEDE (life-saving activities)[1] 250 mSv (25 rem) TEDE (life-saving activities)[2] 0.5 Gy (50 rad) Decision Dose (life-saving activities) 100 mSv (10 rem) TEDE (protect property only)[2] 500 mSv (50 rem) TEDE (protect property only)[4]
Turn back value for emergency response personnel	10 mSv/hr (1 rem/hr)[1] 50 mSv/hr (5 rem/hr) [3]
Follow up response (non-emergency work)	50 mSv/yr (5 rem/yr) TEDE[1] 5 mSv/day (0.5 rem/day) TEDE[3]
Sheltering	5-50 mSv (0.5 – 5 rem) TEDE averted[1]
Evacuation	50-500 mSv (5 – 50 rem) TEDE averted[1]
Administer KI	50-500 mSv (5 – 50 rem) averted thyroid dose[1]
Restriction on use of contaminated foodstuffs during an emergency	10 mSv/yr (1 rem/yr) TEDE from any single source[1]

TEDE = Total Effective Dose Equivalent = sum of deep dose equivalent for external radiation and the committed dose equivalent for internal radiation.

References

[1] NCRP Report 138. Management of terrorist events involving radioactive material, 2001
[2] EPA 400-R-92-001. Manual of protective action guides and protective actions for nuclear incidents. 1991
[3] State of Florida Bureau of Radiation Control, SOP's for radiological emergencies
[4] NCRP Report 116. Limitation of exposure to ionizing radiation. 1993
[5] NCRP Report 165. Responding to Radiological and Nuclear Terrorism: A Guide for Decision makers. 2010

B. Guidelines for Incident Command

When responding to a radiological/nuclear incident, one of the most important factors in exposure control is establishing the incident command post and chain of command.

NCRP 165 and the "Planning Guidance for Response to a Nuclear Detonation" introduce concepts including severe damage zone, moderate damage zone, light damage zone, and dangerous fallout zone that should be used in developing operational protocols for responding to radiological/nuclear emergencies in order to be consistent with federal partner use of terminology and operational zone criteria. These documents delineate the opportunities for emergency responders to provide the maximum assistance to victims and to preservation of infrastructure while minimizing responder health and safety concerns.

The operational parameters involved in response to a small RDD incident will be vastly different than the response to a nuclear detonation. However, some commonalities include:

1. Approach incident site with caution. Position personnel, vehicles, and command post at a safe distance upwind and uphill of the site, if possible.

2. Ensure safety of responders.

    - Identify all hazards (danger of fire, explosion, toxic fumes, electrical hazards, structural collapse, etc.).

    - If transportation related, identify cargo.

    - Obtain information concerning the cargo from placards, labels, shipping documents, and other immediately available sources.

    - Keep upwind of smoke, fumes, etc.

    - Create a control zone within the emergency operations zone. For a minimal radiation incident, three zones should be established:

        - Hot Zone or Controlled (Contaminated) Zone – This is typically the immediate incident site. Only essential personnel and equipment are admitted to perform emergency response activities. Protective clothing and radiological monitoring

equipment is required for entry. All contaminated items should remain in this zone.

- o Warm Zone – The corridor between the Hot Zone and the Cold Zone.
- o Cold Zone or Non-controlled (non-contaminated) Area – Non-essential personnel and equipment (including ambulance) located here. Equipment and personnel must be monitored when entering from the Warm Zone.

- Reroute pedestrian and vehicular traffic.
- Mark controlled area by use of ropes or tapes.
- Limit entry to rescue personnel only.
- Order evacuation or sheltering as needed.
- Follow usual protocols for respiratory protection, use of protective clothing and turnout gear.
- Monitor changing conditions that could create a hazardous situation.

3. Locate victims and facilitate extrication, emergency care, and transportation of the injured. Medical problems take priority over radiological concerns. Do not delay rescue or transport of a seriously injured or contaminated patient.

4. Communications

   - Notify the hospital of possible contamination/exposure of victim.
   - Notify DOH Bureau of Radiation Control for radiological assistance and provide situational assessment of incident area.

5. Prevent/fight fires, as if toxic chemicals are involved.

6. Ensure radiation protection and contamination control.

   - Do not allow eating, drinking, smoking, or other activities within contaminated areas that might lead to intake of radioactive material.
   - Avoid direct contact with radioactive materials where possible. Utilize protective clothing and anything available for remote handling (shovels, branches, ropes, etc.).
   - Limit time near radioactive materials to the minimum necessary so as the keep radiation doses to as low as reasonably achievable (ALARA). Rotate staff as necessary.
   - Determine radiation levels within controlled area and monitor rescue personnel with individual dosimeters, if available.
   - Evacuate personnel from the immediate downwind area. Detain personnel who were in the incident area until they can be checked by radiological monitors. Follow instructions of the radiation authority.
   - Remove protective gear/clothing at the control line, as applicable.

- Wrap, label, and isolate all clothing, tools, etc, used in the controlled area, and retain them until the radiation authority can clear them.

- Determine if measures are needed to contain all incident debris in the control zone until cleanup is achieved. Prevent unnecessary handling of incident debris.

IV. Exposure Monitoring

A. Instrument Selection

Radiation cannot be detected by the human senses. A variety of instruments are available for detecting and measuring radiation. Response to incidents involving ionizing radiation will depend on several factors, including

1. Expected magnitude of the incident;

2. Isotopes and activity levels most likely to be encountered; and,

3. Additional resources responding to the incident.

When thinking of possible radiological incidents occurring in Florida, the most likely incident would involve relatively small amounts of radioactive material as a result of highway or industrial accidents. Materials used to create dirty bombs have to be included in the discussion, especially after 9/11, but are not as likely to occur. Nuclear detonation is very unlikely to occur but would cause massive casualties and would definitely overwhelm the local emergency response system. Information provided below will be limited to the most likely incidents to occur, i.e., highway and industrial accidents. Further guidance on nuclear detonations is available in NCRP 165, “Planning Guidance for Response to a Nuclear Detonation”, and “Key Response Planning Factors for the Aftermath of Nuclear Terrorism”.

Response would be tiered if an incident including an explosion occurs. Police, EMS and Fire and Rescue/HAZMAT would probably be first on the scene. Either through reviewing packaging and labeling, the alarm of a personal radiation detector, or a radiation survey, recognition that ionizing radiation is involved would have to occur. If needed, local experts could be called to assist, and, if extensive contamination or exposure is found, the Florida Department of Health Bureau of Radiation Control would be contacted. Similarly, for larger incidents, federal response teams could be dispatched to the area, if needed. It may take several hours or longer for these groups to arrive. In the interim, local responders would be involved in the incident.

During the first few hours in which responders may be exposed to ionizing radiation, a method to evaluate accumulated exposure as well as detecting contamination and measuring exposure rates would be useful. Unfortunately, there is no single device currently made which can accomplish all three objectives.

B. Method for Evaluating Accumulated Exposure

To determine accumulated exposure, it is recommended that self-reading dosimeters, i.e., "pocket dosimeters", and chargers or electronic dosimeters, e.g., radiological pagers, be used to monitor exposure to individuals. Multiple ranges are available for pocket dosimeters but the most useful would range from 0 to 200 mR (full scale). Although pocket dosimeters are shock sensitive, they are easy to use, are relatively reliable once they have been zeroed properly, and are very cost effective. The Electronic Personal Dosimeters (EPD) have proven to be more effective in an emergency response situation when compared to self-reading dosimeters because they read both gamma and beta doses, whereas the pocket dosimeters read only gamma. The Florida Department of Health, Bureau of Radiation Control, uses EPD's as their primary dose instruments. Consideration in the use of these self-reading dosimeters includes:

- Measures gamma radiation only with limited detection efficiency.
- Wear outside of all clothing on the front of your upper body.
- Avoid dropping or rough handling. This can cause the dosimeter to read incorrectly.
- Read the pocket dosimeter by holding it facing a light source and keeping the scale horizontal. Do not read the dosimeter in the charger.
- Read the dosimeter at least every half hour.
- If the dosimeter goes off scale or alarms continuously, leave the area immediately.
- Keep pocket dosimeters charged while storing them. If any dosimeters drift noticeably faster than the others, replace them.
- If using a pocket dosimeter, record the initial reading and subtract it from the final reading. Never start off with the reading below zero.

C. Method for Determining Exposure Rate

Exposure rate measurements are important in determining the length of time a person can remain in a certain radiation field. An exposure rate meter, typically, an ion chamber or energy-compensated Geiger-Mueller device, is energy independent and can be used for determining control zone boundaries and assessing package integrity. If the exposure or exposure rate is too great, as determined by either a pocket or electronic dosimeter or an exposure rate instrument, and victims are not present, the area would most likely be cordoned off and response would be provided by the Bureau of Radiation Control or federal authorities. It is important that the instrument selected to monitor exposure rate be energy independent (most contamination detection instruments are energy dependent). These instruments tend to be affected by temperature and humidity and are most useful in a stable environment. Exposure rate instruments require batteries which will periodically need to be changed. Some instruments will have a zero control to make the meter read zero. Without proper zero adjustment, the instrument may have large errors.

D. Emergency Worker Dosimetry

All Florida Department of Health, Bureau of Radiation Control radiological health professional personnel are routinely monitored with dosimeter badges. Permanent dose records are maintained at the BRC in Orlando. Prior to deployment, the Department of Health field monitoring teams are issued electronic personal dosimeters.

The Department of Health has a contract with a National Voluntary Laboratory Accreditation Program-certified dosimetry company to provide dosimeter badges to State Emergency Response Team personnel. These dosimeter badges are stored in each location at risk for nuclear reactor incidents and include: Palm Beach County; Indian River County; Brevard County; Miami-Dade County; Monroe County; Levy County; Citrus County; St. Lucie County; Martin County; and, at the Division of Emergency Management building in Tallahassee. The Department of Health also maintains an additional supply of dosimeter badges in Orlando that would have to be brought by the BRC to an incident.

Those counties associated with nuclear power facilities who may be involved in monitoring and decontamination activities will have a Radiation Safety Officer (RSO) in the county emergency operations center that is responsible for monitoring exposure of county emergency personnel. The RSO will issue, as appropriate, dosimeters (including direct- reading and dosimeter badges) to emergency workers. The BRC and county health departments would be involved in this activity in non-nuclear power plant counties.

All of these resources may be called upon to respond to an all-hazards radiological emergency.

E. Decontamination

A practical goal for whole body personnel decontamination has been set at no more than twice background using a sensitive detector such as a pancake GM meter. However, factors such as monitoring a large number of potentially contaminated individuals or accounting for non-removable contamination may cause local and state authorities to establish a greater unconditional release point. Equipment and facilities may have higher decontamination release points depending on use and occupancy factors as well as financial considerations.

The Department of Health field team personnel who have been in contaminated or potentially contaminated areas will be monitored at the Mobile Emergency Radiological Laboratory. Contaminated personnel will be decontaminated prior to being relieved from duty.

All emergency personnel will be monitored at appropriate county monitoring and decontamination stations. Public members who are contaminated will be processed through appropriate county monitoring and decontamination stations such as Community Reception Centers. Decontamination primarily consists of removal of at least the outer layer of clothing and may include showering. Injured and contaminated personnel will be treated at medical facilities identified in Chapter 12 (Medical and Public Health Support) of this Plan.

All contaminated tools, clothing, equipment and other material that cannot be decontaminated will be placed in plastic bags, tagged and placed in suitable containers for later disposition, under the direction of the County Health Department and the BRC.

F. Method for Determining Contamination

Not all responders would necessarily require a contamination meter. Usually, this meter will consist of a base unit with detachable Geiger-Mueller (GM) probe Background radiation is usually less than 0.05 mR/hr, or under 50 cpm, when the selector switch is on the most sensitive range. Since their response to various energies of radiation is non-linear, GM meters are not designed to measure radiation exposure. Their greatest benefit lies in locating contamination on personnel and equipment and verifying the success of removing contamination. The detection efficiencies for two commonly available contamination instruments, a Ludlum Model 3 with 44-9 pancake probe and a CDV700, are presented in Table 2 for a variety of radioisotopes.

There are fifty seven portal monitors in the state used to screen individuals potentially contaminated with radioactive materials. The state has also purchased and deployed strategically in all seven regions in order to provide a statewide response Johnson Model AM-801 Portable Portal Monitors. The Model AM-801 is used for beta/gamma monitoring and can be quickly assembled without any tools. The unit has a walk through mode and a timed mode. The walk-through mode is preferred and is used to screen large numbers of persons rapidly

Electronic pagers have a similar window density but typically are less sensitive to gamma radiation. The size of the window is much less than most common GM pancake probes and, therefore, would not be as useful in scanning victims or areas for contamination. Electronic pagers weigh substantially less than most contamination meters. In an actual emergency, it is uncertain that a user would be able to hear the beeper sound from some electronic pagers

Table 2

RESPONSE OF MONITORING INSTRUMENTATION TO VARIOUS RADIONUCLIDES

(Listing of Common Isotopes, Not all Inclusive)

		CDV-700		LUDLUM MODEL 3
	RADIONUCLIDE	OPEN	CLOSED	44-9 PANCAKE
ELEMENT	SYMBOL	SHIELD	SHIELD	
Americium	Am-241	S	S	S
Carbon	**C-14**	**N**	**N**	**S**
Cesium	Cs-137	G	G	G
Chromium	Cr-51	G	S	G
Cobalt	Co-57	G	G	G
	Co-60	G	G	G
Gallium	Ga-67	G	G	G
Hydrogen	H-3 (Tritium)	N	N	N
Iodine	I-123	G	G	G
	I-125	G	S	G
	I-131	G	G	G
Iridium	Ir-192	G	G	G
Phosphorus	P-32	G	N	G
Radium	Ra-226	G	S	G
Technetium	Tc-99m	G	G	G
Thallium	Tl-201	G	G	G
Uranium	U	G	S	G
Xenon	Xe-133	G	G	G

G: Good detection capabilities
S: Some detection capabilities
N: No detection capabilities

G. Dose Records

Emergency and other personnel, except for the Department of Health, will be issued an Incident Radiation Exposure Record form (unless a similar institutional form indicating an existing radiation monitoring program is already in place) as shown in Figure 1. Each emergency responder is responsible for:

1. Monitoring their direct-reading dosimeter every 30 minutes.

2. Reporting their exposure to their supervisor every six hours.

3. For returning the direct-reading dosimeter and record form to their supervisor at the end of the emergency.

Emergency responder dosimeter badges will be returned to the Bureau of Radiation Control when the emergency is over or conditions have returned to normal. The dosimeter badges will be returned by the Bureau to the vendor for reading. The Bureau of Radiation Control will receive all emergency responder exposure records from the vendor. Records will be sent to the

appropriate Radiation Safety Officer for distribution to the appropriate workers. A copy will be retained by the Bureau of Radiation Control.

