Comprehensive Emergency Management Plan

Section 6-14 Radiological Annex

June 2019

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Annex 6 – 14 Radiological Annex

I. PURPOSE

The purpose of this annex is to supplement the Horry County Emergency Operations Plan by establishing procedures specific to response operations during a radiological release at the Brunswick Nuclear Power Plant that could cause potential contamination of areas within governmental limits. Special emphasis is placed on the use of the Emergency Classification Level (ECL) to increase the safety of the citizens of Horry County.

In the event of a release, the agricultural community to include home gardeners, livestock owners, farmers, food processors and water supply agencies within the 50 mile IPZ of the facility will be notified of areas that may be contaminated and advised of protective actions necessary to reduce the risk of contamination to farm equipment and livestock, agricultural products, and water supplies.

Steps will also be taken to identify the degree of contamination to human foods, livestock feeds, and water supplies. If necessary, controls on the food chain will be initiated and continued until cessation of undesirable conditions.

II. SITUATION

The 50-mile radius of the Ingestion Pathway Zone (IPZ) is based on the following considerations:

A. The downwind range potentially threatened by contamination, would generally be limited to about 50-miles or less from the power plant due to wind shifts, wind speed during the release, particle deposition and time for radioactive decay of deposited particles.

B. There may be a conversion of atmospheric iodine suspended in the atmosphere for long time periods to chemical forms that do not readily enter the ingestion pathway.

C. Samples will be taken to identify the exact location of ground deposition and the degree of contamination to human foods, livestock feeds, and water supplies.

III. ASSUMPTIONS

A. Much of any release of radiological particulate could be deposited on the ground within 50 miles of the nuclear site.

B. Projected contamination will not exceed Protective Actions Guidance (PAGs) levels beyond the 50-mile planning zone.

C. Sampling and monitoring procedures would be taken by Federal and State agencies to ensure that appropriate protective actions and recommendations will be made to safeguard the public.

D. The State of North Carolina will exercise its direction and control authority due to the multi-jurisdictional nature of the incident.

E. State Emergency Response Team (SERT) may require county support to carry out assigned responsibilities.

F. Resources will be critical due to an increase in demand from surrounding counties.

IV. CONCEPT OF OPERATIONS

A. Planning

1. Once the situation at the Brunswick Plant is stabilized and no further releases of radioactive material off-site have occurred or will occur, efforts will begin to define the geographic limits of the contamination. Identification of the geographic limits and radiation levels within the contaminated areas are necessary to know where and at what level ingestion Protective Action Decisions (PADs) will need to be placed in effect.

2. Protective actions to be taken by the public will be recommended by N.C. Radiation Protection Section (RPS), utility responsible for the nuclear facility, State of South Carolina and other concerned agencies following U.S. Food and Drug (FDA) guidance as published in "Accidental Radioactive Contamination of Human Food and Animal Feeds: Recommendations for State and Local Agencies", dated August 13, 1998. This is accomplished by the following:

    a. Setting limits, called Derived Intervention Levels (DILs) on the radionuclide activity concentration permitted in human food. DILs are limits on the concentration permitted in human food distributed in commerce.
    b. Taking protective actions to reduce the amount of contamination.

3. In order for an effective response to take place in the event of an accident and release of radiation, knowledge of the agricultural community within the 50-mile IPZ is needed. The state Department of Agriculture maintains farm and crop data. The agencies involved can provide the needed data to inform our county decision makers of areas of concern. Three main areas of concern are: milk, food crops and water supplies.

4. Due to their changing seasonal usage, croplands are not plotted in advance of an event. At the time of an event, the local agricultural extension office will provide the SERT with accurate information concerning the location of farms and precisely where and what crops and livestock are located within the IPZ.

B. Operations

1. Preventive Protective Actions – These protective actions would be initiated based on the evaluation of the situation and would remain in effect so that the concentrations remain below the recommended DILs. Suggested protective actions can be taken will follow the South Carolina Operational Radiological Emergency Response Plan (SCORERP) Annex 7 Ingestion Pathway Zone.

2. Emergency Protective Actions - Actions taken by public officials to isolate food to prevent its introduction into commerce and to determine whether condemnation or other disposition is appropriate (e.g., embargo). This action is based upon actual sampling and will follow SCORERP Annex 7.

3. Information necessary for the protection of public health and welfare will be given via information released through the Public Information System. A Joint Information Center (JIC) will be established by the state in response to this event, and county public information support will be

provided to ensure accuracy of information and specifics concerning our overall impact throughout the event.

