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JAN 16 2013

10 CFR 50.4(b)(5)(iii)
10 CFR 50.54(q)(5)
10 CFR 50, Appendix E, Section V
10 CFR 72.4

Serial: BSEP 13-0009

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325, 50-324, 72-006
Revision to Radiological Emergency Response Plan

In accordance with 10 CFR 50.4(b)(5)(iii); 10 CFR 50.54(q)(5); 10 CFR 50, Appendix E, Section V; and 10 CFR 72.4, Carolina Power & Light Company (CP&L) is submitting a revision to the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2, Radiological Emergency Response Plan, Revision 82, effective December 18, 2012.

The Company has evaluated this revision, in accordance with 10 CFR 50.54(q), and determined that the revision is not a reduction in the effectiveness of the Radiological Emergency Response Plan and that the Plan, as changed, continues to meet the standards of 10 CFR 50.47(b) and the requirements of 10 CFR 50, Appendix E. Enclosure 1 provides a 10 CFR 50.54(q)(5) summary for the revised Radiological Emergency Response Plan. Enclosure 2 contains a copy of the revised Radiological Emergency Response Plan.

This document contains no regulatory commitments.

Please refer any questions regarding this submittal to Mr. Kent Crocker, Supervisor – Emergency Preparedness at (910) 457-3165.

Sincerely,

Annette H. Pope
Manager – Organizational Effectiveness
Brunswick Steam Electric Plant

JMK/jmk

Enclosures:
1. 10 CFR 50.54(q)(5) Summary
2. Copy of Revised Radiological Emergency Response Plan

AXYS
NMSS26
NRR
NMSS

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10 CFR 50.54(q)(5) Summary

In accordance with 10 CFR 50.54(q)(5), Carolina Power & Light Company (CP&L) is providing a summary for the revised Radiological Emergency Response Plan being submitted with this letter.

1. Radiological Emergency Response Plan (0ERP), Revision 82

- Updated a figure from a simple flow chart to a more detailed flow chart describing Control Room emergency response actions associated with each emergency classification (i.e., Unusual Event, Alert, Site Area Emergency, and General Emergency). This change also includes a block describing a Security Threat.

- Changed the title of "Senior Control Operators" to "Senior Reactor Operators;" changed the title "Control Room Operators" to "Reactor Operators;" and changed the title "Control Operators" to "Reactor Operators." The changes provide for consistency with site procedures.

- Added the procedure title and number that the Technical Support Center Site Emergency Coordinator would reference for instructions when located at the Alternate Emergency Facility.

- Corrected the description of the composition of the fire brigade for consistency with other site procedures. Reference to "Fire Brigade Advisor" was deleted from the description of the composition of the fire brigade. The Fire Brigade Advisor is not a member of the Fire Brigade. This position is a member of the Operations staff who provides advisory support to the fire brigade during fire brigade activities.

- Updated the letter of agreement with the Institute of Nuclear Power Operations (INPO).

- As required by the NRC Interim Staff Guidance (ISG) NSIR/DPR-ISG-01, added the "On-Shift Staffing Analysis for Brunswick Nuclear Plant – 2012," which is included as new Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012. The revision includes the staffing requirements from the On-Shift Staffing Analysis and clarification of position responsibilities to ensure adequate personnel will continue to be onsite at all times to provide support in the event of an emergency. The changes include:

  - "Three Control Operators" was changed to "Four Reactor Operators" and "one Chemistry Technician" was changed to "two Chemistry Technicians."

  - Revised Figure 3.1-1, Brunswick Shift Organization, for consistency with the minimum on-shift staffing table depicted in "Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012," Attachment 1. The new figure is similar in format to NUREG-0654, Table B-1, Minimum Staffing Requirements for NRC Licensees for Nuclear Power Emergencies.

  - Referenced new Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012, in the text of the 0ERP where appropriate

- Added new reference, Letter from Conrad S. Burnside (Federal Emergency Management Agency) to Carolina Power & Light Company regarding provisions for Emergency Plan Backup Alert and Notification, dated November 28, 2012. (Serial Number, FED 12-0001.)

