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J. PROTECTIVE RESPONSE

To assure that a range of protective actions is available for the plume exposure pathway for emergency workers and the public. Guidelines for protective actions during an emergency, consistent with Federal guidance, are developed and in place and protective actions for the ingestion exposure pathway appropriate to the locale have been developed.

To protect onsite personnel during hostile action and ensure the continued ability to safely shutdown the reactor and perform the functions of the emergency plan a range of protective actions are in place.

J.1. a-d On-site Alerting and Notification

The means and time required to warn, alert and/or notify employees not having emergency assignments (non-essential), visitors, contractor and construction personnel and other individuals who may be on or passing through the owner-controlled area are described in Emergency Response Procedure RP/0/A/5000/010, Conducting a Site Assembly/Evacuation.

Methods to notify and alert onsite personnel (essential and non-essential) during hostile action activities are described in RP/0/B/5000/026, Site Response to Security Events, AP/0/A/5500/046, Hostile Aircraft Activity and RP/0/A/5000/010, Conducting a Site Assembly or Preparing the Site for an Evacuation.

J.2 Evacuation Routes and Transportation

The Operations Shift Manager/Emergency Coordinator or designee uses station and local area maps, information available from meteorological tower instrument readouts and current radiological data for determining the evacuation route. Provisions for evacuation of on-site individuals include evacuation by private automobile. Personnel would then drive along Concord Road (SR 1132) west (which is not in one of the prevailing wind directions) to SC Highway 274. Personnel would then drive either South approximately 11 miles and assemble at the Duke Energy, York Operations Center or North approximately 10 miles to the Duke Energy, Allen Plant. The relocation site will have decontamination and contamination control capability and equipment in the event it is needed. Evacuation by automobile requires 15 to 30 minutes depending on which Relocation Site is chosen. High traffic density is not considered in estimating evacuation times due to the relatively untraveled area selected for the site (UFSAR Section 2.2.2.1).

J.3 Personnel Monitoring

Radiation Protection emergency personnel survey teams equipped with portable monitoring instruments will monitor employees, visitors, construction workers and vehicles for contamination at the Relocation Sites. Monitoring will be performed in accordance with procedure HP/0/B/1009/005 Personnel/Vehicle Monitoring for Emergency Conditions.

J.4 Site Evacuation Procedures - Decontamination/Non-Essential Personnel Criteria

Non-essential personnel may be evacuated from the plant site in the event of a Site Area Emergency and will be evacuated in the event of a General Emergency. Provisions are made for the decontamination of vehicles and personnel at an off-site location if the situation should warrant.

All members of the general public who are on-site must be evacuated if there is a possibility they may exceed either of the following limits:

External Radiation Level = 2 mrems/hr
Airborne Radioactivity = 1 times DAC for an unrestricted area

During hostile threat conditions expedited relocation of personnel to locations away from the hazards area are performed in accordance with RP/0/B/5000/026, Site Response to Security Events, AP/0/A/5500/046, Hostile Aircraft Activity and RP/0/A/5000/010, Conducting a Site Assembly or Preparing the Site for an Evacuation.

J.5 Personnel Accountability

Within thirty minutes of a Site Assembly, all persons within the Protected Area of Catawba Nuclear Station can be accounted for and any person(s) determined to be missing, will be identified by name. RP/0/A/5000/010 provides for the accounting of personnel (on site) continuously thereafter.

During hostile threat conditions personnel accountability is performed in accordance with RP/0/A/5000/010, Conducting a Site Assembly or Preparing the Site for an Evacuation.

J.6 Protective Measures - Breathing Apparatus, Protective Clothing, KI

Protective equipment and supplies will be distributed (as needed) to personnel remaining or arriving on site during the emergency to minimize the effects of radiological exposures or contamination. Protective measures to be utilized are as follows:

- Protective measures will be utilized to minimize the ingestion and/or inhalation of radionuclides and to maintain internal exposure below the limits specified in 10CFR20, Appendix B.

- Engineering (ventilation) controls are utilized in the TSC and Control Room to control concentrations of radioactive material in air. Otherwise, when not practical to apply process or other engineering controls to limit intakes of radioactive material in air, one or more of the following protective measures will be utilized:

    - Control of access
    - Limitation of exposure times
    - Use of individual respiratory protection equipment. Specific positions within the TSC and OSC are required to be respirator qualified. These positions are:

        TSC - Operations Manager, Assistant Operations Manager, Engineering Manager, Mechanical Engineer, Electrical Engineer and Reactor Engineer
        OSC - All positions except the OSC Log Keeper

- Self-contained breathing apparatus will be used in areas that are deficient in oxygen or when fighting fires. Respiratory protective equipment will be issued by Radiation Protection or Safety and Health Services. SCBA's are available with other firefighting equipment for use by the station fire brigade.