C. Agricultural Notification

Notification of the agricultural community of steps it can take to reduce the risk of contamination to livestock and farm commodities will be dispensed through the media as outlined in the Public Information Annex. Information not covered by the prepared messages will be addressed in public information coordinated at the Joint Information Center. This public information will also address recommendations to the general public as to the advisability of consuming unprotected and/or unprocessed foods. These recommendations will follow FDA guidelines.

D. Contaminated human food supply will be treated as follows:

1. Protective actions will follow the guidance of SCORERP Annex 7 and would be initiated subject to evaluation of the situation and would continue until the absence of actions the concentrations remain below the DILs.

E. Contaminated cropland will be treated as follows:

1. Protective actions will follow the guidance of SCORERP Annex 7 and would be initiated subject to evaluation of the situation and would continue until the absence of actions the concentrations remain below the DILs.

V. ORGANIZATION AND RESPONSIBILITIES

A. Each agency involved in response to an ingestion pathway event is responsible for the safety of its own personnel, including training in the hazards of radiation, emergency response techniques, protective measures, the provision of protective clothing and equipment, and medical monitoring of personnel, if needed. In this regard, each agency is, therefore, responsible for developing, maintaining, and updating training programs and standard operating procedures.

B. Principal Response Organizations

1. Local county governments within the 50-mile IPZ of the following location:
   Brunswick Nuclear Power Plant, Southport, NC (DUKE ENERGY)

Bladen	New Hanover	Sampson
Brunswick	Onslow	Horry, SC
Columbus	Pender	

2. County / Municipal Government Agencies:
   a. Law Enforcement
   b. Public Information
   c. Fire Rescue
   d. School District
   e. Public Works

3. State:
   a. Department of Public Safety
   b. Department of Natural Resources
   c. Department of Agriculture

d. Clemson Cooperative Extension
e. SCEMD
f. Department of Commerce
g. Department of Transportation

4. Federal:
    a. Nuclear Regulatory Commission (NRC)
    b. Department of Energy (DOE)
    c. Environmental Protection Agency (EPA)
    d. Department of Health and Human Services (DHHS)
    e. Food and Drug Administration (FDA)
    f. Federal Emergency Management Agency (FEMA)
    g. Department of Agriculture (USDA)
    h. National Weather Service (NWS)

C. Roles and Responsibilities

1. State Government
   All protective action decisions and recommendations will be made by the state due to the involvement of multiple counties and the highly technical nature of the event. For specific responsibilities of State agencies refer to South Carolina Operational Radiological Emergency Response Plan (SCORERP).

2. Federal Government
   Specific Federal Government responsibilities are listed in SCORERP.

3. County Government
   During ingestion pathway emergencies, each jurisdiction will exercise its command and control authority through the local Emergency Operations Center according to their Emergency Operations Plan.
   In addition to regular duties, during an ingestion pathway incident, affected counties should be prepared to provide the following support and assistance as requested.
    a. Law Enforcement
        i. Send assigned personnel to the County EOC.
        ii. Coordinate necessary law enforcement and provide necessary traffic control measures in support of evacuation and effect security procedures of the restricted areas.
        iii. Establish roadblocks to reroute traffic and prevent unauthorized entry into contaminated or restricted areas.
        iv. Maintain a log of authorized/unauthorized persons and vehicles entering and leaving a designated secured zone subsequent to evacuation.
        v. Direct potentially contaminated persons and vehicles to designated decontamination stations.
        vi. Coordinate efforts of other local law enforcement agencies.
        vii. During a State of Emergency declared by the Governor, provide the NC State Highway Patrol with local law enforcement resources and assistance.

    b. Public Information
        i. Maintain contact with the SERT Public Information Officer through the State EOC Communications Center or the applicable utility Joint Information Center (JIC) to provide information for news releases.

ii. Review any JIC news releases concerning the county for accuracy of county-related information and notify the JIC of approval and/or requested changes.
iii. Coordinate rumor control activities with the JIC.
iv. Maintain current inventories of public information resources.

c. Fire Rescue
   i. Coordinate local fire departments to provide assistance with possible radiological survey and decontamination activity, as needed.

d. School District
   i. Provide school facilities outside the impacted area for use as reception centers, congregate care centers, and other incident support activities.
   ii. Provide equipment and personnel to establish and operate kitchens for mass feedings.
   iii. Support reception centers and congregate care center operations.
   iv. Assist in reception centers and congregate care center management.
   v. Provide buses with drivers to transport individuals and groups being evacuated from contaminated or threatened areas.

e. Public Works
   i. Provide the Emergency Management Coordinator with information needed to identify water intake sources in the county.
   ii. Provide support to state agencies, as needed, for water sampling and intake control.