Figure 1: Individual Exposure Record Form (Front)

Name:				**Instructions:** Charge your dosimeter and enter the best reading obtainable on the first line (0). Read the dosimeter and record the reading every 30 readings to your supervisor every 6 hours, or when your dosimeter indicates an exposure reading of 100 mR. Begin a new card every 6 hours. The Dosimeter Badge issued to you is to be worn at all times and turned in only when requested by your supervisor. Exposure in excess of 500 mR must be authorized.
Agency/Dept.				
SS#		DOB:		
Dosimeter#:		Type:		
Date:		Time:		
Dosimeter		Total		
Time	Reading	Exposure	Location	
0				
0+30				
1+00				
1+30				
2+00				
2+30				
3+00				
3+30				
4+00				
4+30				
5+00				
5+30				
6+00				

Report to Your Supervisor
Record of Potassium Iodide Consumption

Date	Time	Int.	Date	Time	Int.	

(Back)

Above is a sample of a 3" x 5" card that may be used as an individual Incident Radiation Exposure Record form. This form may be used in conjunction with the permanent radiation record.

V. Exposure Control Measures for Acute High Dose Incidents

Although unlikely to occur, exposure potential and, therefore, exposure control measures are critical for acute, high dose incidents. Examples of acute high dose incidents include:

- Detonation of device containing highly active radioactive material ("dirty bomb")(RDD)
- Nuclear detonation

- Accidents at a nuclear reactor

A. Dirty Bombs

Dirty bombs or radiological dispersal devices spread radioactive contamination to personnel and the immediate area. Unlike a nuclear weapon, radiation is not released in a massive burst of energy. For those wishing to cause malevolent harm, the advantage of a RDD over nuclear weapons is that nuclear technology is not required. Because of this potential, security of all radioactive material should be of paramount concern to all licensees. Radiological dispersal devices create more psychological terror than actual radiation risk; however, the potential exists for some localized areas of heavy contamination near the detonation area.

Response to Incidents Involving Dirty Bombs

The management of incidents involving a dirty bomb would be similar to the response after a transportation accident involving ionizing radiation. Emergency responders would require similar PPE and radiation detection devices. Care would need to be exercised when establishing a hot line to ensure the extent of the contamination resulting from a dirty bomb has been well defined. Population monitoring and psychological counseling would be available for the responders and the public.

B. Thermonuclear Devices

Transportation of Thermonuclear Devices

In the United States, nuclear weapons may be transported by aircraft, truck, train, or naval vessel. In each case, weapons and other components are installed in special containers, which are securely fastened to the transport vehicle by carefully designed tie-downs and mountings. Stringent safety measures have also been incorporated into the design of all nuclear weapons which should enable them to survive all but the most severe accident conditions. A nuclear detonation can be produced only upon proper functioning of the weapon in the normal sequence of arming and firing. It is highly doubtful that any nuclear weapon involved in a transportation accident would, or could, detonate with a nuclear yield. Most nuclear weapons will contain conventional high explosives in varying amounts up to many hundreds of pounds. These high explosives constitute the major hazard associated with accidents involving nuclear weapons. Accidents or fires involving such shipments should be treated like similar accidents involving conventional high explosives. If a nuclear weapon is enveloped in the flame of a gasoline fire, the high explosive may ignite, burn, and, in some cases, detonate in one large or several small explosions.

Regardless of the nature of fires or detonations of high explosives in nuclear weapons, the major radiological threat will be the release of plutonium. When associated with a fire, metallic plutonium may burn, producing radioactive plutonium oxide particles, which may present serious hazards if inhaled or deposited in wounds. Also, detonation of the high-explosive component in nuclear weapons may pulverize plutonium into very small particles, which can cause contamination over a large area. If the high explosives burn instead of detonating, the amount of plutonium dispersed into the atmosphere usually is small and represents a serious health

hazard only in the immediate area of the smoke cloud. Plutonium is not a radiation hazard it if remains outside the body, because it is an alpha-emitter which has a very short range and lacks the ability to penetrate the skin. Internal plutonium contamination can be a very serious hazard if inhaled or ingested.

Unless it is necessary to approach a nuclear weapon to rescue injured individuals, emergency responders at an accident should establish an exclusion zone with a radius of at least 1,600 feet (500 meters) from the weapon. No attempt should be made to extinguish fires or otherwise approach a nuclear weapon involved in a transportation accident except to recover injured personnel. Even then, if an armed individual orders you to stay away; do it. The teams escorting nuclear weapon shipments have the authority to declare a National Security Area (NSA) around the weapon and to shoot anyone entering that zone without permission (only appropriate individuals with the proper count ersign will be allowed to enter the NSA). Notify the nearest military installation and the Joint Nuclear Accident Coordinating Center (JNACC) of the accident. JNACC is a combined Defense Nuclear Agency (DNA) and Department of Energy central office for the exchange and maintenance of information regarding radiological assistance capabilities in connection with accident involving nuclear weapons and other radioactive materials. JNACC offices are located in Albuquerque, NM (505.845.4667), and in Alexandria, VA (703.325.2102).

Nuclear Detonations

Most experts believe the largest improvised nuclear device (fission bomb) that could be assembled and used by terrorists in the United States would not exceed 10 kilotons (kT) in yield. By comparison, the uranium nuclear weapon dropped on Hiroshima was 15 kT in yield and the plutonium weapon dropped on Nagasaki was 21 kT in yield.

Nuclear weapons will certainly generate more casualties than local medical resources can handle. Nonetheless, the effectiveness and adequacy of the rescue, evacuation, and treatment effort during the first 24 hours after such an attack is critical.

The principle physical effects of nuclear weapons are blast, thermal radiation (heat), and nuclear radiation. Effects are dependent on the yield or size of the warhead and method of deployment. The most likely terrorism related method of deployment would result in a surface blast. In a surface blast, the fireball actually touches the land or water. The area affected by blast, thermal radiation, and initial nuclear radiation will be less extensive than for an air burst of similar yield; however, the local fallout, especially downwind, will be significantly higher. Blast injuries result from overpressure forces and indirect blast wind drag forces. Casualties can result from significant overpressure alone but the major damage from overpressure is lung damage and eardrum rupture. Indirect blast wind drag forces injuries result from flying objects impacting the body or from physical displacement of the body against objects and structures. Indirect blast wind injuries far exceed those caused directly by the blast. The thermal radiation associated with the blast can cause burns directly by absorption of the thermal energy through exposed surfaces (flash burns) or by the indirect action of fires in the environment. Close to the fireball, all objects will be incinerated. Indirect burns are primarily caused by clothes igniting. Flash blindness, as a result of viewing the blast within several miles, can result in temporary loss of vision for two minutes during daylight hours and seven minutes or longer at night. Blast and thermal injuries will far outnumber radiation injuries.

The nuclear blast will create four types of ionizing radiation: neutron, gamma, beta and alpha. Neutrons and gamma rays are present in the initial burst while the residual radiation is primarily composed of alpha, beta and gamma rays.

Significant prompt radiation occurs only within the area of severe blast damage from ground bursts. Initial radiation becomes less of a hazard with increasing yield.

Fallout and residual radiation will be a hazard for survivors, rescuers, and medical personnel. Residual radiation is composed of radioactive fallout and neutron-induced activity. Over 300 different fission products can be produced in a blast. The estimated activity of fission products one minute after detonation is approximately 3×10^{10} Curie/kiloton (by comparison, the total radioactive inventory for a 100 megawatt (Mwe) uranium-fueled light water reactor is 1.5×10^{10} Ci). The soil may become neutron activated due to neutron capture by the sodium, manganese, aluminum and silicon in the soil**. As a general rule of thumb, the initial exposure rate immediately after the blast will be reduced by 1/10 in 7 hours; 1/100 in 49 hours (2.04 days) and 1/1000 in 343 hours (14.3 days).**

In a surface blast, large quantities of earth or water will be vaporized by the heat of the fireball and drawn up into the radioactive cloud. This material will become radioactive when it condenses with fission products and other radio-contaminants or has become neutron-activated. The diameter size will vary with the largest particles settling to earth within about 24 hours.

Logistical plans should provide not only for medical supplies and equipment but also general supplies, food, clothing, water purification equipment, radiation detection and survey instruments, communications equipment and alternative modes of transportation. Certain type of medical supplies such as whole blood, blood expanders, burn kits, dressings, individual protective clothing, and gloves will be needed.

Radiation monitors should be available to all rescue personnel and evaluated to verify stay times. Accumulated doses should be maintained below appropriate Protective Action Guidelines.

Consolidated staging, treatment, and evacuation sites in areas of relative safety from residual radiation, secondary explosions and fires should be established between medical, rescue, evacuation and damage control groups.

Emergency responder actions after a nuclear detonation should follow these rules http://www.hps.org/hsc/documents/HSCEmergCardv2_6.pdf:

1. Duck and cover when you see a flash. Stay down behind cover for at least two full minutes. Any type of cover could prevent serious burns and injuries from flying and falling debris such as broken glass. Keep eyes closed during the bright light to prevent blindness.

2. Go in. Stay in. Tune in. Shelter-in-place by going underground or to the center of the middle floor of a nearby, stable large building. Minimize the time exposed to radiation (Rule 9). Maintain communications (Rule 5)

.

3. Radioactive fallout occurs soon after the detonation and it will fall and accumulate on the ground. The direction of the fallout plume spread is dependent on surface AND

upper level winds. Generally, stay upwind especially if you can see the direction of the plume's movement. Fallout may or may not be visible on the ground. Radioactive fallout can be detected ONLY by using radiation monitoring instruments.

4. Use the "Inverse" 7/10 Rule: Fallout loses 90% of its radioactivity in the first 7 hours after a detonation and an additional 90% for every 7-fold increase in time. It is reduced: by 90% in the first seven hours; by 99% in 49 hours (two days); and, by 99.9% in 343 hours (two weeks

)

5. Maintain communications with local, tribal, and state authorities and other response elements; provide a scene assessment for the regional situation assessment center (e.g., EOC). Report visible fallout and approximate radiation levels in the area and the times they were taken at regular intervals. Monitor the media including radio, TV, and the Internet

.

6. PPE for emergency responders. External fallout contamination will collect on outer garments and exposed body parts. No PPE will protect responders from external gamma radiation. Although inhalation and ingestion are a secondary concern compared to external gamma radiation exposure, masks or improvised respiratory protection may be used during fallout plume passage, for smoke and dust, and for high indoor radiation levels.

7. Contamination removal. Most external contamination can be removed by taking off the outer layer of clothes, wiping exposed hair and skin areas, and/or by taking a shower.

8. Fight fires. The detonation will cause fires in the area where populations are sheltered; take actions to slow the spread of fire.

9. Responders with radiation monitoring instruments should initially shelter using these instruments to monitor shelter conditions and not exit the shelter if it requires entering a dangerous radiation zone (>10 R/hr) unless there is a time critical safety issue such as avoiding fire, a building collapse, or an evident lifesaving mission. Provided outdoor radiation levels are below 10 R/hr, perform scene assessment of the immediate area for hazards. Stay close to shelter locations and closely monitor radiation levels and immediately shelter if radiation levels increase rapidly. Responders without radiation monitoring equipment should shelter as long as practical or until informed that they are not in the dangerous radiation zone (> 10

R/hr).

10. Establish safe evacuation routes from dangerous radiation zones (>10 R/hr) and identify evacuation priorities. Establish triage, decontamination, and casualty collection points outside of dangerous fallout zones (in areas <10mR/hr).

Public and citizen responder actions after a nuclear detonation should follow these rules http://www.hps.org/hsc/documents/publicEmergency_Card_121509v2_3-1up.pdf:

1. Duck and cover when you see a flash. Stay down behind cover for at least two full minutes. Any type of cover could prevent serious burns and injuries from flying and falling debris such as broken glass. Keep your eyes closed during the bright light to prevent blindness.

2. Go in. Stay in. Tune in. Shelter-in-place by going underground or to the center of a middle floor of a nearby, stable large building. If at home, go to the basement or a ground floor room the farthest from outside. Close windows and doors. It may be necessary to shelter for 24 to 48 hours. Keep disaster kits containing food, water, medications, and other supplies in your vehicle, at work, and at home. Maintain communications (Rule 5).