The Radiological Emergency Response Plan (0ERP), Revision 82, changes continue to meet the requirements of:

- 10 CFR 50.47(b)(1) – Assignment of Responsibility/Organizational Control
- 10 CFR 50.47(b)(2) – Onsite Emergency Organization
- 10 CFR 50.47(b)(5) – Emergency Notifications
- 10 CFR 50.47(b)(8) – Emergency Facilities and Equipment
- 10 CFR 50.47(b)(10) – Emergency Protective Actions
- 10 CFR 50.47(b)(16) – Emergency Plan Maintenance
- 10 CFR 50, Appendix E, IV.A.1, 2 and 9 - Organization
- 10 CFR 50, Appendix E, IV.D.1, 3 and 4 – Notification Procedures
- 10 CFR 50, Appendix E, IV.E.8.d – Emergency Facilities and Equipment
- NUREG-0654, Section II.A.1 – Assignment of Responsibility (Organizational Control)
- NUREG-0654, Section II.B – Onsite Emergency Organization
- NUREG-0654, Section II.E.6 – Notification Methods and Procedures
- NUREG-0654, Section II.P – Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans

Reference: EREG AR 00577103

Copy of Revised Radiological Emergency Response Plan

PLANT OPERATING MANUAL

VOLUME XIII

EMERGENCY RESPONSE PLAN

(0ERP)

RADIOLOGICAL EMERGENCY RESPONSE PLAN (ERP)

Revision 82

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REVISION SUMMARY

PROGRESS ENERGY
BRUNSWICK NUCLEAR PLANT (BNP)
RADIOLOGICAL EMERGENCY PLAN (ERP)

1.0 INTRODUCTION

The Emergency Program for the Brunswick Nuclear Plant consists of the Brunswick Radiological Emergency Plan and its implementing Plant Emergency Procedures. The Radiological Emergency Plan may also be referred to as the Emergency Response Plan (ERP) in other plant documents. Also included are the related radiological emergency plans and procedures of state and local organizations. The purpose of these programs is to provide for the protection of plant personnel and the general public and to prevent or mitigate property damage that could result from an emergency at the Brunswick Nuclear Plant. The combined emergency preparedness programs have the following objectives:

1. Effective coordination of emergency activities among all organizations having a response role.

2. Early warning and clear instructions to the population-at-risk in the event of a serious radiological emergency.

3. Continued assessment of actual or potential consequences both on site and off site.

4. Effective and timely implementation of emergency measures.

5. Continued maintenance of an adequate state of emergency preparedness. The Supervisor - Emergency Preparedness is the BNP Emergency Planning Coordinator. The BNP Emergency Plan and Procedures are contained in the Plant Operating Manual (POM), Volume 13, which consists of the following parts:

   Book 1, Radiological Emergency Plan (ERP)
   Book 2, Plant Emergency Procedures (PEP)

   A list of procedures required to implement the plan can be found in Book 2.

1.1 GENERAL INFORMATION

1.1.1 Plant Site Description

The Brunswick plant site is located in the southeastern portion of North Carolina 2 1/2 miles north of Southport in Brunswick County, and 16 miles south of Wilmington, North Carolina, in adjacent New Hanover County. (See Fig. 1.1-1 and Fig. 1.1-2.) The Brunswick Plant utilizes two General Electric Company boiling water reactors. The major structures of the Brunswick plant which contain radioactive materials are the Units 1 and 2 reactor buildings, the turbine building, augmented off-gas building, radwaste building, and a dry fuel storage facility (Independent Spent Fuel Storage Installation (ISFS).

Figure 1.1-1 shows a site plan for the Brunswick plant and Figure 1.1-3 shows the location of the buildings at the site.

1.1.2 Plume Exposure Emergency Planning Zone

The plume exposure Emergency Planning Zone (EPZ) is defined to be the area within an approximate ten-mile radius of the Brunswick plant.

Principal exposure sources from plume exposure pathways are: (a) external exposure to gamma and beta radiation from the plume and deposited material and (b) exposure of internal organs to gamma and beta radiation from inhaled radioactive gases and/or radioactive particulates.

Figure 1.1-2 shows the ten-mile plume exposure EPZ in relation to the location of the Brunswick plant. The plume exposure EPZ includes portions of the North Carolina counties of Brunswick and New Hanover.