D. County Coordinating Instructions

1. Many tasks to be undertaken during the conduct of emergency operations will require the resources and the efforts of more than one agency of government.

2. Some tasks may require the efforts of various combinations of Federal, State and County agencies and private organizations.

3. County department and agency heads, directors and supervisors are responsible for preparing their organizations to accept the role of "lead agency" when directed by the appropriate authority.

E. Recovery and Reentry Operations

1. Suggested recovery and reentry operations that can be taken will follow Horry County recovery and reentry plans in conjunction with the South Carolina Operational Radiological Emergency Response Plan (SCORERP) Annex 7 Ingestion Pathway Zone.

VI. ATTACHMENTS

A. EPZ Plume and Ingestion Concepts Map
B. Emergency Classification and Protective Response Examples
C. Recommended Protective Actions
D. Maps

ATTACHMENT A

EMERGENCY PLANNING ZONE (EPZ) PLUME and INGESTION CONCEPTS MAP

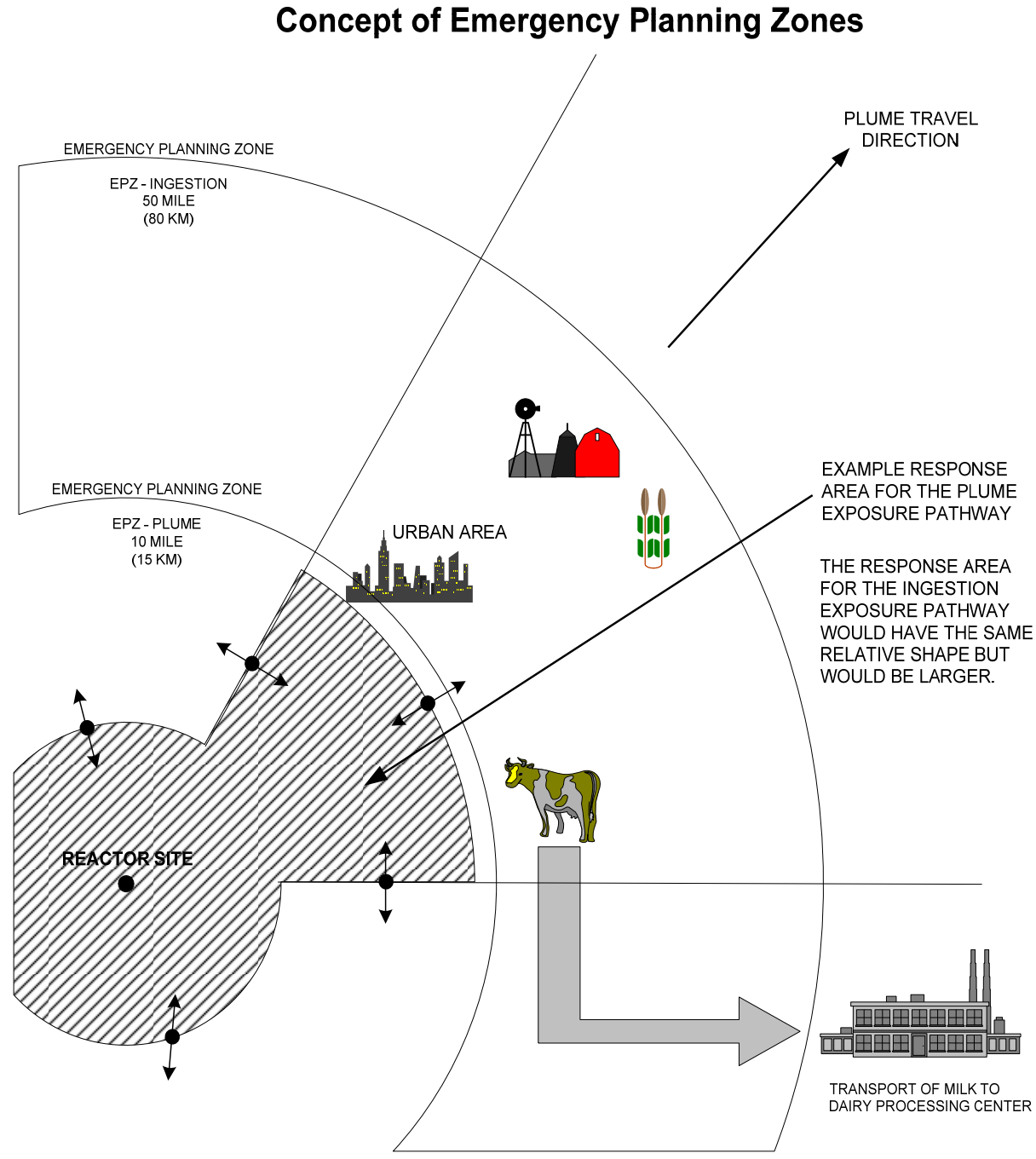


Figure 1

ATTACHMENT B

EMERGENCY CLASSIFICATION and PROTECTIVE RESPONSE EXAMPLES	
EMERGENCY CLASSIFICATION	PROTECTIVE RESPONSE ACTIONS
UNUSUAL EVENT Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs	1. Notify persons on Key Alert List as appropriate. 2. Stand by until EAL degrades or escalate.
ALERT Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of intentional malicious dedicated efforts of a hostile act. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	1. Notify persons on Key Alert Lists. 2. Activate county EOC as appropriate; alert key emergency personnel to standby status. 3. Maintain status until closeout, or escalation to a more severe emergency class.
SITE AREA EMERGENCY Events are in process or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or security events that result in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) prevents effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective action Guideline exposure levels beyond the site boundary.	1. Notify key persons on Key Alert Lists. 2. Activate siren system, EAS, tone alert radios and provide public information. 3. Assemble personnel for siren back-up and, mobile / route alerting. 4. Fully activate county EOC. 5. Alert personnel to standby for possible evacuation. 6. Maintain status until closeout, reduction of class or escalation to a more severe emergency class.
GENERAL EMERGENCY Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or security events that result in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.	1. Activate siren system, EAS, tone alert radios and mobile / route alert warning systems. 2. Consider sheltering and/or evacuating based on the protective action recommendations. 3. Maintain close status of the event until termination/closeout.