3. Radioactive fallout could look like sand, silt, smoke, or even ash that will fall and accumulate on the ground and horizontal surfaces. The direction of the fallout cloud spread depends on surface AND upper level winds. Stay upwind especially if it is daylight and you can see the direction of the fallout cloud. Any visible fallout represents immediate danger and exposure to even small amounts, only detectable by radiation monitoring instruments, should be avoided.

4. Radiation levels from deposited fallout decrease rapidly in the hours after detonation. As a rule of thumb, if fallout deposition is complete by 1 hour after detonation, the radiation level at 7 hours drops to 10% of the radiation level at 1 hour, and the radiation level at 2 days drops to 1% of the radiation level at 1 hour. However, depending on wind and weather, fallout deposition miles from a detonation may continue or even begin after 1 hour, and the radiation level may rise at first before dropping off.

5. Maintain communications with local authorities by monitoring the radio, TV, or the Internet. Follow the directions of local authorities.

6. Protective equipment for the public. Fallout contamination will collect on outer garments and exposed body parts. Masks or improvised breathing protection (several layers of cloth) may be used during fallout cloud passage.

7. Contamination removal. To avoid bringing fallout contamination into your shelter or home, most contamination can be removed by taking off the outer layer of clothes, wiping exposed hair and skin areas, and/or by taking a shower.

8. Orderly evacuation of your shelter-in-place location when told by authorities it is safe to leave the area. Do not leave your shelter to pick up children. Children will be sheltered at their school or other care location and evacuated, as directed by authorities. Follow the directions of emergency responders.

9. Hazard avoidance. Unless threatened by fire or building collapse, avoid outdoor exposure during the first minutes and hours after the fallout arrives. It is safe to consume food and beverages that were not outside during the fallout cloud passage.

10. Stay in control. By following the above rules, members of the public will know the proper actions to take and will not panic during a nuclear emergency.

NCRP 165 provides guidance on adequate locations to shelter-in-place. Shelters located within the affected area should be chosen to best reduce exposure from fallout. Steel and concrete shelters provide the best protection. The following thicknesses of material will attenuate the incident dose by 1/2:

Steel	0.8 in (2 cm)
Concrete	2.4 in (6 cm)
Earth	3.1 in (8 cm)
Water	4.7 in (12 cm)
Wood	8.7 in (22 cm)

VI. Prophylactic and Post-Exposure Radiation Countermeasures

If internal uptake is suspected, several options are available to limit either future uptake or to limit the long-term effects. Some of these agents may not be immediately available for victims. A list of radiation countermeasures is in Attachment A -11.

A. Limit Uptake

Radioiodines (^{131}I, ^{134}I, ^{125}I)

Potassium iodine (KI) should normally only be taken prior to exposure; however, for suspected radioiodine exposure prescribe KI if within 12 hours of exposure. Giving 130 mg of KI to an adult at or before radioiodine exposure effectively blocks 100% of the thyroid uptake of radioiodine. KI given 4 hours post-exposure blocks 50% of the thyroid uptake. KI given 12 hours post-exposure has little effect. Contraindications include individuals allergic to iodine. The fetus is at greatest risk of thyroid cancer induction. **KI does not provide radioprotection to organs other than the thyroid.** Radioactive iodine exposure is most likely to occur during the release of radioactive materials from a nuclear reactor event or those downwind from a nuclear detonation, but would not be useful in most other types of radiological incidents. The Florida Department of Health's Bureau of Radiation Control's Standard Operating Procedures for KI distribution looks at exposures of 5 REM, and includes adults in that class.

The state has determined that potassium iodide will be furnished for emergency responders and difficult to move people.

B. Emergency Responders and Difficult to Move Individuals

Radiocesium (^{137}Cs, ^{134}Cs)

Radioactive Cesium 137 is readily regarded as a likely material used in a RDD. Insoluble Prussian blue, sold under the trade name, Radiogardase-Cs, enhances excretion of isotopes of cesium from the body by means of ion exchange. Orally administered Prussian blue traps cesium in the gut, interrupts its resorption from the GI tract and, thereby, increases fecal excretion. It reduces the effective half life of the material in the body by up to 75%. If given within one hour of the incident, initial absorption can also be suppressed. Expert medical attention is required for dosing this medication. The prescribed dose will depend on the level of suspected internal contamination, e.g., low (1 to 5 x ALI[Annual Limit on Intake]): 3 g daily; intermediate (5 to 10 x ALI): 3-10 g daily; high (>10 x ALI): 10 to 20 g daily. All administrations should be TID. This drug is effective only if GI motility is intact. Pregnant and lactating women are able to tolerate this compound. A physician's order is required in order to administer this material. Use of Prussian blue for this indication is FDA approved. Prussian blue is available in the DOH RADPACKS.

Transuranic Elements (Plutonium, Americium, Californium and Curium)

Ca-DTPA and Zn-DTPA exchanges either calcium or zinc for another metal with greater binding ability and carries it to the kidneys where it is excreted in the urine. The chelating efficacy is greatest immediately, or within one hour, following exposure when the radionuclide is circulating in or available to tissue fluids and plasma. Ca-DTPA is approximately 10 times more effective than Zn-DTPA for initial chelation of transuranics and, therefore, should be used whenever larger body burdens are expected. However, after 24 hours, Zn-DTPA is as effective as Ca-DTPA and should be used for protracted therapy because of its lesser toxicity. Ca-DTPA is contraindicated in minors, pregnant women, patients with known kidney disease, and in patients with bone marrow suppression. Ca-DTPA or Zn-DTPA should be given as a 1 gram daily dose and administered either by slow intravenous push over a period of 3 to 4 minutes, an intravenous infusion, or by inhalation in a nebulizer. Follow-up and additional therapy may be continued for years, if necessary. **DTPA should not be used for uranium or neptunium exposure.**

A physician's order is required in order to administer this material. Ca-DTPA and Zn-DTPA are

FDA-approved for this indication. DTPA is available from the DOH RADPACKS.

Uranium

Alkalize the patient with sodium bicarbonate in order to promote excretion. This treatment is not FDA-approved.

C. Limit Long Term Effects

Sulfhydryl compounds scavenge free radicals. Amifostine/Ethyol is the most effective medication clinically available. Doses of 700 to 900 mg/m^2 can significantly reduce doses, but can cause nausea, vomiting and hypertension. Lower concentrations could be used to protect selected emergency responders. A physician's order is required in order to administer this material. This medication is not FDA-approved for this indication. Other medications are being investigated currently.

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Attachment A-11
Radiation Countermeasure Agents

Radionuclides	Treatment	Preferred Rx
Actinium (Ac)	Consider DTPA	Consider DTPA
Americium (Am)	DTPA	DTPA
Antimony (Sb)	BAL, penicillamine	BAL
Arsenic (As)	BAL, DMSA	BAL
Barium (Ba)	Ba, Ca Therapy	See NCRP 161
Berkelium (Bk)	DTPA	DTPA
Bismuth (Bi)	BAL, Penicillamine, DMSA	DMSA
Cadmium (Cd)	DMSA, DTPA, EDTA	DMSA
Californium (Cf)	DTPA	DTPA
Calcium (Ca)	Ba, Ca Therapy	See NCRP 161
Carbon	No treatment available	N/A
Cerium (Ce)	DTPA	DTPA
Cesium (Cs)	Prussian blue	Prussian blue
Chromium (Cr)	DTPA, EDTA (antacids are contraindicated)	DTPA
Cobalt (Co)	DMSA, DTPA, EDTA, NAC	DTPA
Copper (Cu)	EDTA, penicillamine, trientine	Penicillamine
Curium (Cm)	DTPA	DTPA
Einsteinium (Es)	DTPA	DTPA
Europium (Eu)	DTPA	DTPA
Fission Products (Mixed)	Management depends on predominant isotopes present at time. Early: iodine; Late: strontium, cesium, and others	
Fluorine (F)	Aluminum hydroxide	Aluminum hydroxide
Gallium (Ga)	Consider penicillamine	Penicillamine
Gold (Au)	BAL, penicillamine	BAL
Indium (In)	DTPA	DTPA
Iodine (I)	Potassium iodide (KI), propylthiouracil, methamizole	KI
Iridium (Ir)	Consider DTPA, EDTA	Consider DTPA
Iron (Fe)	Deferoxamine (DFOA), deferasirox, DTPA, DFOA and DTPA together	DFOA
Lanthanum (La)	DTPA	DTPA
Lead (Pb)	DMSA, EDTA, EDTA with BAL	DMSA

Attachment A-11 (Con't.)
Radiation Countermeasure Agents

Radionuclides	Treatment	Preferred Rx
Manganese (Mn)	DFOA, DTPA, EDTA	DTPA
Magnesium (Mg)	Consider strontium therapy	Consider strontium therapy
Mercury (Hg)	BAL; EDTA; penicillamine; DMSA	BAL
Molybdenum (Mo)	Limited clinical experience	
Neptunium (Np)	Consider DFOA and/or DTPA	Consider DFOA and/or DTPA
Nickel (Ni)	BAL, EDTA	BAL
Niobium (Nb)	DTPA	DTPA
Palladium (Pd)	Penicillamine, DTPA	Penicillamine
Phosphorus (P)	Phosphorus Therapy	Phosphorus therapy
Plutonium (Pu)	DTPA, DFOA, EDTA, DTPA and DFOA together	DTPA
Polonium (Po)	BAL, DMSA, penicillamine	BAL
Potassium (K)	Diuretics	Diuretics
Promethium (Pm)	DTPA	DTPA
Radium (Ra)	Ra, Sr therapy	
Rubidium (Rb)	Prussian Blue	Prussian Blue
Ruthenium (Ru)	DTPA, EDTA	DTPA
Scandium (Sc)	DTPA	DTPA
Silver (Ag)	No specific therapy. Consider gastric lavage and purgatives.	
Sodium (Na)	Diuretic and isotopic dilution with 0.9 % NaCl	Diuretic and isotopic dilution with 0.9 % NaCl
Strontium (Sr)	Ra, Sr therapy	
Sulfur (S)	Consider sodium thiosulfate	Consider thiosulfate
Technetium	Potassium perchlorate	Potassium perchlorate
Thallium (Tl)	Prussian Blue	Prussian Blue
Thorium (Th)	Consider DTPA	Consider DTPA
Tritium (^{3}H)	Force fluids	Water diuresis
Uranium (U)	Bicarbonate to alkalinize the urine. Consider dialysis	Bicarbonate
Yttrium	DTPA, EDTA	DTPA

Chapter 12 - Medical and Public Health Support

I. General

This chapter describes the arrangements that have been made for medical services for radiologically contaminated/radiation exposed individuals. This chapter includes provisions for emergency care and transportation of victims of accidents/incidents, and medically incapacitated persons among the population affected by evacuation and relocation during a radiological/nuclear emergency.

Personnel from the Department of Health will coordinate the delivery of medical support services to victims of radiological incidents. The Department of Health Emergency Coordinating Officer will be notified by the Division of Emergency Management and will, in turn, activate the proper Department of Health personnel including the Regional Domestic Security Task Force public health & medical co-chair in the affected Florida Department of Law Enforcement region.

Chapter 16, “Hospital Radiological Emergency Response Plan Template”, will assist local hospital planners in developing their emergency response plan.

II. Medical Support

A radiological emergency can present actual or potential radiological health hazards to individuals within the affected area or surrounding areas. It is imperative that capabilities exist for treating contaminated or acutely irradiated individuals. An ongoing capability for emergency care and transportation of victims of incidents, sudden illness, and vulnerable populations during evacuations must also exist.

Coordination of the delivery of medical and other health services for victims of radiological emergencies is the responsibility of the Department of Health as the lead agency for Emergency Support Function 8. Per that responsibility, the State Surgeon General appoints an Emergency Coordinating Officer who is responsible for ESF-8’s response and recovery efforts associated with a disaster. The Department of Health will coordinate with medical and health facilities and emergency transport services in any area of the state potentially affected by radiological emergencies. Communications between local hospitals and ambulance services will be operationalized via local emergency medical services communication systems.

The Department of Health will annually update the list of medical and health facilities that have filed a letter with the Department of Health to provide medical treatment to radiologically-contaminated or acutely irradiated individuals (refer to Figure 12-1). This list will be coordinated with the Division of Emergency Management and will include the name, location, type of facility, bed capacity, and any special radiological handling capabilities. All hospitals and EMS services which have the routine capability to care for acutely injured or ill patients can use existing protocols/materials to treat and stabilize individuals acutely contaminated or irradiated. Training through the Oak Ridge Radiation Emergency Assistance Center/Training Site (REAC/TS) has been sponsored by the Bureau of Radiation Control at Level 1 Trauma centers in Gainesville, Miami, Orlando, Tampa, and Ft> Lauderdale.

A. Hospitals and Emergency Medical Services Which Have Provided a Letter of Agreement

Hospitals and other emergency medical service facilities which have provided a letter of agreement with the Department of Health to provide medical support for acutely injured or ill individuals who have been contaminated or irradiated are identified in Figure 12-1. Ambulance services who have signed an agreement to transport radiological emergency victims are listed in Figure 12-2. All of these facilities have developed these agreements because of their proximity to nuclear power plants. In addition, 200+ hospitals in the state that received ASPR hospital preparedness grants were required to have a radiological response plan for treating contaminated patients. In the event of an event in most counties of the state, one of these hospitals can provide the necessary care, even if using no precautions other than those for blood borne pathogens.