The prevailing winds around the Brunswick plant are from the southwest. Figure 1.1-4 presents wind roses for the Brunswick plant site.

1.1.3 Ingestion Exposure Emergency Planning Zone

The ingestion exposure EPZ is defined to be the area within a 50-mile radius of the Brunswick plant.

The principal exposure sources from ingestion pathways are contaminated water or food, such as milk or fresh vegetables. The time of potential exposure can range in length from hours to months.

Figure 1.1-5 shows the 50-mile ingestion exposure EPZ in relation to the location of the Brunswick plant. The ingestion exposure EPZ includes the North Carolina Counties of Bladen, Brunswick, Columbus, New Hanover, Onslow, Pender, and Sampson, and the South Carolina County of Horry.

The region within a 50-mile radius of the Brunswick plant site is predominantly rural, with less than one-half the land devoted to farming. The remainder of the region consists of undeveloped, non-utilized marshes and woodlands.

1.1.4 Demographic Information

Demographic information for the 10-mile Emergency Planning Zone is presented in Figure 1.1-6, 1.1-6a and 1.1-6b.

The information is presented by (1) local planning zones and (2) distance from plant at 0-2 miles, 2-5 miles, and 5-10 miles, based on the longitude and latitude of the plant site. Since some of the local planning zones extend beyond the 10-mile radius, the total population for the local planning zones is greater than the total population for the 0-10 mile radius.

1.2 SCOPE AND APPLICABILITY

This document describes the Brunswick Radiological Emergency Plan (Plan) which has been prepared in accordance with Section 50.47 and Appendix E, of Title 10, Part 50, of the Code of Federal Regulations. The Plan shall be implemented whenever an emergency situation is indicated as defined in Section 2.0 Emergency Classifications. Radiological emergencies can vary in severity from the occurrence of an abnormal event, such as a minor fire with no radiological health consequences, to nuclear accidents having substantial on-site and/or off-site consequences.

In addition to emergencies involving a release of radioactive materials, events such as security threats or breaches, fires, electrical system disturbances, and natural phenomena that have the potential for involving radioactive materials are included in the Plan. Other types of emergencies that do not have a potential for involving radioactive materials are not included in the Plan.

The activities and responsibilities of outside agencies providing an emergency response role at the Brunswick plant are summarized in Appendix C and in the state's Emergency Plan.

1.3 SUMMARY OF EMERGENCY PROGRAM

The Brunswick radiological emergency program consists of the Brunswick Radiological Emergency Plan and its implementing procedures. The Plan provides the basis for performing advance planning and for defining specific requirements and commitments to be implemented by other documents and procedures. The Brunswick plant procedures provide the detailed actions and instructions that will be required to implement the Plan in the event of an emergency. The Plan and its implementing procedures are briefly described below.

1.3.1 Concept of Operations

The Brunswick Radiological Emergency Plan describes the general nature of emergency response activities, the available emergency response resources and facilities, and the means for maintaining emergency preparedness. Specific plant implementing procedures have been developed (or existing ones modified) to describe in detail how involved plant and corporate personnel carry out their specific responsibilities as identified in the Plan.

1.3.1.1 Emergency Response Activities

The first step in responding to an emergency is recognizing and classifying the nature of the emergency. In order to standardize this process, the four emergency classifications described in NUREG-0654 and NRC Bulletin 2005-02 are adopted for use in this plan. Each class of emergency (Unusual Event, Alert, Site Area Emergency, and General Emergency) encompasses a predefined set of increasingly severe circumstances, including plant conditions, ISFSI conditions, instrument readings, and effectiveness of in-plant corrective actions, known as Emergency Action Levels. The process of properly classifying an emergency is important because the subsequent response activities are dependent on the severity of the emergency.

The next step is to notify (and activate as conditions warrant) the proper emergency organizations, both inside and outside Progress Energy. Proper integration of the efforts of the various response organizations is important to prevent omission or unnecessary duplication of key activities. Therefore, the emergency plan identifies in terms of information flow and communications links the interfaces between pertinent organizations, and identifies the role each is to perform. The emergency response measures to be taken by Progress Energy are discussed in detail in this Plan, while those taken by the state and local governments are summarized herein with details provided in the North Carolina State Emergency Plan.