- Individual Thyroid Protection - Protective measures will be utilized to minimize the ingestion and/or inhalation of radioactive iodine. However, if an unplanned incident involves the accidental or potential ingestion or inhalation of radioactive iodine, Potassium Iodide Tablets (KI) are available for distribution by AD-EP-ALL-0204 (Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release).

- Use of Protective Clothing - Protective clothing will be issued when contamination levels exceed 1000 dpm/100 cm² beta-gamma and 20 dpm/100 cm² alpha of smearable contamination. Protective clothing items are located in the Change Rooms inside the Radiation Control Area, available for emergency use. Special fire-fighting protective clothing and equipment is available in designated station supply storage areas for use by fire brigade personnel.

J.7 Protective Action Recommendations

The Emergency Coordinator (Operations Shift Manager or Station Manager) or the EOF Director shall be responsible for contacting the state and/or local governments to give prompt notification for implementing protective measures within the plume exposure pathway.

Protective Action Guides are adopted from EPA 400-R-92-001 and are shown in Figure J-2. A flowchart to aid the Emergency Coordinator in making Protective Action Recommendations is also shown in Procedures RP/0/A/5000/005, General Emergency, and AD-EP-ALL-0109, Off Site Protective Actions Recommendations.

As described in section B.4, the Emergency Coordinator and the EOF Director are responsible for making protective action recommendations. Prior to activation/operation of the EOF, the Emergency Coordinator will be responsible for making these recommendations. After activation of the EOF, the EOF Director assumes this responsibility. Protective action recommendations will be provided to the off-site authorities (states and counties) who are responsible for implementing public protective actions. Refer to AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment, for protective action recommendations concerning the use of KI by the public. The pre-established warning message format (Figure E-1) will be used in transmitting the recommendations.

The mechanism for making dose projections upon EOF activation is as follows:

The Radiological Assessment Manager is responsible for making dose projections on a periodic basis. These calculations will use existing plant procedures to calculate projected dose to the population-at-risk for either potential or actual release conditions. For conditions in which a release has not occurred but fuel damage has taken place and radiation levels in the containment building atmosphere are significant, a scoping analysis will be performed to determine what recommendations would be made if containment integrity were lost at that time. The analysis will be based upon a design leak rate and upon a projected penetration failure indicated by a hole size of certain diameter. This analysis will include the use of actual containment pressure, realistic meteorology, and actual source term. A Total Effective Dose Equivalent (TEDE) and Committed Dose Equivalent (CDE) thyroid will be calculated at various distances from the plant (site boundary, 2 miles, 5 miles, 10 miles and beyond, if needed). These dose projections are compared to the Protective Action Guides in Procedure AD-EP-ALL-0202, which are derived from the "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" (EPA 400-R-92-001). Based on these comparisons, protective action recommendations are developed by the Radiological Assessment Manager. If these recommendations involve sheltering, evacuation of the public around the plant or the administration of KI to the public, the Radiological Assessment Manager informs the EOF Director of the situation and recommendations for protective actions.

If dose projections show that PAGs have been exceeded at 10 miles, the dose assessment code and in-field measurements, when available, shall be used to calculate doses at various distances downwind to determine how far from the site PAG levels are exceeded. The Radiological Assessment Manager shall forward the results to the EOF Director who will communicate this information to the off-site authorities.

J.8 Evacuation Time Estimates

A description of the methods and assumptions used in developing the analysis of evacuation time estimates is included in the current Evacuation Time Estimate Study for the Catawba Nuclear Site. (CNS-ETE-12132012, Rev. 000, Part 1 of 2 and Part 2 of 2)

The "evacuation time" is the time between the start of the notification process and the moment the last evacuee crosses out of the area being evacuated. Thus, it includes notification time and time spent preparing to leave, not just travel time.

An updated ETE analysis will be submitted to the NRC under §50.4 no later than 365 days after CNS determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

The criteria for determination that an updated ETE analysis have been met:

a. The availability of the most recent decennial census data from the U.S. Census Bureau;

OR

a. If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the currently NRC approved or updated ETE.

During the years between decennial censuses CNS will estimate EPZ permanent resident population changes once a year, but no later than
365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. CNS will maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.

CNS' ETE analysis, using the 2010 decennial census data from the U. S. Census Bureau, was submitted to the NRC via §50.4 on December 13, 2012.