FIGURE 12-1: Emergency Medical Support Facilities With Utility Agreement To Treat Radiological Emergency Patients

Special Utility Hospitals & Address	Type	Capacity	Services Agreement
CRYSTAL RIVER AREA			
Citrus County			
Citrus Memorial Hospital 502 W. Highland Boulevard Inverness, Fl. 34452	County Surgical	171	General Medical/ YES
Seven Rivers Community Hospital 6201 N. Suncoast Blvd. Crystal River, Fl. 34428	Corporation Profit Surgical (excluding obstetrics)	112	General Medical/ YES
TURKEY POINT AREA			
Dade County			
Baptist Hospital of Miami, Incorporated 8900 South West 88th Street Miami, Fla. 33176	Corporation Non Profit Surgical	513	General Medical/ YES
Mercy Hospital, Inc. 3663 South Miami Avenue Miami, Fla. 33134	Church Operated Non Profit Surgical	391	General Medical/ YES
ST. LUCIE AREA			
St. Lucie County			
HCA Lawnwood Medical Center	Corporation Profit Surgical	335	General Medical/ YES

1700 S. 23rd Street
Ft. Pierce, FL34950

Martin County

Martin Memorial Hospital 300 Hospital Drive Stuart, Fla. 34995	Corporation Non Profit Surgical	336	General Medical/ YES

Palm Beach County

J.F. Kennedy Memorial Hospital 5301 South Congress Avenue Atlantis, Fla. 33462	Corporation Non Profit Surgical (excluding obstetrics)	369	General Medical/ NO
Jupiter Hospital 1210 South Old Dixie Highway Jupiter, Fla. 33458	Corporation Non Profit Surgical (excluding obstetrics)	156	General Medical/ NO
St. Mary's Hospital 901 - 45th Street West Palm Beach, Fla. 33407	Corporation Non Profit Surgical	358	General Medical/ NO

Figure 12-2: Agreements for EMS Service Support

EMERGENCY MEDICAL SERVICE	DEPARTMENT OF HEALTH AGREEMENT
Citrus County Florida Regional Emergency Medical Service	YES
St. Lucie County St. Lucie County – Ft. Pierce Fire District	YES
Martin County Martin County Emergency Medical Service	YES
Dade County Metro-Dade County Fire/Rescue Department	YES

B. Emergency Medical Services

1. Field decontamination may be helpful in stable patients, but should not delay life-saving medical care, including transport to a medical facility.

    a. Unstable patients or patients requiring immediate transport should be cocooned in a double layer of blankets and transported with appropriate care.

b. To this date, no medical care professional has been subjected to a medically significant level of radiation while caring for a patient of a radiological accident/incident.

c. Simple removal of contaminated clothing can significantly decrease exposure to the patient and medical care givers.

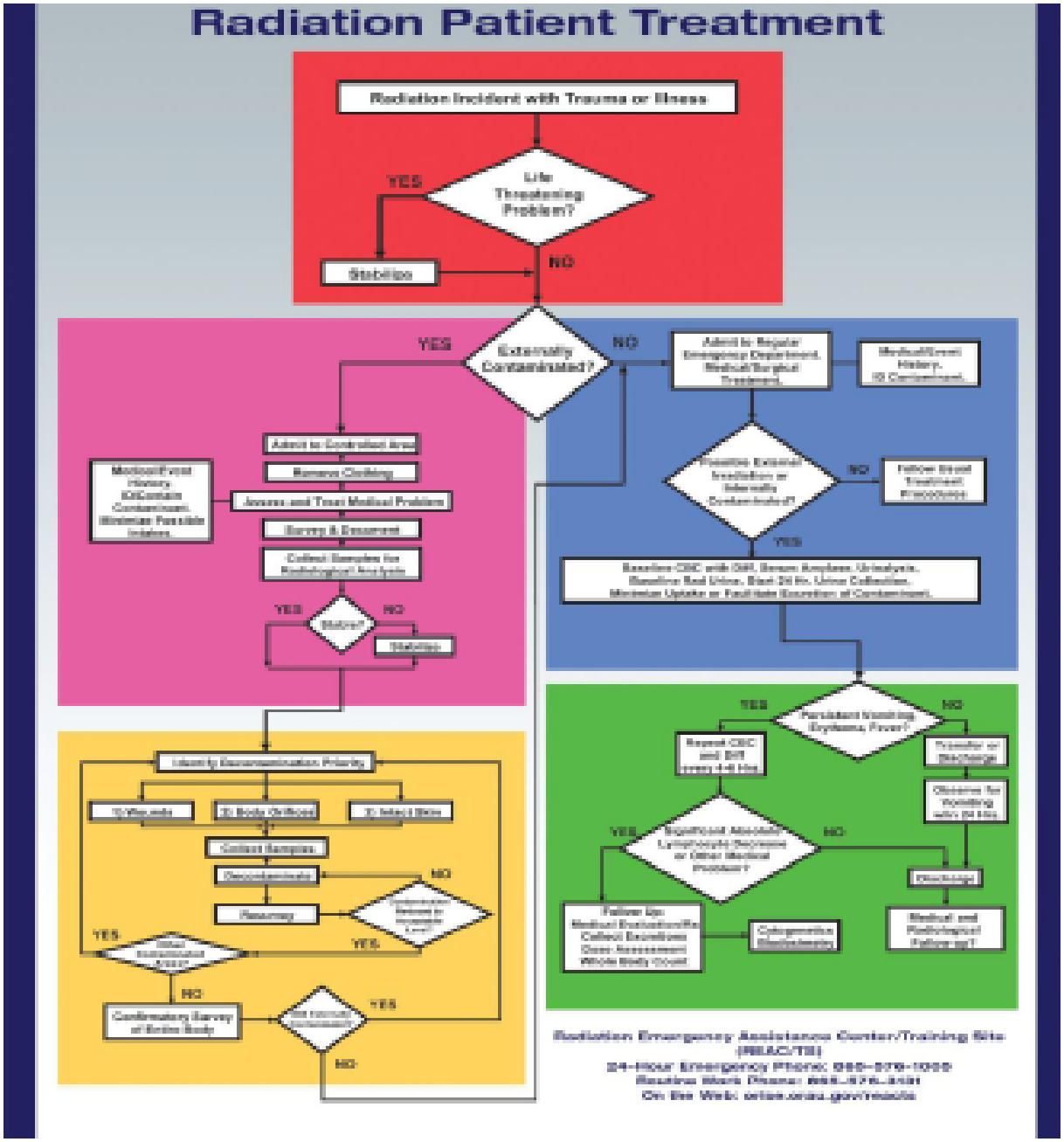
d. With the exception of criticality accidents (involving exposure to a nuclear chain reaction such as in a critical reactor or a nuclear detonation), irradiated patients are NOT radioactive. Those exposed to criticality accidents will have some measurable radioactivity, but not enough to be a risk to caregivers.

2. Recommended core competencies and planning/mitigation strategies for hospital personnel have been developed by the State of Florida (See Chapters 14 and 15).

Biodosimetry information is provided in Attachment A-12 to assist the clinician in the medical management of patients exposed to ionizing radiation. Based on information gathered during the Chernobyl incident, the majority of emergency responders survived because they did not have radiation-induced emesis within the first two hours post-exposure. The lethal dose of radiation that will, without medical intervention, impact 50% of the population within 60 days, i.e., $LD_{50/60}$, has been established at approximately 3.5 Gy (350 rad).

III. Hospitals

The following algorithm provides an overall summary of the suggested response hospitals should provide during an incident involving radiation exposure and/or contamination. Specific details follow the algorithm. Chapter 16 has a complete radiological emergency response template that can be modified for individual hospital use.



Oak Ridge Institute for Science and Education, Radiation Emergency Assistance Center/Training Site (REAC/TS), *The medical aspects of radiation incidents*, Appendix A, http://orise.orau.gov/files/reacts/medical-aspects-of-radiation-incidents.pdf. Accessed January 5, 2011.

A. Prior to Patient Arrival

1. Upon notification of an incident potentially involving radioactive contamination, a radiation treatment area should be prepared according to the hospital's emergency plan prior to arrival of any patients. Ideally, this area should have a separate entrance for contaminated patients, a "clean" exit area, a copious supply of necessary materials (including bags for containing contaminated materials, bandaging, gloves, irrigation fluids and a means of containment of run-off, and necessary medical supplies).

a. Patients may present suddenly without prior notification. Life-saving and necessary emergency medical care should not be delayed in order to prepare a decontamination treatment area, but common sense measures can be used to isolate potential spread of contamination.

b. No medical care professional has been subjected to a medically significant level of radiation while caring for a patient of a radiological accident/incident.

2. Contact a Health Physicist for assistance. These individuals should be available through the hospital's radiology or nuclear medicine departments and a pre-plan for how to contact them in an emergency should be developed and be in place. The county health department and the Department of Health, Bureau of Radiation Control, may be able to assist in this capacity.

3. A radiological screening area should be established in the patient receiving area. Use of radiation instrumentation such as a Geiger counter to screen for the presence of radiological contamination (qualitative, not quantitative) will allow separation of non-contaminated patients which can be treated in the usual manner from those to be routed to the decontamination area. Non-injured, but contaminated, patients can be directed to a decontamination area.

4. Situations involving multiple or unknown contaminants should be managed for the most restrictive case. For example, management of a patient arriving at the hospital that has been exposed to both a volatile chemical agent as well as a radiological agent may require additional PPE protection for hospital staff.

B. Patient Management

Patients exposed to ionizing radiation may include those who have received a significant whole body exposure, have inhaled radioactive materials, or who have wounds contaminated with radioactive materials, including shrapnel. Emergency treatment and stabilization of patients should always take precedence over radiation exposure evaluations or decontamination procedures. General objectives, in the approximate order of importance for the management of exposed or injured patients,are as follows (NCRP 138):

1. Triage on the scene of the incident.

2. Medical stabilization.

3. Prevention/minimization of internal contamination.

4. Decontaminate on the scene, if injuries not life threatening.

5. Triage upon arrival at hospital.

6. Set up of a controlled area large enough to hold the anticipated number of victims.

7. Treat and stabilize life-threatening injuries.

8. Decontaminate in isolated area outside of the Emergency Department, if injuries are not life threatening.

9. If life-threatening medical conditions exist, treat patient in isolated area of the Emergency Department.

10. While wearing protective clothing, change patient's outer clothing, if a radiological incident is suspected. Bag, label and hold clothing for the Radiation Safety Officer. Double glove and change outer gloves after handling patient items.

11. Question patient regarding potential exposure.

12. Access external contamination and decontaminate localized areas.

13. Treatment of other minor injuries.

14. Containment of the contamination to the treatment area and prevention of contamination of other personnel.

15. Minimization of external radiation to care staff.

16. Assessment of internal uptake.

17. Treatment of internal uptake.

18. Assessment of local radiation injuries/radiation burns.

19. Long-term follow-up of patients with significant whole body irradiation or internal contamination.

20. Counseling of patient and family members about expected long-term effects and risks.

C. Initial Response to Patients Suspected To Be Contaminated and Injured

The following measures are considered and implemented as needed for cases of: (1) patient(s) presenting at a hospital with symptoms suggestive of exposure to radioactive material; and, (2) for incidents involving possible exposure to radioactive material which occur at the hospital.

1. Following incident command protocol, identify and contact hospital incident commander.

2. At the discretion of the hospital's incident commander, the following actions should be considered:

   a) Notify the State Warning Point, local and state health departments, including the RDSTF Public Health & Medical co-chair in the affected FDLE region, the FDLE, the FBI field office, local police, the CDC, and/or medical emergency services (see Section D).

   b) A facility lockdown (generally not a consideration for limited situations involving non-communicable agents) (see Section E).

   c) The release of stable hospital patients who are not part of the incident and/or the need to restrict admissions, as well as the transferring of victims to other facilities (see Section F).

d) Internal communications for staff, patients and/or visitors.

e) External communications with the media, other healthcare facilities, and the community at large.

f) Additional quantities or types of personal protective equipment.

g) Evaluate ventilation controls (see Section G).

h) Isolation measures for specified patients or patient groups.

i) Establishment of a decontamination area and procedures for decontamination of patients and the environment/equipment (see Section H).

j) Post-traumatic incident counseling (see Section I).

k) Population monitoring (see Section J).

3. Access external contamination and decontaminate localized areas. Remove external clothing and place in a labeled bag and place in a controlled area. Ordinary water or saline is sufficient to remove the majority of contamination from a patient. Do NOT scrub aggressively or use a hard bristled brush. This will potentially allow radioactive contamination to be absorbed through the skin. Decontamination should be performed with the following priorities:

   - **Wounds**. Contaminated wounds are first draped, preferably with a waterproof material to limit the spread of radioactivity. Contaminated wounds are to be cleaned by gentle cleansing, not scrubbing, with a surgical sponge and irrigation, preferably utilizing tongs to hold the surgical sponge. Wound cleaning should be performed concentrically from farther away from the wound to the center of the wound—from less contaminated areas to more contaminated areas. THIS IS IN THE OPPOSITE DIRECTION OF USUAL MEDICAL CLEANSING. Remove contaminated drapes, dressings, etc. and monitor with Geiger Mueller meter probe covered with latex or nitrile glove. Place in a bag and label bag as radioactive. Depending on the half-life of the radioactive contaminants, they may either be held for decay-in-storage or sent to a licensed disposal facility.