Beyond the process of notification and activation of support groups, a variety of efforts must be made to assess and minimize the consequences of an emergency condition. These efforts include estimates of the radiation exposures that may occur to plant and off-site personnel if the emergency is not brought quickly under control. Such estimates can be used to initiate preplanned protective actions. The decisions on protective actions off site, such as taking shelter or evacuation, are the responsibility of state and local authorities. The Plan provides for technical assessments of the course and consequences of the emergency and the means for providing state and local agencies with adequate information upon which to make their decisions. Emergency response activities also include personnel accountability, search and rescue, first aid, personnel decontamination, fire fighting, and damage control.

The final step is to declare the emergency over and perform any necessary post-accident recovery activities. The Plan describes post-accident recovery provisions and identifies the transition from the emergency phase to the recovery phase.

1.3.1.2 Emergency Response Resources

The emergency response resources available to respond to an emergency consist of the personnel at Corporate Headquarters, at other Progress Energy facilities, and, in the longer term, at organizations involved in the nuclear industry. The first line of defense in responding to an emergency lies with the normal operating shift on duty when the emergency begins. Therefore, members of the Brunswick staff are assigned defined emergency response roles that are to be assumed whenever an emergency is declared. The overall management of the emergency is normally performed by the Control Room Site Emergency Coordinator until relieved by the on-call Technical Support Center Site Emergency Coordinator. Because of his overall knowledge, he is best able to bring the full resources of the plant to bear on controlling the emergency. On-site personnel have preassigned roles to support the Site Emergency Coordinator and to implement his directives. These roles, for the purpose of emergency planning, are cast in terms of emergency teams and assignments, each having a designated leader or primary person and alternate(s) assigned to it.

Each team and individual assignment carries with it specific emergency response duties and, where practical, each is provided with an on-shift person to perform those duties on an interim basis. This approach ensures under most conditions that an emergency response duty falls under some predesignated position and provides a smooth transition as additional people are called to the plant, since each one knows ahead of time what his area of responsibilities will be. The Site Emergency Coordinator will also have ready access to the Technical Support Center. This Emergency Facility is comprised of personnel who are knowledgeable of and responsible for engineering and management support. It will assemble shortly after a non-security related Alert, Site Area Emergency, or General Emergency is declared in order to assist the Site Emergency Coordinator and to carry out their directives.

Upon declaration of an Alert, Site Area Emergency, General Emergency, or at the discretion of the Site Emergency Coordinator, the Emergency Operations Facility will be activated and staffed by personnel under the direction of the Emergency Response Manager. The position of Emergency Response Manager is staffed by qualified senior plant management personnel. Once the Emergency Operations Facility has been fully activated, the Emergency Response Manager will be responsible for all off-site emergency response including radiological and environmental assessment, determination of recommended public protective actions, and coordination of emergency response activities with federal, state, and local agencies. The Emergency Response Manager will manage the corporate response activities, to relieve the Brunswick plant personnel of any activities that could hamper their response efforts, and to marshal the corporate resources needed to properly respond to the emergency.

Progress Energy has a staff of well-trained and experienced engineers, analysts, and technicians. These personnel represent a pool of technical expertise which can be called upon to provide additional support to the emergency response and recovery organizations. Progress Energy personnel will staff an off-site Joint Information Center to interface with the media and general public in order to effectively communicate to the public the nature of an emergency in progress. Available to assist the Brunswick plant in responding to an emergency are Progress Energy personnel assigned to the Harris, Robinson, and Crystal River nuclear plants and the Corporate Offices.

In addition as outlined in Appendix C, Progress Energy has arranged for support from outside Progress Energy in the areas of fire fighting, rescue and medical assistance, as well as that support delineated in the state and local emergency plans. Assistance may also be available from the Nuclear Regulatory Commission, Federal Emergency Management Agency, Department of Energy, and General Electric. The industry resources identified by INPO are also available. Progress Energy is a signatory to the mutual assistance agreement developed by INPO for utilities in the nuclear power industry.

1.3.1.3 Emergency Response Facilities

Special provisions have been made to assure that ample space and proper equipment are available to effectively respond to the full range of possible emergencies.