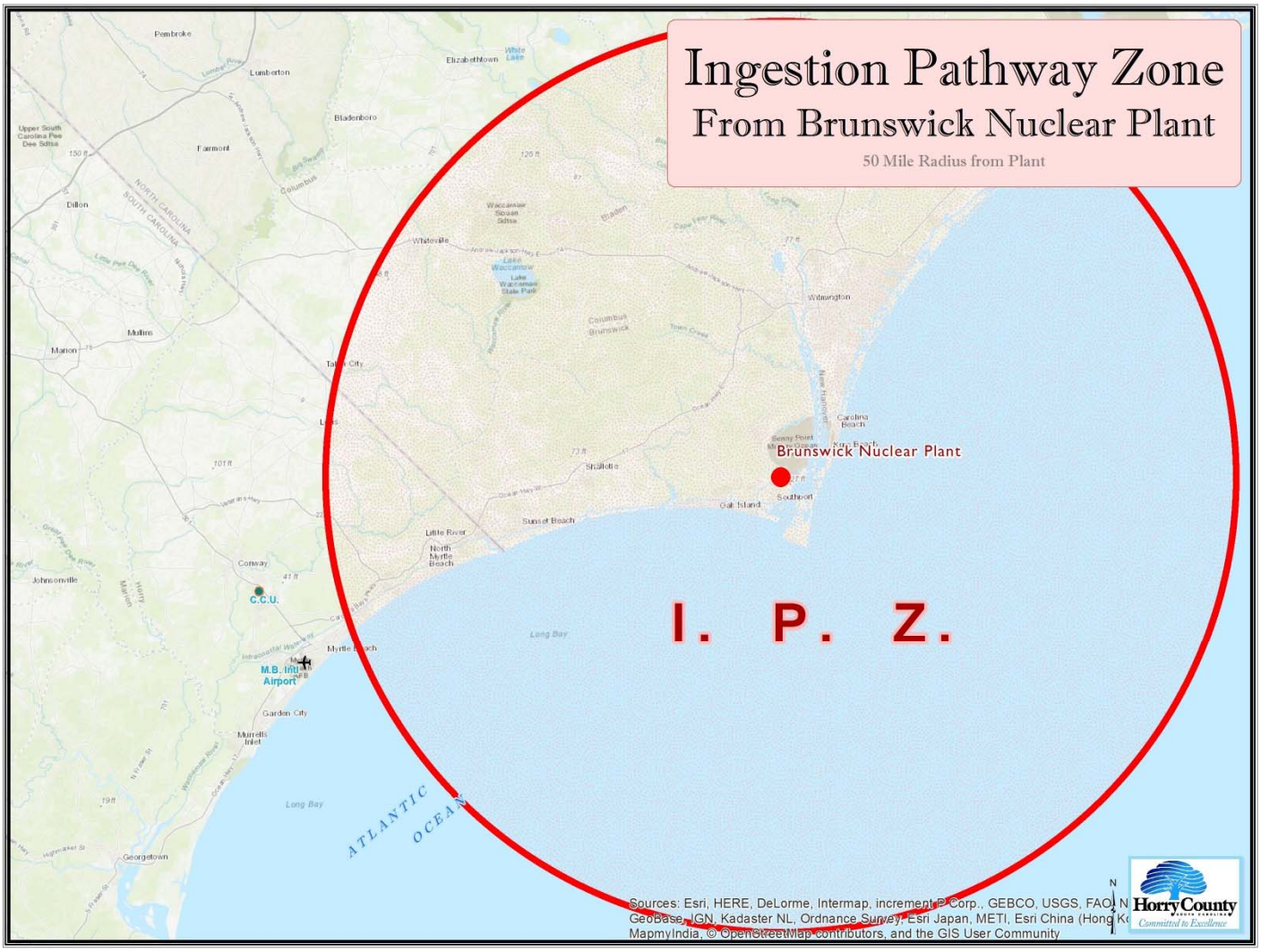
ATTACHMENT C

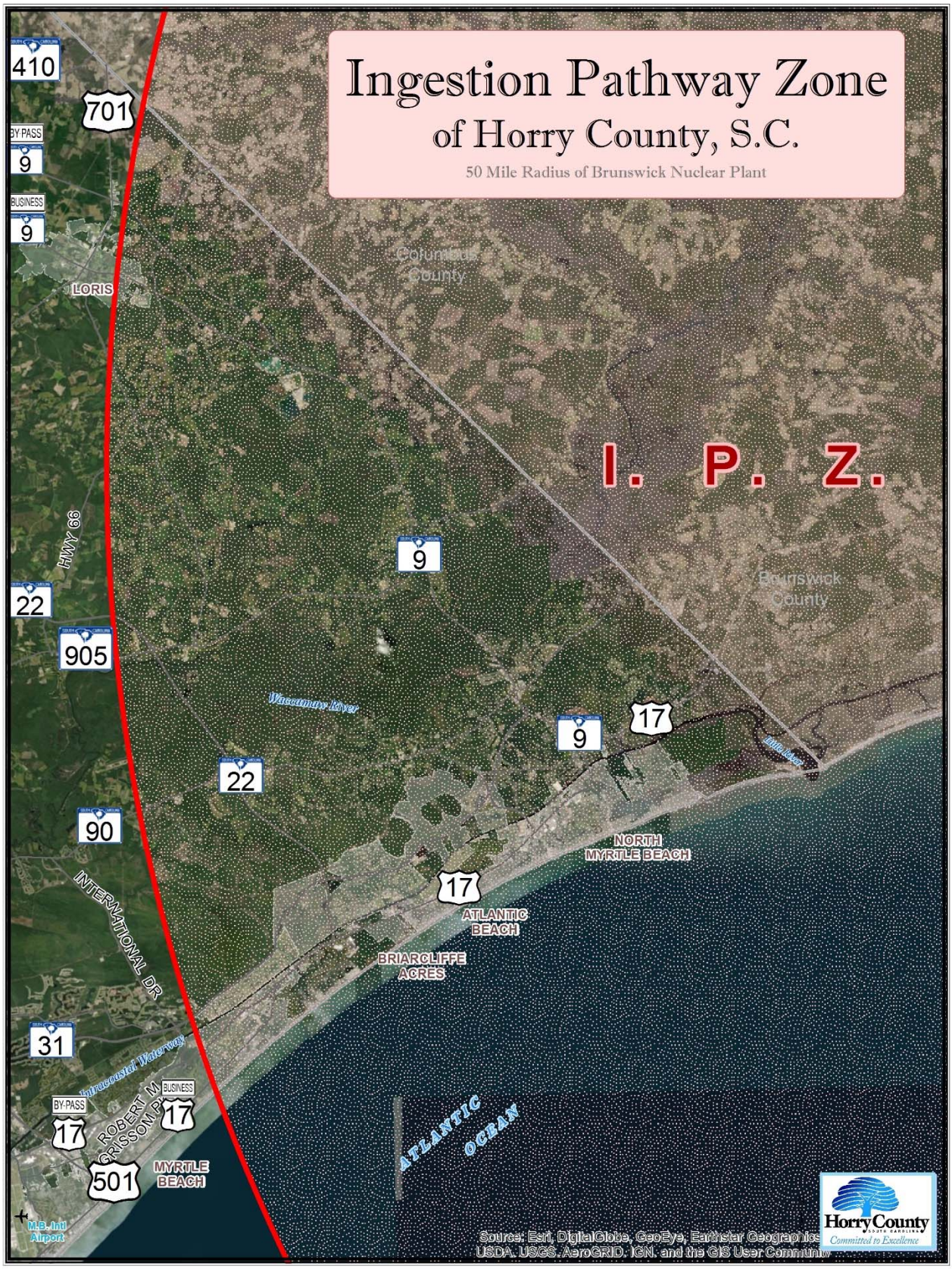
FIGURE 5Recommended Protective Actions to Avoid Whole Body and Thyroid Dose From Exposure to a Gaseous Plume		
GENERAL PUBLIC		
Projected Population Dose TEDE*	**Recommended Actions**	**Comments**
<0.1 rem	No actions based on risk from radiation dose.	
0.1 to 1 rem	In-place Sheltering. Monitor environmental radiation levels.	Not to be interpreted as an additional lower level PAGs for in-place sheltering.
1 to 5 rem (TEDE*) **5 rem (CDE**)**	Evacuate General Public. In-place sheltering acceptable alternative for high risk conditions.	High risk may be due to immobility, infirmity or adverse health conditions. Evacuation / in-place sheltering normally initiated at 1 rem. In-place sheltering is preferred action and provides equal or greater overall protection.
5 to 10 rem	Evacuate General Public In-place sheltering acceptable alternative when both immobile, infirmed persons and high-risk conditions are present.	10 rem is maximum dose for in-place shelters unless it will provide greater protection than evacuation. The possibility of shelter failure should be considered for in-place sheltering recommendations at projected doses >10 rem
Inhalation of Radioiodine > 25 rem (CDE)**	Administration of stable iodine to institutional persons	Requires authorization of the State Health director of designee