   - **Orifices**. Contaminated body orifices, such as the mouth, nose, eyes and ears need special attention because of possible rapid absorption. Using moistened swabs collect a sample of each nare separately. Bag, e.g., in a labeled “zip-lock baggie”, separately and save for assay for internal contamination. If radioactive material has entered the oral cavity, encourage brushing the teeth with toothpaste and frequent rinsing of the mouth. Instruct the patient NOT to swallow. If the pharyngeal region is also contaminated, gargling with a 3% hydrogen peroxide solution might be helpful. Contaminated eyes should be rinsed by directing a stream of water from the inner canthus to the outer canthus of the eye while avoiding contamination of the nasolacrimal duct. Contaminated ears require external rinsing and an ear syringe can be used to rinse the auditory canal provided the tympanic membrane is intact.

   - **High-level skin area**. Complete decontamination is usually not possible because some radioactive material remains fixed to the skin. Decontamination to twice background levels is usually sufficient. Decontamination should be stopped if no further decrease is noted. Remember to assess the background radiation level in the treatment area before the contaminated patient arrives.

- **Low-level skin areas**. Complete decontamination is usually not possible because some radioactive material remains fixed to the skin. Decontamination to twice background levels is usually sufficient. Decontamination should be stopped if no further decrease is noted.

The distribution of radioactivity should be recorded in the patient's chart, e.g., using the Rule of 9's chart for burn victims readily found in most emergency departments.

4. Question the patient. Questions should include:

   - When did the incident occur?
   - Any current allergies?
   - What medications are currently being used?
   - Any history of chronic or recent illness?
   - Any recent nuclear medicine tests conducted?
   - What measurements may have been taken at the site, e.g., air monitors, fixed radiation monitors, nasal smear counts, and skin contamination levels?
   - Are other chemical or biologic agents involved?
   - What therapeutic measures have already been taken, such as the use of blocking agents or isotopic dilution procedures?

5. Before leaving the treatment area or hot zone remove personal protective equipment, including booties and gloves. Monitor hands and feet with a Geiger counter.

6. Wash hands thoroughly in a designated sink.

7. Samples taken from the patient, such as blood or urine, should be labeled with "Caution Radioactive Material" tape, if available. A summary of possible tests to be considered is listed in Attachment B-12.

D. Notification of County/State Health Departments, Centers for Disease Control, Law Enforcement and Emergency Medical Services

External Contacts:

State Warning Point	800.320.0519 (24 hr)
Bureau of Radiation Control Department of Health	407.297.2095 (24 hr)
FBI Field Office (Jacksonville)	904.721.1211
State Health Department	850.487.2945
REAC/TS – medical assistance for radiation injuries	865.576.1005 (24 hr)
HAZMAT National Response Center (Coast Guard)	800.424.8802 (24 hr)

Department of Energy Savannah River Operations	803.725.3333 (24 hr)
Nuclear Regulatory Commission (NRC)	301.816.5100 (24 hr)
Centers for Disease Control and Prevention	770-488-7100 (24 hr)
Federal Emergency Management Agency (Thomasville, GA)	912.225.4500 (24 hr)
EPA Emergency Response Section, Atlanta	404.562.8700 (24 hr)

County/state health departments may provide assistance in any of the following ways:

- Designating triage centers throughout the area.
- Providing information to citizens via the media.
- Requesting additional medical equipment from the Strategic National Stockpile, if required.
- Forwarding updated information to health care professionals (e.g., email," blast faxes", etc.).

E. Facility Lockdown

In general, a lockdown may be contemplated when the risk of the unregulated arrival of persons seeking care from within the community will exceed the capabilities of the facility to safely deliver care. A modified lockdown may be required in the Emergency Department to prevent the spread of contamination. The decision to terminate a lockdown will be made only after consultation with appropriate county/state health agencies.

F. Management of the Hospital's Patient Census

If the number or type of hospital beds may be inadequate for anticipated needs:

1) Assess the readiness of hospital inpatients for discharge;

2) Specify what, if any, restrictions will be needed for hospital admissions; and,

3) Determine if transfer of patients to other facilities will be necessary.

G. Ventilation Control

1. If airborne radioactive contamination is suspected, the HVAC system must be placed on recycled air as soon as possible.

2. In addition, raising the temperature of the facility will cause air to expand creating positive pressure and pushing air through cracks to the outside. However, this may have a negative impact on patient care and should be considered only after consultation with the hospital incident commander and appropriate medical staff. Reduce cracks as much as possible by stuffing with cloth or towels.

H. Decontamination of Patients and the Environment

1. The treatment of patients should always take precedence over radiation exposure or decontamination procedures.

2. In a contamination accident/incident, all patients should be considered contaminated until proven otherwise and wounds should be decontaminated prior to decontaminating intact skin. Wounds free of contamination should be covered with waterproof dressing to prevent cross-contamination. Patients who have no evidence of external contamination should be treated in a routine manner in the Emergency Department. Patient specimens should be considered contaminated and labeled with "Caution Radioactive Material" tape.

3. Every effort should be made to explain the decontamination process, equipment used, patient specimens taken, and contamination precautions to the patient prior to the start of any decontamination procedure.

4. Obtain the appropriate radiation meter in order to monitor the patient. Perform a battery check and determine if the instrument is functioning properly by performing a function test using the embedded check source, if available. Cover the pancake probe with a latex or nitrile glove. Do not place probe in direct contact with the contaminated area. Operation of a radiation meter with accurate quantitative measurements requires experience and practice for proper technique. Individuals familiar with the use of radiation instrumentation such as the Radiation Safety Officer, health physicists, or nuclear medicine staff should be consulted.

5. If the clothing of exposed persons needs to be removed for purposes of decontamination, it must be handled only by trained Patient Decontamination Team personnel wearing appropriate protective equipment/garb, and must be sealed in a labeled impervious bag to prevent contamination to other areas.

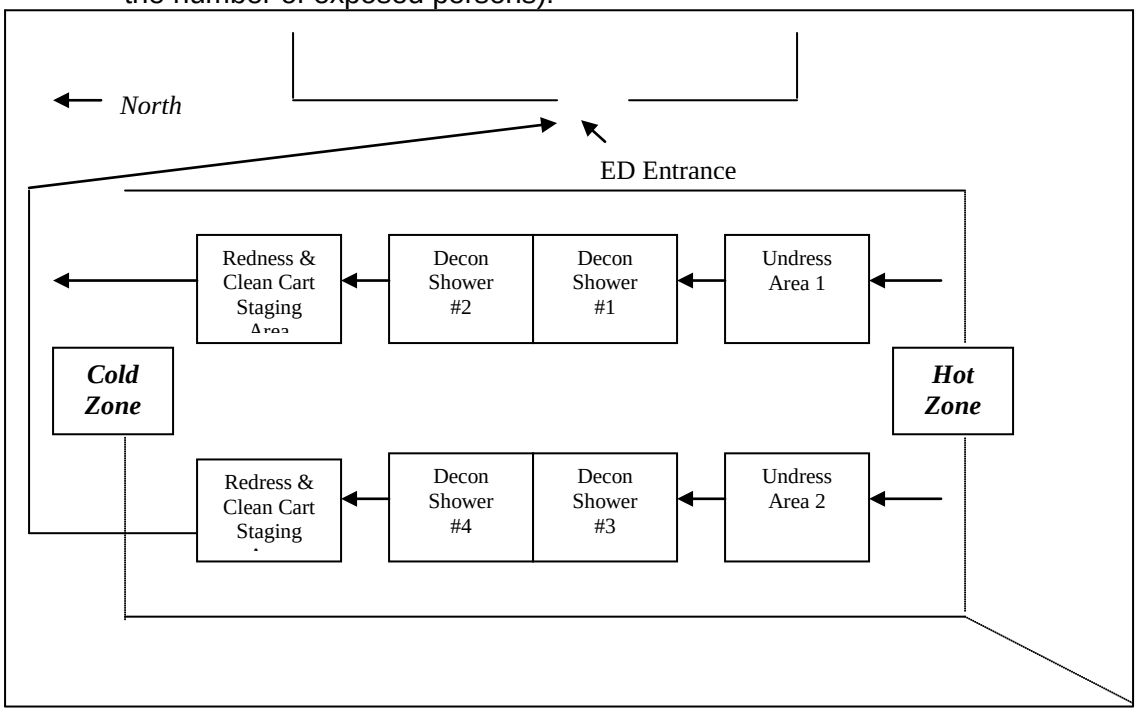
    - After removal of contaminated clothing patients should be instructed, or assisted if necessary, to immediately shower with soap and water working from the scalp to the toes. Instruct the patients NOT to swallow any water.

    - For localized areas of contamination, irrigate with tepid water. Avoid using either hot or cold water. Harsh scrubbing should be avoided. Extensive thermal burns should NOT be scrubbed due to the danger of hypothermia and hypotension. Scrubbing abrades and removes marginally viable skin, increases blood flow to the affected area, and can increase dermal absorption of contaminants. Gentle rinsing only should be employed.

    - Potentially harmful practices such as bathing patients with bleach solutions are unnecessary and should be avoided. Clean water, saline solution or commercial ophthalmic solutions are recommended for rinsing the eyes. Hair clipping is usually not required in decontamination.

6. Periodically check the background level of radiation in an area. Elevated background levels can occur if the probe becomes contaminated or if radioactive material is accumulating in the scanning area.

A typical decontamination area may be set up as outlined below (actual setup will depend on the number of exposed persons):



The FDLE/FBI may require collection of exposed clothing and other potential evidence for submission to FDLE/FBI or Department of Defense laboratories to assist in exposure investigations. Place potentially contaminated clothing in a bag identified with the patient's name and date. The bag should be clearly marked: DO NOT DISCARD.

I. Post-Traumatic Incident Counseling

Radiation counseling should be conducted by appropriate medical/behavioral and health physics staff. Possible discussion items would include:

- Acute effects
- Cancer risks
- Genetic risks
- Fetal risks

J. Population Monitoring (Community Reception Centers)

Following a mass casualty radiation emergency, public health professionals will play a crucial role in assessing and monitoring people potentially exposed to radiation or contaminated with radioactive material. This process, called population monitoring, will be conducted in community reception centers (CRCs). Contamination screening and long-term monitoring of the health of the affected population will

be the responsibility of the Department of Health (ESF 8) with assistance from the Centers for Disease Control and Prevention. County health departments will need to implement community reception centers and a population registry as part of their epidemiology function.

Virtual Community Reception Center (vCRC) is a web-based training tool that provides an overview of the CRC process for planners, managers, and potential CRC staff. After completing the program, users will be able to:

- Describe the process flow in a CRC
- Identify the key stations in a CRC
- Recognize essential services for each station in the CRC

vCRC is a self-paced program that uses a simulated 3-D environment, embedded video segments, an interactive process flow diagram, and customizable supporting resources to deliver a unique training experience for all users.

- Launch vCRC
- More Information

Environmental Health Strike Teams have been trained and equipped to assist in the community reception centers function. Medical Reserve Corps members have also been trained to augment the strike teams and use their equipment.

IV. References

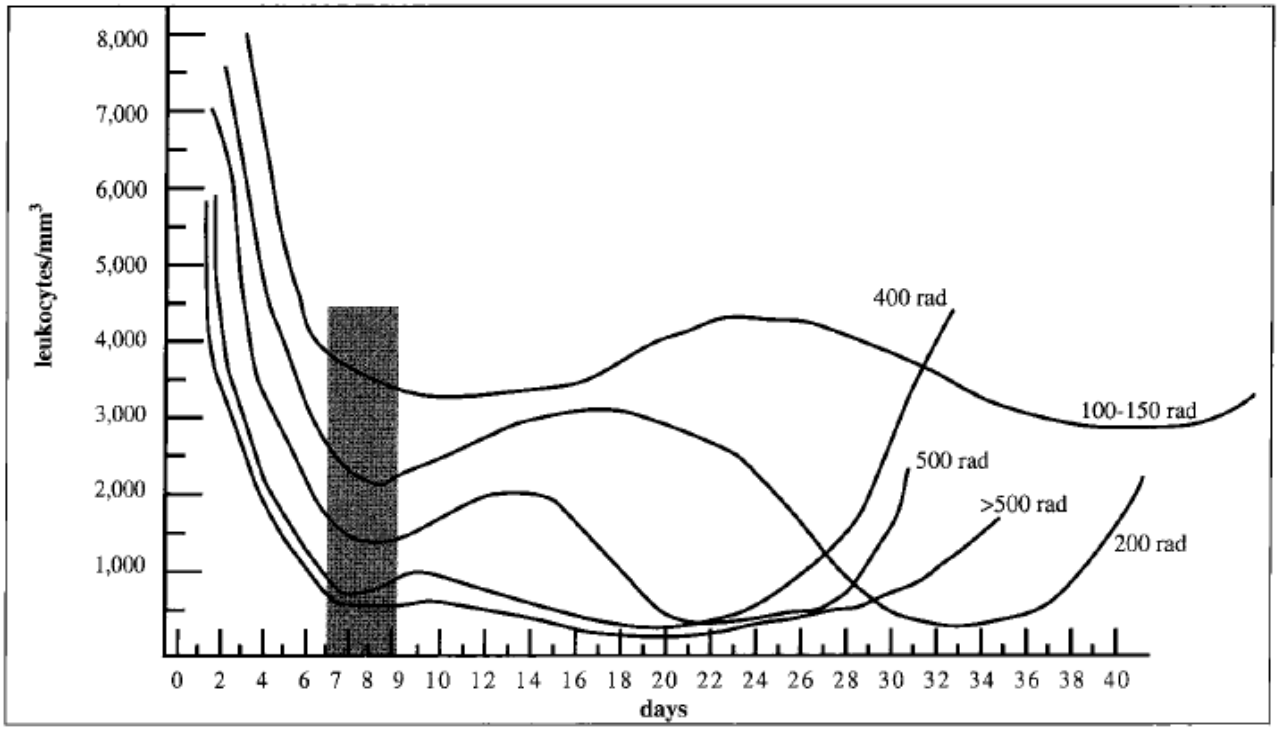
- NCRP Report no. 138. Management of Terrorist Events Involving Radioactive Material. 2001. Available for purchase from: http://www.ncrppublications.org/Reports/138
- NCRP Report no. 165. Responding to Radiological and Nuclear Terrorism: A Guide for Decision makers. 2010. Available for purchase from: http://www.ncrppublications.org/Reports/
- Council on Radiation Control Program Directors. “Handbook for Responding to a Radiological Dispersal Device”. 2006. Available at website: http://www.crcpd.org/RDD_Handbook/RDD-Handbook-ForWeb.pdf
- Population Monitoring in Radiation Emergencies. August 2007. Available online at website: http://emergency.cdc.gov/radiation/pdf/population-monitoring-guide.pdf
- Florida CEMP, Annex A, “Radiological Emergency (nuclear power plants and space launch vehicles)”. Available at website: http://www.floridadisaster.org/documents/CEMP/REP2004/Annex%20A/AnnexAtbc.htm