The emergency facilities available include the Brunswick plant Control Room, Operational Support Center, Technical Support Center, Emergency Operations Facility, and Joint Information Center. Each of these facilities, as well as the North Carolina Emergency Operations Center, the Brunswick County Emergency Operations Center, and the New Hanover County Emergency Operations Center, are described in Section 5, Emergency Facilities and Equipment.

1.3.1.4 Emergency Response Plan Maintenance

The Plan, as described in Section 6, provides for maintenance of emergency preparedness by establishing the framework and requirements for training, drills and exercises, and periodic updating. Each Brunswick employee having an emergency response role is trained, and annually retrained, in his area of responsibility and also how his duties fit in with those of others. Each individual must know what is expected of him and what he should expect of others while responding to an emergency. A basic description of the required training for emergency assignment is provided in the Plan. The effectiveness of such training is gauged by the use of drills and exercises. Drills are supervised instruction periods aimed at developing, maintaining, and testing skills in a specific operation such as communications or radiation monitoring. An exercise tests the overall capability of the integrated plant, state, and local emergency organizations to properly respond to an emergency. The Plan sets forth the frequency and content of such drills and exercises and also establishes how lessons learned will be used to improve the Plan.

The Plan also delineates the requirements for reviewing, updating, and auditing the Plan and for performing maintenance on and taking inventories of emergency equipment and supplies. An Emergency Planning Coordinator is designated to be responsible for overseeing this process as outlined in Section 6.2.

1.4 BRUNSWICK PLANT EMERGENCY PROCEDURES

Plant Emergency Procedures (PEP's) are implementing procedures which define the specific (i.e., step-by-step) actions to be followed in order to recognize and assess an emergency condition and to mitigate its consequences. Procedures to implement the Plan have been developed or existing procedures modified to provide the following information:

1. Specific instructions to the plant operating staff for the implementation of the Plan.

2. Specific authorities and responsibilities of plant operating personnel.

3. A source of pertinent information, forms, and data to ensure prompt actions are taken and that proper notifications and communications are carried out.

4. A record of the completed actions.

5. The mechanism by which emergency preparedness will be maintained at all times.

1.5 DEFINITIONS

Abnormal Operating Procedures (AOPs) - Specific procedures that provide step-by-step instructions to guide plant operations during potential or actual emergency situations.

Accident - Any unforeseen, or unintentional occurrence or mishap resulting in, or potentially resulting in, physical injury or injury due to radiation exposure or excessive exposure to radioactive materials.

Activated - To formally put on active duty with the necessary personnel and equipment to carry out the function required.

Activating - Key personnel are responding as a mandatory step to make the facility operational within the required time.

ALARA - Acronym for "As Low As Is Reasonably Achievable." Means making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

Backup Route Alerting - General population alerting accomplished using Mobile Route Alerting should the primary alert system (or a portion of the system) have known or indications of sirens being out of service.

Confinement Systems – Those systems, including ventilation, that act as barriers between areas containing radioactive substances and the environment.

Corrective Actions - Those emergency measures taken to lessen or terminate an emergency situation at or near the source of the problem, to prevent an uncontrolled release of radioactive material, or to reduce the magnitude of a release (e.g., equipment shutdown, fire fighting, repair, and damage control.)

Emergency Action Levels - Plant conditions used to determine the existence of an emergency and to classify its severity. The conditions include specific instrument readings (e.g., radiation release rates out of a building vent) that may be used as thresholds for initiating emergency measures such as initiating a notification procedure.

Emergency Classification - The characterization of emergency situations consisting of several groupings including the entire spectrum of possible radiological and hostile action based emergencies. The four classes of emergencies, listed in order of increasing severity (and decreasing probability), are (1) Unusual Event, (2) Alert, (3) Site Area Emergency, and (4) General Emergency.

Emergency Operations Centers - Designated facilities designed and equipped for effective coordination and control of emergency operations carried out within an organization's jurisdiction.

Emergency Operations Facility (EOF) - An on-site support facility for the management of overall licensee emergency response including coordination with federal, state, tribal, and local officials, coordination of off-site radiological and environmental assessment, and determination of recommended public protective actions. The EOF is located in the TSC/EOF/Training Building.