* TEDE = Total Effective Dose Equivalent
** CDE = Committed Dose Equivalent (To the thyroid from radioiodine)

Recommended Protective Actions to Avoid Whole Body and Thyroid Dose From Exposure to a Gaseous Plume			
EMERGENCY WORKERS			
DOSE LIMITS	**ACTIVITY**	**CONDITIONS**	**COMMENTS**
1 rem	All Activities	Cumulative dose reading. Consider implementing methods to maintain dose as low as reasonably possible.	1 rem is the "Administrative Limit" Value for Emergency Workers
5 rem	All Activities	Implement worker rotation or other methods to maintain dose as low as reasonably possible.	5 rem is the "Turn Back" Value for Emergency Workers
10 rem	Protecting Valuable Property	Lower dose not reasonably possible	Only when protection of valuable property justifies potential increased health risk.
25 rem	Lifesaving or protection of large populations	Lower dose not reasonably possible	Justified in situations where dose incurred by emergency worker executing his task will significantly lower the projected dose for the population being protected.
> 25 rem	Lifesaving or protection of large populations	**VOLUNTARY BASIS ONLY** Volunteers must be fully aware of health risks involved	Awareness must include more than numerical values at which acute or delayed health effects will occur.

ATTACHMENT D




Ingestion Pathway Zone
of Horry County, S.C.
50 Mile Radius of Brunswick Nuclear Plant
I. P. Z.
Columbus County
Brunswick County
LORIS
NORTH MYRTLE BEACH
ATLANTIC BEACH
BRIARCLIFFE ACRES
MYRTLE BEACH
ATLANTIC OCEAN
Waccamaw River
Intracoastal Waterway
HWY 66
INTERNATIONAL DR
ROBERT M. GRISSOM PKWY
M.B. Intl Airport
410
701
BY-PASS
9
BUSINESS
9
22
905
9
17
9
22
90
17
31
BY-PASS
17
BUSINESS
17
501
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