J.9 Implementing Protective Measures

If protective actions for any off-site location are deemed necessary, the emergency planning agency of the affected county, in conjunction with the appropriate State agencies (SC-Emergency Planning Division, NC-Department of Crime Control and Public Safety) has the legal authority and responsibility for initiating protective measures for the general public in the plume exposure pathway EPZ including evacuation of these areas. The decision to shelter the public as an alternative to evacuation will be made by the off-site agencies for special populations or when an impediment to evacuation exists. Sheltering in lieu of evacuation should also be considered during a short term release. A short term release is any release that can be accurately projected to be less than the affected protective action zone's evacuation time. An example would be a "puff release." In addition, sheltering may be appropriate (when available) for areas not designated for immediate evacuation because: 1) it positions the public to receive additional instructions; and 2) it may provide protection equal to or greater than evacuation. Public notification of the emergency, the resources used to determine if an evacuation is necessary, the evacuation routes, and the methods used for evacuating persons in the plume exposure pathway EPZ are outlined in the appropriate County and State emergency plans.

For hostile action events, a range of protective actions for onsite workers including evacuation of essential personnel from potential target buildings, timely relocation of non-essential site personnel, dispersal of critical personnel to safe locations, sheltering of personnel away from potential site targets and accountability of personnel after the attack are provided in Emergency Plan Implementing Procedures RP/0/B/5000/026, Site Response to Security Events, RP/0/A/5000/010, Conducting a Site Assembly or Preparing the Site for an Evacuation and AP/0/A/5500/046, Hostile Aircraft Activity.

J.9.a Carowinds: Special Consideration

Comprehensive plans provide for early notification to Carowinds of a radiological emergency at Catawba and for evacuation of Carowinds. The plans describe the responsibilities of the emergency response organizations of Mecklenburg and York Counties and provide for the coordination of their efforts among themselves and with Carowinds' officials. The plans provide for immediate notification of patrons and staff of Carowinds at the time of the precautionary closing of the park and of the cause of the emergency. Both states and counties located in the ten-mile EPZ agreed that the Charlotte-Mecklenburg Emergency Management Office (CMEMO) will perform the lead planning role regarding a recommended course of action for Carowinds theme park. Refer to Carowinds Standard Operating Procedure (SOP).

See County and State Plans for more detailed information.

J.10 Implementation of Protective Measures for Plume Exposure Pathway

J.10.a EPZ Maps

Figures i-1 and 2 describe the EPZ's, government jurisdictions, and evacuation zones for Catawba Nuclear Station. Evacuation routes are displayed in Figure J-4.

J.10.b EPZ - Population Distribution Map

See Appendix 4, Evacuation Time Estimates.

J.10.c EPZ - Population Alerting and Notification

As described in Appendix 3 of this plan, a system exists for alerting and notifying the population (resident and transient) within the EPZ areas. This system is activated by the county and state organization and includes the use of large fixed-site sirens and the Emergency Alert System. A back-up means of alerting and notification is described in the State and County Emergency Plans.

J.10.d EPZ - Protecting Immobile Persons

The state and county organization referenced in Section A of this plan have the capability to protect those persons whose mobility may be impaired. The State and County Plans provide for transportation from the person's location to a reception center or shelter.

J.10.e Use of Radioprotective Drugs For Persons in EPZ

See State and County plans.

J.10.f Conditions For Use of Radioprotective Drugs

See County and State Plans.

J.10.g State/County Relocation Plans

See County and State Plans.

J.10.h Relocation Center Locations

See County and State Plans.

J.10.i Evacuation Route - Traffic Capacities

See County and State Plans.

J.10.j Evacuated Area Access Control

See County and State Plans.

J.10.k Planning For Contingencies in Evacuation

See County and State Plans.

J.10.l State/County Evacuation Time Estimates

The estimates referenced in Appendix 4 are references in the County and State Plans.

J.10.m Bases For Protective Action Recommendations

Figure J-2 describes the considerations used by Duke management in developing protective action recommendations.

J.11 Ingestion Pathway Planning

See County and State Plans.

J.12 Relocation Center - Registering & Monitoring

See County and State Plans

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FIGURE J-2, PAGE 1 OF 1
GUIDANCE FOR OFFSITE PROTECTIVE ACTIONS

PROTECTIVE ACTION GUIDES (a)

Projected Dose

Total Effective Dose Equivalent (TEDE)	**Committed Dose Equivalent Thyroid (CDE Thyroid)**	**Protective Action Recommendation**
< 1 rem	< 5 rem	No Protective Action is required based on projected dose.
≥ 1 rem	≥ 5 rem	Evacuate affected zones and shelter the remainder of the 10 mile EPZ not evacuated.
N/A	≥ 5 rem (b)	Consider the use of KI (potassium iodide) in accordance with State Plans and Policy.

(a) Protective Action Guides (PAGs) are levels of radiation dose at which prompt protective actions should be initiated and are based on EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

(b) PAG for KI taken from Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, FDA Guidance, November 2001 and Guidance for Industry, KI in Radiation Emergencies, Questions and Answers, FDA, December 2002.

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FIGURE J-3

Catawba Nuclear Station Evacuation Road Network and Nodes