Emergency Operating Procedures (EOPs) – Specific operations procedures which provide specific technical guidance for operations during emergency conditions.

Emergency Planning Zones (EPZ) - A generic area defined about a nuclear plant to facilitate emergency planning off site. The plume exposure EPZ is described as an area with a 10-mile radius and the ingestion exposure EPZ is described as an area with a 50-mile radius in NUREG-0654. (See Figure 1.1-7)

Exclusion Area - Progress Energy-owned property that surrounds the reactor plants as defined in 10CFR100. The area is of such size that an individual located at any point on its boundary for two hours immediately following onset of the postulated fission product release would not exceed 25 rem whole body dose or 300 rem thyroid dose. This is the property boundary used for off-site dose projections. (See Figure 1.1-1)

Hostile Action - An act toward an Nuclear Power Plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the Nuclear Power Plant. Non-terrorism based EALs should be used to address such activities, (e.g., violent acts between individuals in the OCA).

Hostile Force - One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming or causing destruction

Independent Spent Fuel Storage Installation (ISFSI) – A complex designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

Ingestion Exposure Pathway - The potential exposure pathway to the public through consumption of radiologically contaminated water and foods such as milk or fresh vegetables. The basis for planning within the 50-mile EPZ.

Joint Information Center (JIC) - An off-site facility equipped and staffed by Progress Energy, State, County, and Federal Agencies to coordinate the dissemination of information to the news media and general public during an emergency.

Manning - A person is in the facility to respond to incoming calls.

Nuclear Incident - An event or series of events, either deliberate or accidental, leading to the release or potential release into the environment of radioactive materials in sufficient quantity to warrant consideration of protective actions.

Offsite Response Organization (ORO) – Any State and local government, supporting private industry and voluntary organizations and licensee offsite response organizations that are responsible for carrying out emergency functions during a radiological emergency.

Operational - The facility is executing its designed functions and tasks.

Operational Support Center (OSC) - The place to which emergency response support personnel report and standby in an emergency situation. The OSC is located in the Operations and Maintenance (O&M) Building.

Plume Exposure Pathway - The potential exposure pathway to the public through (a) whole body external exposure from the plume and from deposited materials, and (b) inhalation of radioactive materials. The basis for planning within the 10-mile EPZ.

Population-at-Risk - Those persons for whom protective actions are being or would be taken.

Primary Alert Notification – A fixed siren system at specific locations surrounding the Brunswick Nuclear Plant, with activation controls located in the applicable EPZ County Warning Point and/or EOC. These sirens will serve as the primary system for alerting the public to listen to local radio and television stations for information and instructions related to conditions at Brunswick Nuclear Plant. Along with the fixed siren system, the Emergency Alert System (EAS) will provide information or instructional messages via radio and TV on an area-wide basis throughout the land and water portion of the 10 mile EPZ.

Projected Dose - An estimate of the potential radiation dose which affected population groups could receive.

Protected Area - The double-fenced security area with intrusion detection devices immediately surrounding the plant structures. (See Figure 1.1-3.)

Protective Action - An activity conducted in response to an incident or potential incident to avoid or reduce radiation dose to members of the public (sometimes referred to as protective measure).

Protective Action Guide (PAG) - The projected dose to reference man, or other identified individual, from an accidental release of radioactive material at which a specific protective action to reduce or avoid that dose is warranted.

Radiological Emergency - An off-normal situation that has or may have a radiological impact on the public health and safety.

Recovery Actions - Those actions taken after an emergency to restore the Brunswick plant and the surrounding environment as nearly as possible to its pre-emergency radiological condition.

Restricted Area - Any area, access to which is controlled by Progress Energy for purposes of protection of individuals from exposure to radiation and radioactive materials.

Severe Accident Management Guidelines (SAMGs) - Severe Accident Management Guidelines are entered when Emergency Operating Procedures (EOPs) are not able to maintain adequate core cooling.

Special Facility Population – School, hospital and family care facility occupants located in the plume exposure EPZ.

Staffing - Key personnel are responding to the facilities as a proactive step to prepare for potential operational status.

State - The State of North Carolina.

Technical Support Center (TSC) - A center outside of the Control Room that supplies information on the status of the plant to those individuals who are knowledgeable or responsible for engineering and management support of reactor operations in the event of an emergency, and to those persons who are responsible for management of the emergency response. The TSC is located in the TSC/EOF/Training Building.