Attachment A-12

Biodosimetry Exposure Parameters

Dose, Gy	% emesis	Median onset of emesis (hours)	Absolute Lymphocyte count; % of normal in first 24 h	Relative increase in serum amylase day 1	Number of dicentrics per 50 metaphases
0	-	-	100	1	0.05-0.1
1	19	-	88	2	4
2	35	4.6	78	4	12
3	54	2.6	69	6	22
4	72	1.7	60	10	35
5	86	1.3	53	13	51
>6	90-100	1.0	< 47	>15	-

Oak Ridge Institute for Science and Education, Radiation Emergency Assistance Center/Training Site (REAC/TS), *The medical aspects of radiation incidents*, Table 10, http://orise.orau.gov/files/reacts/medical-aspects-of-radiation-incidents.pdf. Accessed January 5, 2011.



Vorobiev, A. I., Acute radiation disease and biological dosimetry in 1993, Stem Cells, 1997; 15 (suppl 2):269-274.

Attachment B-12

Suggested Patient Specimens To Be Collected In a Radiation Incident (REAC/TS)

FOR ALL SUSPECTED RADIATION CASES

Samples Needed	Rationale	Collection Methodology
CBC and differential count. Followed with absolute lymphocyte counts every 6 hours for 48 hours when history indicates possibility of whole body irradiation	Needed to access dose. Initial counts establish a baseline, subsequent counts reflect the degree of injury	Choose non-contaminated area for venipuncture. Verify using Geiger counter. Cover site after collection
Routine urinalysis	To determine if kidneys are functioning normally and to establish a baseline of urinary constituents; especially important if internal contamination is likely	Collect in urine container labeled with patient name, date and time. Wear gloves and avoid contaminating specimen during collection

FOR EXTERNALLY CONTAMINATED RADIATION CASES

Samples Needed	Rationale	Collection Methodology
Swabs from body orifices	Assess possibility of internal contamination	Use separate saline- or water-moistened swabs to wipe individual nostrils, ears mouth, etc. Save each sample in a labeled plastic zip-lock bag.
Wound dressings	To determine if wounds are contaminated	Save dressings in a plastic zip lock bag labeled with patient name, date and time. Use moistened or dry swabs to sample secretions from each dressing

FOR SUSPECTED INTERNAL RADIATION UPTAKE CASES

Samples Needed	Rationale	Collection Methodology
Urine: 24 hour specimen collected for four consecutive days	Body excreta may contain radionuclides if internal contamination has occurred	Use 24-hour urine collection container. Wear gloves when handling specimen

CHAPTER 13 - Recovery and Return Operations

I. General

This chapter describes recovery and return operations after a radiological/nuclear emergency has been brought under control and no further significant radioactive material releases are anticipated. Refer to Florida CEMP Annex A for specific information regarding nuclear power plant and space vehicle launch accidents. Annex A also includes a detailed example of a recovery and re-entry plan for a nuclear power plant accident.

II. Recovery

In the Recovery Phase after a radiological/nuclear incident, the Florida Department of Health acts in partnership with the U.S. Environmental Protection Agency (USEPA), the U.S. Department of Energy (USDOE), the Florida Department of Environmental Protection (DEP), and the Florida Department of Agriculture and Consumer Services (DACS). The ESF-8 Emergency Coordinating Officer will ensure a lead has been selected for radiological/nuclear emergency recovery operations. Depending on the size and nature of the initial radiological emergency ESF-8 and the Department of Health may lead or be part of a unified command with other federal and state agencies. Recovery operations will be coordinated and directed through the state and county Emergency Operations Centers.

Recovery operations may include decontamination, removal, transport, and recovery of contaminated material and debris as well as covering low-level contaminated areas with impervious materials. Technical assistance in conducting recovery operations may be obtained from the Florida Department of Healths' Bureau of Laboratories and Bureau of Radiation Control, DEP, U.S.DOE, and the US EPA. If agricultural lands have been affected by the radiological emergency, coordination and technical assistance will also be required from the Florida Department of Agriculture and Consumer Services.

The adequacy of recovery operations will be determined by radiological monitoring and sampling as cleanup and containment measures proceed. The Bureau of Radiation Control and FRMAC field teams will evaluate the environmental conditions in the affected areas by conducting direct radiation measurements and collecting environmental samples from water systems and soil, and, as appropriate, samples from dairies and milk processors and edible foodstuffs for laboratory analysis. Laboratory analysis of collected samples may be performed at the Department of Health's Health Physics Lab (Orlando) and/or the Mobile Emergency Radiological Lab (MERL). Additional laboratory assistance may be requested from USDOE, USEPA, and other laboratories via mutual aid compacts including SMRAP and EMAC.

III. Return

The Surgeon General, in coordination with DEP, DOE, and EPA will make the final determination when areas affected by a radiological/nuclear emergency are safe for public access and occupancy. The determination will be based on post-recovery radioactive exposure levels and on the projected long-term exposure to residents and transients in the affected area. The Commissioner of Agriculture and Consumer Services will determine the safety of land affected by the radiological emergency for producing food for human consumption based on guidance provided by the U.S. Food and Drug

Administration Derived Intervention Levels and recommendations by the Florida Department of Health, Bureau of Radiation Control.

Estimates of population exposure will be made following return based on methods developed in the Department of Homeland Security, Federal Emergency Management Agency, Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents, August 2008, or other references. This document will serve as guidance for all radiation emergencies other than those involving nuclear power plants which would continue to use United States Environmental Protection Agency's Manual of Protective Action Guides and Protective Actions for Nuclear Power Plants, Environmental Protection Agency 400-R-92-001, May, 1992. The Surgeon General may also direct epidemiological surveys to determine long-term health effects in those individuals returning to areas involved in the radiological/nuclear emergency.

IV. References

- Department of Homeland Security. Federal Emergency Management Agency. Planning Guidance for Protection and Recovery Following Radiological Dispersal Device (RDD) and Improvised Nuclear Device (IND) Incidents. August 2008. Available online at website: http://www.fema.gov/good_guidance/download/10260

- Florida CEMP. Annex A. State of Florida Radiological Emergency Management Plan; Appendix V. Available at website: http://www.floridadisaster.org/documents/CEMP/REP2004/Annex%20A/AnnexAtbc.htm

- Environmental Protection Agency. Manual of Protective Action Guides and Protective Actions for Nuclear Power Plants, EPA 400-R-92-001. May 1992. Available on-line: www.epa.gov/radiation/docs/er/400-r-92-001.pdf

Chapter 14 - Exercises And Drills

I. General

Exercises and drills should be conducted periodically to evaluate the adequacy of the radiological emergency plan, and the skills of emergency response organizations and others involved in all-hazards emergency preparedness and response. Results of drills and exercises provide a basis for changes in the response plans, implementing procedures, and for future scheduled training.

There are many conceivable radiological emergency incidents as seen in Chapter 1, Table 1, of this Plan. In many conceivable scenarios the incident could be radioactive material coupled to an explosive weapon such as the so-called “dirty bomb”. Although, considered less likely, a nuclear weapon detonation, either improvised or an illegally obtained military device, is feasible given our current world situation. Exercises and drills will have to be developed in concert with the management of at least two likely scenarios: 1) an initial blast with attendant injuries and potential fatalities; and/or, 2) the discovery of radiological materials released and disseminated within a given area.

The exercises and drills discussed in this Chapter are not intended to supplant the exercises and drills already in place in FLCEMP Annex A, and practiced yearly for nuclear power plant incidents; however, there may be circumstances were response issues associated with radiological/nuclear incidents can be incorporated into already scheduled exercises and drills.

The Florida Division of Emergency Management, in conjunction with the Florida Department of Health’s (DOH), Bureau of Radiation Control and the DOH’s Bureau of Preparedness and Response, should take the lead in developing and conducting these exercises and drills.

II. Exercises

An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency preparedness plans and organizations. The emergency preparedness exercise will simulate an emergency that results in radiological releases that would require response by appropriate authorities. Exercises will be conducted as set forth in rules adopted by appropriate federal, state, and local authorities.

A. Full Scale Exercise (FSE)

A full scale exercise is typically a multi-agency, multi-jurisdictional, multi-discipline exercise involving functional (e.g., field office, EOC’s, others) and actual field exercises (“boots on the ground”) using real time and real event scenarios (victims, decontamination, extraction, SWAT) occurring at an actual scene.

B. Functional Exercise (FE)

A functional exercise examines and/or validates the coordination, command, and control between various multi-agency coordination centers (EOC, Joint Field Office, etc.) Another term

for a functional exercise is a Command Post Exercise (CPX). It does not involve deployment of field assets, nor does it involve actors, or an actual scene.

C. Remedial Exercise

A remedial exercise may be required if, during a radiological emergency exercise, specific portions of the exercise demonstrate inadequacies, deficiencies, and/or items requiring corrective actions.

Deficiencies are demonstrated and observed inadequacies that could cause a finding that State/local emergency preparedness was not adequate to provide reasonable assurance that appropriate protective measures can be taken to protect the health and safety of the public living in the vicinity of the site of a radiological emergency. Because of the potential impact of deficiencies on emergency preparedness, they are required to be promptly corrected through appropriate remedial actions including exercises, drills, training, or other actions.

D. Scheduling and Scenario Development

Exercises can be scheduled jointly by the RDSTF's, the Division of Emergency Management, the Florida Department of Health's Bureau of Preparedness and Response and Bureau of Radiation Control, the Florida Hospital Association, and other appropriate agencies/organizations. Exercise objectives and the scenarios for the exercises may be developed and prepared jointly by the foregoing authorities. Scenarios should be varied from year to year so that all major elements of the plan and preparedness organizations are tested.

The scenarios should challenge the responders entering the scene and the subsequent management of both victims, as well as the environment post-attack.

The exercises should be both discussion and operations based and should be aimed at developing, testing, and monitoring the administrative/technical skills necessary to perform emergency radiological response and recovery operations. These exercises are recommended to be conducted on at least an annual basis and include public health, hospital, pre-hospital, law enforcement and other emergency responder organizations.

As a starting point for preparing the response agencies for radiation incidents there are several basic scenarios that could be exercised:

1. Scenario One – Blast

In this scenario, the detonation of a common explosive device is coupled with the release of radioactive material that had been obtained from any of a variety of sources, such as hospitals or university laboratories. This is the "dirty bomb" scenario and has a host of exercise difficulties, particularly if the incident triggers a fire resulting in contaminated water runoff issues.

In this incident there are the attendant problems of individuals self-referring to local health facilities with potential contamination on their clothing.

2. Scenario Two - Environmental Contamination

In this scenario, the individuals that have stolen the material mishandle it and allow for an airborne release in an urban or other environment where human exposures are potentially considerable. The first identification of the incident would come from the discovery of the attackers dying or dead from the radiation exposure and the panic of the citizens living at or near the scene.

3. Scenario Three - Nuclear Device

While highly improbable, the use of an improvised nuclear device or the acquisition and detonation of a small military nuclear weapon ("battlefield nuke") should be, at a minimum, performed in a tabletop exercise (TTX) for an evaluation of potential casualties and the management of the incident area. While important, this should be the last in the series of activities, as the two previous incidents have a much higher likelihood of occurring.

E. Critique and Reports

Controllers and Evaluators will fully participate in functional and full Scale Exercises. All exercises should be evaluated.

For operations based exercises a critique (Hot Wash) will be conducted after each exercise and an HSEEP-compliant After Action Report (AAR) developed which evaluates the capability of participating State and local governments to implement emergency preparedness plans and procedures in response to a radiological emergency. Evaluators will provide their assessment and participating agencies will be requested to submit critique notes in writing as input for an after-action report on the exercise. The after-action report will contain all deficiencies and strengths noted and will be grouped according to operational area. The deficiencies will then be forwarded to the appropriate operational section for implementation and correction.

III. Drills

A drill is a supervised instruction period aimed at developing, testing and monitoring technical skills necessary to perform a single emergency response operation. A drill may be a component of an exercise. Each drill will be evaluated by the coordinator for that particular drill.

In addition to the required exercise, radiological drills will be conducted annually, as indicated.

A. Communications Drills

Communications between the agencies, state and local government, and organizations should be tested as part of any exercise.

B. Medical Drills

Emergency medical service drills involving a simulated radiologically contaminated injured person(s) should be conducted.

C. Radiological Monitoring Drills

Radiological monitoring drills for state and appropriate county radiological monitors will be conducted as part of the required exercise. These drills will include collection and analysis of sampling media, provisions for communications, and record-keeping.

D. Health Physics Drill

Health physics drills for state emergency response personnel should involve response to, and analysis of, simulated elevated airborne and liquid samples, and direct radiation measurements in the environment. One drill should be conducted in conjunction with the scheduled exercise; the other should be conducted in conjunction with annual training.

Chapter 15 - Radiological Emergency Response Training

I. General

The purpose of this chapter is to establish a training program that will ensure that appropriate radiological emergency awareness and response training is provided for appropriate staff of facilities handling radioactive material, emergency response personnel, and other individuals in order to facilitate decision-making, planning, and response subsequent to a radiological emergency.

Training will have to be developed in concert with the management of at least two incidents: 1) an initial blast with attendant injuries and potential fatalities; and/or, 2) the discovery of radiological materials released and disseminated within a given area. In either case, considerable uncertainty and misinformation will exist further complicating the incident.

The training programs discussed in this chapter are not intended to supplant the training already in place in the State of Florida Comprehensive Emergency Management Plan, Annex A, and practiced yearly for nuclear power plant events; however, there may be circumstances were response issues associated with radiological/nuclear incidents can be incorporated into already scheduled trainings .

The Florida Department of Health (FDOH) has, through their training and exercise group, developed a training plan. Training and exercise should be routed and approved through the tiered system of both the FDOH and in concert with Homeland Security Exercise and Evaluation Program (HSEEP) principles. FDOH should utilize the assets of the Bureau of Radiation Control, among others, to develop this training.

II. Training Levels

A radiological emergency response training program has been developed as part of the State Working Group (SWG) on Training and Equipment. The SWG is comprised of various local and State experts on all-hazard emergency planning and response.

The training program is established with three (3) separate levels. These levels are as follows:

A. Level I

Level I training was designed to provide a basic overview of the radiological emergency preparedness program that would apply to all Florida citizens. It can be used as an orientation for new state and county employees, or presented to such citizen groups such as churches and homeowners/condo associations.

The training may include:

- Basic radiation knowledge and types of radiological threat
- General radio protective actions (i.e., shielding, PPE, sheltering-in-place, evacuation)
- Specific responsibilities of state and federal agencies

If the county has a Medical Reserve Corps (MRC), training should be designed to meet their skill levels and capabilities

B. Level II

Level II training was designed to give to those individuals in state, county, and other agencies/organizations basic radiological emergency awareness and, in some situations, a more advanced understanding of emergency response plans and procedures based on job responsibilities.

It may include:

- Awareness level training appropriate for the setting in which the individual operates.
- Incident Command System training at the FEMA/NIMS ICS 100/200/level or hospital ICS (HICS).
- If time permits, ICS 700 is appropriate for all.
- Awareness level training of the Emergency Operations Center (EOC) at the county level, particularly focusing on ESF 8 (Public Health and Medical).
- Radiation specific awareness level training for law enforcement, fire personnel and other are non-medical response staff. This training should have a crossover awareness component to reduce confusion at a scene.
- Training supporting monitoring and decontamination, as required.
- Training supporting radiological exposure control response, as required.
- Training supporting ingestion pathway response, as required.
- Complete IS-3, FEMA on-line course, “Radiological Emergency Management” certification.

C. Level III

Level III training will give specific training to each agency or individual according to their role as outlined in the chapters of this Plan. Training time will vary according to the specific training requirements.

Specialized training courses offered by federal, State, county or private agencies will be used to the extent practical. These include, but are not limited to:

1. Radiological emergency preparedness planning
2. Radiological emergency management
3. Radiological emergency response operations
4. Handling of radiation accidents by emergency personnel
5. Fundamentals course for radiological monitoring instrumentation
6. Decontamination and dose assessment
7. Fundamentals course for radiological response team

8. Hospital emergency department management of radiation incidents.

The FEMA on-line course IS-3 “Radiological Emergency Management” certification should be obtained prior to initiating any training at this level.

More specifically, Level III training should focus on the issues surrounding radiological incidents for those involved at the field level. This training would encompass, at a minimum:

- A medical/nursing Continuing Medical Education (CME)/Continuing Education Unit (CEU) course related to diagnosis, treatment, and management of radiological casualties. Attendees would include pre-hospital providers, emergency and intensive care hospital staff, including physicians and nurses, as well as other emergency responders. Existing experts such as radiation oncologists and health physicists would be included in this training.

- A course in the investigation, management, and remediation of a contaminated scene by environmental/specialty personnel is required. This would include potential source issues such as runoff, agricultural damage, and livestock issues.

- A course in the consequences of a dirty bomb, nuclear detonation, or other radiological incident and the potential for subsequent injuries is necessary. This course is for all participants as well as individuals responsible for post-incident operations at “contaminated” facilities, particularly hospitals.

- Training in decontamination of persons and areas subsequent to a radiological incident for emergency responders, hospital medical staff, and other appropriate personnel should be provided.

III. Training - Management and Public Information Team

Radiation evokes fear in the population much as a biological agent would do. This fear occurs whether the incident is an accident or terrorist driven. One of the key issues in dealing with an incident of this type will be a management and public information team thoroughly versed in the actual relative dangers and ongoing problems associated with an incident. Chapter 6 of this Plan details public information management. Training for these individuals should encompass, at a minimum:

- Basic education related to the discharge associated with a dirty bomb or other radiological incident, including information related to the actual hazards resulting from the dissemination of radiological materials.

- Short and long-term health effects associated with this type of an incident. Pre-prepared releases would be helpful in managing the first hours and days of an incident for general release.

- Information on radiation countermeasures and when these medications are not helpful, with placement of this information into a booklet for use by these individuals as well as political policy makers.

For all radiological disaster situations, the development of an information tree is essential in order to provide professionals in the health fields rapid access to Just-in-Time

training regarding the hazard.

IV. Training Standard

Personnel who would normally be used in a radiological emergency should receive formal radiological emergency preparedness training. Formal training for additional emergency personnel will be at the discretion of each state and local governmental entity. Radiological emergency planners, at all levels, should receive continuous Radiological Planning Course specific training that consists of industry, incident, or other activity courses deemed appropriate to enhance their skills.

V. Organizations Requiring Training

The state and local organizations which require radiological emergency response training, and the required levels of training, are shown in Figures 15-1 and 15-2. An overview of training for county health department support to a radiological incident response can be found in Attachment A-15.

VI. Training Schedule

It is recommended that training be conducted a minimum of once per year. It is also recommended that each state and local agency listed in Figures 15-1 and 15-2 receive Level I, II or III training annually or as budget permits. Management and Public Information team members should also have access to training at least yearly. State and local trainers and management will determine the appropriate level of training required by each agency based on existing emergency response plans and procedures. Specialized courses will be scheduled as appropriate. All newly assigned emergency response personnel should receive training within one year of assignment.

Figure 15-1: Levels of Instruction Needed for Local County / Regional Personnel

AGENCY	LEVEL I	LEVEL II	LEVEL III										
				B	C	D	E	F	G	H	I	J	K
Fire	X	X		X				X	X				X
Ambulance / Emergency Medical	X	X						X	X	X			
Sheriff / Police	X	X		X					X				X
County Commission	X												X
American Red Cross Chapter	X						X						
Hospital(s)	X							X	X	X			X
County Emergency Management	X	X	X	X	X			X	X		X	X	X
County Health Department (CHD)*	X	X						X	X	X	X	X	X
County Agriculture Agent(s)	X								X		X	X	X
Public Works	X							X	X				
County / City Waterborne Law Enforcement	X	X	X						X				
County Public Information Officer	X	X											X
County Engineer	X												
Emergency Operation Center Staff	X	X											X
City Council(s)	X												
School Board	X	X		X		X							X
Regional Domestic Security Task	X	X	X	X	X	X	X	X	X	X	X	X	X

Force													

A - Direction & Control
B – Alert and Notifications Communications
C – Accident Assessment
D – Transportation
E – Reception and Care
F – Law Enforcement
G – Monitoring and Decontamination
H – Radiation Exposure Control
I – Medical and Public Health
J – Ingestion Pathway
K – Public Information

*As an example, Attachment 1 to this chapter provides an overview of the training required for CHD support of radiological incidents. Other organizations will have similar training requirements depending on their mission.

Figure 15-2 Levels of Instruction Needed for State Personnel

AGENCY	LEVEL I	LEVEL II	LEVEL III										
			A	B	C	D	E	F	G	H	I	J	K
Department of Health-Headquarters (Emergency Support Function 8)	X	X											X
Orlando, Bureau of Radiation Control (BRC)	X	X	X	X	X				X	X	X	X	X
BRC Regional Offices	X	X		X	X				X	X	X	X	
DOH/Environmental Health Regional Offices	X	X		X								X	
Florida Department of Law Enforcement (Emergency Support Function 16)	X	X		X				X		X		X	X
Florida Highway Patrol (Emergency Support Function 16)	X	X		X				X		X		X	
Florida Fish and Wildlife Conservation Commission (Emergency Support Function 16)	X	X		X				X		X		X	
Department of Environmental Protection (Emergency Support Function 8)	X	X								X		X	X
Department of Agriculture and Consumer Service (Emergency Support Function 8)	X	X								X		X	X
Department of Transportation	X	X				X				X			
Department of Community Affairs (Division of Emergency Management)	X	X	X	X								X	X
Department of Community Affairs (State Coordinating Officer)	X		X	X								X	X
American Red Cross (Emergency Support Function 6)	X	X					X						

Civil Air Patrol (Emergency Support Function 1)	X												
Florida National Guard (Emergency Support Function 13)	X												
United States Coast Guard	X												

A - Direction & Control
B – Alert and Notifications Communications
C – Accident Assessment
D – Transportation
E – Reception and Care
F – Law Enforcement
G – Monitoring and Decontamination
H – Radiation Exposure Control
I – Medical and Public Health
J – Ingestion Pathway
K – Public Information

Attachment A-15

Training Overview for CHD Support To A Radiological Incident Response

Introduction

This training will cover the relevant subjects specified for county health department staff in the State of Florida Comprehensive Emergency Management Plan, Annexes A and B, as well as additional high-level planning and response concerns.

Please note that this training is not intended to be a technical primer on treating radiation injuries or decontaminating victims. Rather, it emphasizes the actions county health departments will need to take to coordinate all public health and medical actions as part of their role supporting the general response.

1. County Health Department Radiological Response Live Workshop with Online Follow-Up

Length: Two day course

Audience: County health department key staff, especially environmental health strike team members

Facilitators: Bureau of Radiation Control and Division of Preparedness and Response staff and other trainers as required

Schedule: Sessions in locations around the state

Certification: Federal Department of Transportation certificate of completion

Follow-Up: Support and planning contacts for each region

Objective: After this workshop participants should be able to demonstrate NIMS compliant competency at Level 1 (Awareness) in basic radiation knowledge, types of radiation threat, Protective Actions (i.e., shielding, PPE, sheltering-in-place), and the specific responsibilities of state and federal agencies.

Attendees should be able to demonstrate Level 2 (Operational) knowledge in supporting those issues cited for County Health Departments by the State of Florida Comprehensive Management Plan, Annex A, Chapter 15:

- Monitoring & Decontamination
- Radiological Exposure Control
- Medical & Public Health Response
- Ingestion Pathway Issues

They should also be able to demonstrate Level 3 (Operational) knowledge toward planning and training their county health department to meet its specific responsibilities in a radiological incident. This would include assessing where their county currently stands in radiological readiness, and what additional technician level trainings might be necessary to ensure readiness.

2. Outline for Live Training:

- Introduction to Radiation and Radiation Threats
    - Types of radiation
    - Exposure versus contamination
    - Types of devices
    - Current threats
- Responsibilities of Responding Agencies
    - Federal responsibilities
    - State responsibilities
        - Bureau of Radiation Control
- Accidental versus Intentional Radiological Incidents
    - Potential scenarios
    - Response differences
- Scenario and Response Discussion About the Radiological Response to Answer Both Local and General Questions About Specific Aspects of That Response.
- Brief Exercise: Making a Partner Map
    - Attendees map specific response partners to their local representatives to make a map of response personnel in their vicinity.
- Specific County Health Responsibilities: Part One: Early Emergency Phase
    - Coordinating with and supporting your partners
        - Bureau of Radiation Control
    - Coordinating the medical and public health response
        - CHD place in unified command for terrorist incidents
    - The CHD role in monitoring and decontamination
    - The CHD role in radiological exposure control
    - The CHD role in ingestion pathway issues
- Specific County Health Responsibilities: Part Two: Intermediate Phase

- Initiating and maintaining an exposure registry
- Effective treatment tracking
- Conducting regular disaster work in contaminated conditions
  - Safe sheltering
  - Inspections
  - Other tasks
- Following and regulating protective action guides

❖ Specific County Health Responsibilities: Part Three: Late Phase

- Recommending relaxation of protective action guides
- Long-term public health tracking.
- Long-term environmental health impacts
- Productive after action and information sharing.

❖ Work Session on Planning to Fulfill County Health Responsibilities in the Early Emergency, Intermediate, and Late Phases

- Participants work through an outline of CHD radiological responsibilities and match them to current plans, partners and resources in their area (using their response map) to assess current readiness and tasks to improve.
- This session requires good network access at the classroom location, and the ability for both the facilitators and attendees to contact outside resources to confirm the latest information.

❖ Day Two: Improvised Nuclear Device Exercise

- This exercise leads participants through an exercise based on an improvised nuclear device in their county.
- Using overlays of damage and radiation dispersal based on device size, each county team should be able to conduct a response based on data specific to either their county or another county in their region.
- The exercise should cover at least four days of the response
- It will take attendees through specific questions regarding CHD responsibilities, with live assistance from subject matter experts covering subjects like monitoring and decontamination, radiological exposure control, medical and public health response, and ingestion pathway issues.

3. Online Resources:

❖ All of the didactic portions of the training should be available online using Macromedia Breeze for follow-on or additional training. These modules will include tests on the material to provide contact hours for online attendees.
❖ Templates and resources for planning for CHD responsibilities will be stored online for reuse.
❖ A discussion and document sharing area will allow CHDs a secure location to share best practices and lessons learned to other counties.

REFERENCES

- NCRP Commentary 19. Key Elements of Preparing Emergency Responders for Radiological and Nuclear Terrorism. 2005. Available for purchase from: http://www.ncrppublications.org/Commentaries/19

- NCRP Report no. 138. Management of Terrorist Events Involving Radioactive Material. 2001. Available for purchase from: http://www.ncrppublications.org/Reports/138

Chapter 16 - Hospital Radiological Emergency Response Plan Template

I. Overview

(Name of Facility) will implement its Radiological Emergency Response Plan to manage a victim(s) who has (have) been exposed to a radioactive source, or to radioactive material, and who may be contaminated or who is not known to have been adequately decontaminated before arrival at the hospital.

In a life-threatening situation, clinical treatment shall have priority over all other considerations, including decontamination.

All members of a Radiological Emergency Response Team should be familiar with the hospital's written plan and be required to participate in scheduled drills.

II. Procedure

Background

In modern society, there is an ever increasing chance that an incident will occur that will cause an individual to be exposed to a radiation source, to be contaminated with radioactive material, or become radioactive. The incident that contaminates a patient is likely to be associated with a violent activity that will cause traumatic injury. Therefore, it is important for the hospital and its Emergency Department (ED) to plan for the care of contaminated patients.

Response Plan

The hospital response plan shall consist of the following parts:

A. Preparations for patient arrival
B. Decontamination
C. Treatment of radioactive or contaminated patients vs. irradiated patients

Attachments

The following attachments contain detailed operational instructions or provide means of logging information during a radiological emergency:

Attachment A-16 – Radiological Emergency Charge Nurse Checklist
Attachment B-16 – Radiological Emergency Area Set-Up Directions
Attachment C-16 – Treatment and Decontamination Nurse Checklist
Attachment D-16 – Buffer Zone Person Checklist
Attachment E-16 – Radiological Contamination Record
Attachment F-16 – Radiation Safety Officer Checklist
Attachment G-16 – Attending Physician Checklist

Attachment H-16 – Security Personnel Checklist
Attachment I-16 – Instructions for Gowning and Dosimetry
Attachment J-16 – How to Survey Radioactive Contamination
Attachment K-16 - Dosimeter Reading Log
Attachment L-16 - Instructions for Patient Decontamination
Attachment M-16 - Staff Exit Instructions
Attachment N-16 - Guidelines for Handling Multiple Patients
Attachment O-16 - Guidance for Receipt of Patients not Decontaminated at the Site
Attachment P-16 Radiological Emergency Telephone Directory
Attachment Q-16 - Evaluation and Management of Internal Contamination
Attachment R-16 - Equipment/Supplies
Attachment S-16 - Procedures for Medical Emergencies Involving Radiation

A. Preparations for Patient Arrival

Pre-arrival information should indicate the approximate condition of the patient and their contamination status (see Number 4: Patient Profile, below). Irradiated but not contaminated individuals do not require decontamination. If no pre-arrival information regarding contamination is available, assume the patient is contaminated. If it has been determined that a patient is or may be contaminated with radioactive material:

1. Notification

a. At the first indication that contaminated patients may arrive at the hospital, the ED will contact:

1) Appropriate individuals such as nursing supervisor, hospital administrators; notification to hospital emergency alert system

2) Radiation Safety Officer (RSO) – to direct response efforts.

b. Upon notification the following positions and groups should be alerted:

1) Attending Nuclear Medicine Physician/Technologist – to coordinate response until radiologist or RSO arrives at the scene.

2) On-call radiologist – to direct response efforts until the RSO arrives at the scene.

3) Security – to secure decontamination area and maintain integrity of established zones.

4) Facilities Engineering – to shut down air handling systems in affected area to minimize spread of airborne contamination, if present.

2. Equipment and Supplies

This equipment should be located on a cart or other for easy access.

The RSO or Nuclear Medicine Technologist will provide:

a. A radiation survey meter

1) 1 – Located in (Name of location)

2) 1 – Located in (Name of location)

b. The "Decontamination Kit" (See Attachment L-16 for a list of contents and decontamination instructions)

1) Located in: (Name of location near ED)

2) Located in: (Name of location, e.g., Nuclear Med RSO Office)

Also available will be: 1) waste receptacle for dry and liquid radioactive materials; 2) a decontamination tray / exam table should be equipped with a hand-held showerhead; and, 2) a drain and liquid waste container for collection of wastewater.

3. Personal Protective Equipment (PPE)

a. Personnel will don protective clothing (scrub suits, surgical caps, face shields, N-95 facemasks, rubber gloves, shoe covers) per OSHA blood-borne precautions.

b. If a known or suspected terrorist incident, staff will utilize chemical precautions and Level C PPE, as appropriate.

4. Patient Profile

Prior to the arrival of the radiological incident patient, ED personnel will attempt to obtain as much information as possible regarding the radiological incident patient's medical condition, type of injury, and details of the incident. In particular, the possibility of contamination will dictate the extent of preparation necessary for treating the radiological incident victim. If contamination cannot be ruled out full preparation for receipt of a contaminated patient should be activated. If possible, try to obtain the following information:

a. Circumstances of the incident:

- When did the terrorist incident occur and what are the circumstances of the incident?
- What are the most likely pathways for exposure?
- How much and what type of radioactive material (specific radionuclide) is potentially involved?
- What injuries have occurred?
- What potential medical problems may be present besides the radionuclide contamination?
- What measurements have been made at the site of the incident (e.g., air monitors, smears, fixed radiation monitors, nasal counts, and skin contamination levels)?
- Are industrial, biological or chemical materials involved in addition to the radionuclides?
- Have any treatments been given for these?

b. Present status of the patient:

- If known, what radionuclides now contaminate the patient?
- Where and what are the radiation measurements at the surface?
- Was the patient also exposed to penetrating radiation? If dosimetry information is available, what has been learned from processing personal dosimeters, e.g., film badge, thermoluminescent dosimeter, or pocket ionization chamber? If not yet known, when is the information expected?
- What information is available about the chemical and physical properties of the compounds containing the radionuclides (e.g., solubility, particle size)?
- What decontamination efforts, if any, have already been attempted? With what success?
- What therapeutic (radiation countermeasures) measures, such as the use of blocking agents or isotopic dilution procedures, have been taken?

5. **Routing**

a. Direct contaminated and potentially contaminated patients to enter the hospital (give location). This will allow the use of the conventional ED door without unnecessary risk of contamination of non-contaminated patients.

b. Cover the route between the ambulance unloading area and the ED, including the floor of the ED in those areas that will be used, with plastic sheeting to provide a disposable surface. Placement of this plastic sheet and step-off padding should be the task performed by ED personnel while waiting for the ambulance to arrive.

6. Zones

Establish three zones in the decontamination area – a "clean area," a "dirty area," and a "buffer area" between the two zones for added security. Delineate the boundaries for these areas with tape or other marks on the floor. People and materials may pass freely into the "dirty" area, but may not leave the area unless monitoring has been accomplished to verify that contamination does not leave the confines of the "dirty" area. A monitor, assigned by the RSO, will make sure that any item or person that leaves the area is "clean."

7. **Monitoring**

Station an individual who is trained in the use of a radiation survey meter, as assigned by the RSO, in the ambulance unloading area to monitor incoming patients and determine whether or not they are contaminated. If the initial radiation survey indicated contamination, the patient shall be brought into the ED via the plastic-covered route. Non-contaminated patients shall be brought in via the normal route.

8. Secondary Contamination

After a contaminated patient has left the ambulance, the person in charge of monitoring the incoming patients will monitor the inside of the ambulance as well as the ambulance attendants (paying particular attention to the hands and feet). If contamination is found in the ambulance, hospital security personnel will impound it until it is decontaminated. If the ambulance attendants are found to be contaminated, they will be instructed to proceed to the decontamination area to be decontaminated.

B. Decontamination

1. Swab the inside of the patient's nose with a cotton-tipped applicator. Place the swab in a test tube or rubber glove and label with the patient's name and time. Forward this sample to the RSO or designee to determine the radionuclide (if possible, otherwise, hold for appropriate agency referral for identification) and a rough quantification of the amount (activity) present.

2. Survey the patient and note on a diagram showing areas of increased exposure and readings (see Attachment E-16).

3. Remove the patient's clothes and place any contaminated clothes in a plastic bag or barrel clearly marked "Radioactive, DO NOT DISCARD".

4. Washing localized areas of contamination.

   If localized areas of skin decontamination are found, wash these areas with soap and water:

   a. The objectives of skin decontamination are to reduce the surface dose rate and to prevent activity from entering the body. Therefore, avoid vigorous scrubbing of the area, particularly with abrasive cleaners. Rather than risk skin injury by continuing active scrubbing when no progress is being made fix the residual contamination with a plastic-backed bandage. Further attempts to remove it can await subsequent evaluation.

   b. Exercise care to avoid washing contamination into any wounds that are present.

   c. Dispose of all materials used in the process into a container designated for this purpose. Use water sparingly and avoid splashing to simplify subsequent cleanup procedures.

5. Total body shower

   If the patient is contaminated over large areas of their skin, a whole body shower is indicated as follows:

   a. Dry off the patient as well as possible and dress him/her in a surgical scrub suit, including booties, gloves, and hat as indicated by locations of contamination. The purpose of the clothing in this case is to keep the contamination in, preventing its spread while the patient is taken to the nearest shower.

   b. Transport the patient to the shower via the most appropriate means, depending upon the extent of their injuries. The patient should be attended by someone in protective garb to assist or actually do the washing and an individual with a monitoring instrument. The monitor should verify, after the showering is completed, that the shower area is either free of contamination or is secured against use until it is fully decontaminated.

6. Save any patient excreta (urine) in a plastic container labeled with the date and time. This will be used for further analysis to help in determining the radionuclide, amount and degree of internal disposition. (name of person or position) will transport containers to (name of location) for monitoring storage, and disposal.

7. After the decontamination efforts are complete, perform a thorough clean up of the area, including a radiation survey, to verify that no residual radioactive material remains.

C. Treatment of Radioactive/Contaminated vs. Irradiated Patients

1. Definitions

It is important to distinguish between contaminated and irradiated patients.

a. **Contamination**: The patient has depositions of solid or liquid radioactive materials on the skin or internally. This radioactive material continues to irradiate the patient and surroundings. External contaminations should be removed as rapidly as possible to minimize the radiation dose to the patient. It also presents a hazard to the attendant because it may be removable, potentially contaminating the attendant as well. Internal contamination may be caused by ingestion, inhalation, entry via other normal body orifice, or by having radioactive particles penetrate the skin after an explosion. Internal contamination will require extensive medical and health follow-up of the individual.

   Radioactive contamination (whether internal or external) is almost never immediately life-threatening and, therefore, a radiological assessment or decontamination should never take precedence over significant medical conditions.

b. **Irradiation**: The patient has been exposed to external fields of radiation. The patient is not radioactive and poses no hazard to their attendants. The patient's injuries will require the same emergency care as any other patient, and all normal procedures would be followed. In some rare accidents, where a person is exposed to a high neutron dose, the sodium in his body may become radioactive. This is not removable and the exposure rates near the patient will not be hazardous to attendants. However, the fact that radiation can be detected outside the patient can be confused with contamination. Therefore, with incidents involving large doses of neutrons, expert help should be enlisted to separate these factors.

2. Priorities

The priorities for emergency care of radiological incident victims are as follows:

a. The saving of life and treatment of the seriously injured.

b. The prevention of further injury, e.g., internal contamination.

c. Assessment of external contamination and decontamination of the patient.

d. Assessment of internal contamination and beginning treatment, as appropriate.

e. Assessment of local radiation injuries/radiation burns.

f. Referral of patient to appropriate in-patient care location or transfer to a specialized facility.

g. Minimization of exposure to attending personnel.

h. Reduction of the spread of contamination to the treatment area.

i. Prevention of damage to the facility.

j. Avoidance of disruption of normal hospital routine.

k. Referral of patient for careful long-term follow-up for those with significant whole body irradiation or internal contamination.

l. Referral for careful counseling of patient and family members about expected long-term effects and care.

3. Definitive Medical Care

Follow the guidelines and procedures found in: Medical Management of Radiological Casualties, 2nd ed. U.S. Armed Forces Radiological Research Institute (USAFRRI)

Available online at: www.afrri.usuhs.mil/www/outreach/pdf/2edmmrchandbook.pdf.

Oak Ridge Associated Universities (ORAU), Managing Radiation Emergencies.

Available on-line at: http://www.orau.gov/reacts/care.htm.

The Radiation Emergency Medical Management (REMM) website is available from DHHS at: http://www.remm.nlm.gov/.

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