Unrestricted Area – Any area to which access is not controlled by the licensee for protecting individuals from exposure to radiation and radioactive materials, and any area used by residential quarters.

Warning Point – A facility that receives warning and other information and disseminates or relays this information in accordance with prearranged plan.

Figure 1.1-1
Brunswick Site Plan
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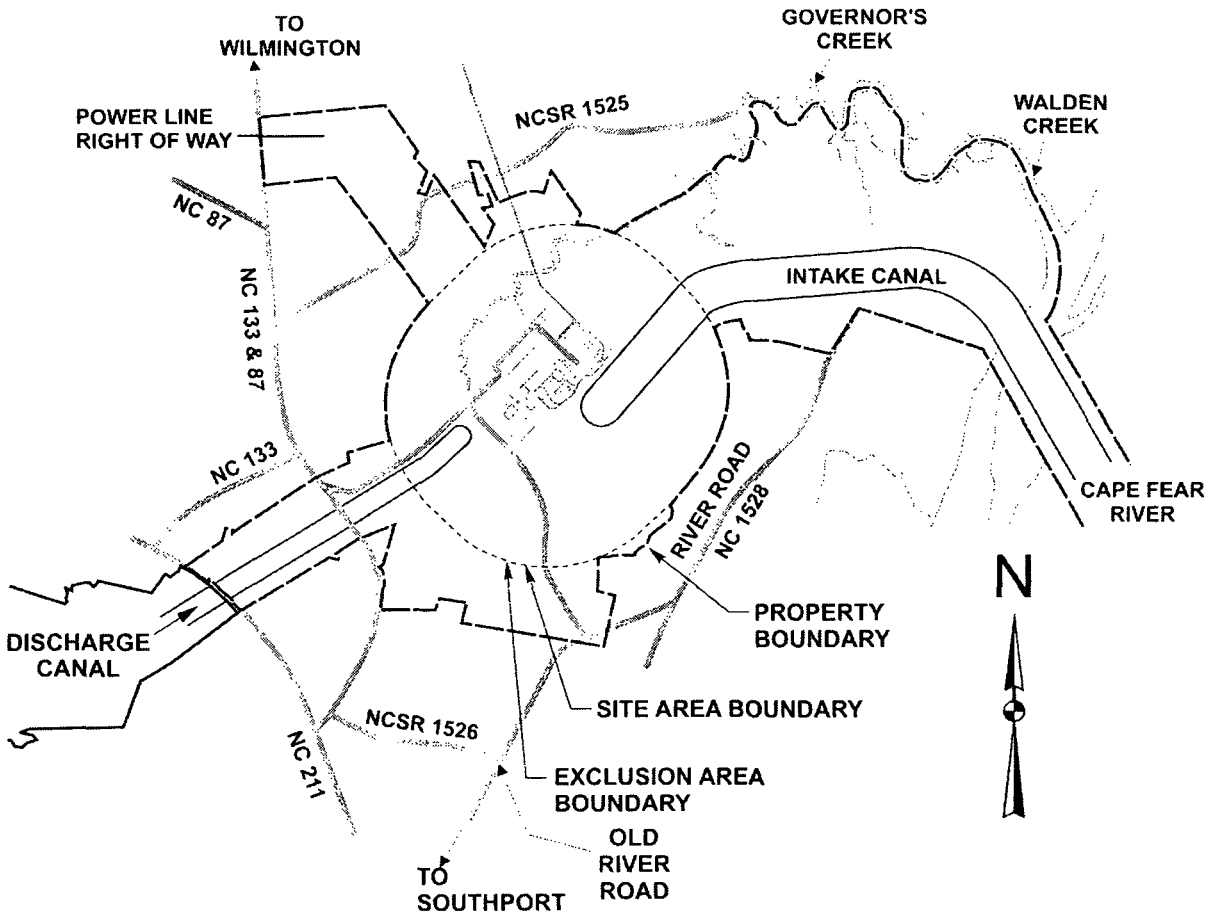

Figure 1.1-2
10-Mile Plume Exposure EPZ and Boundaries
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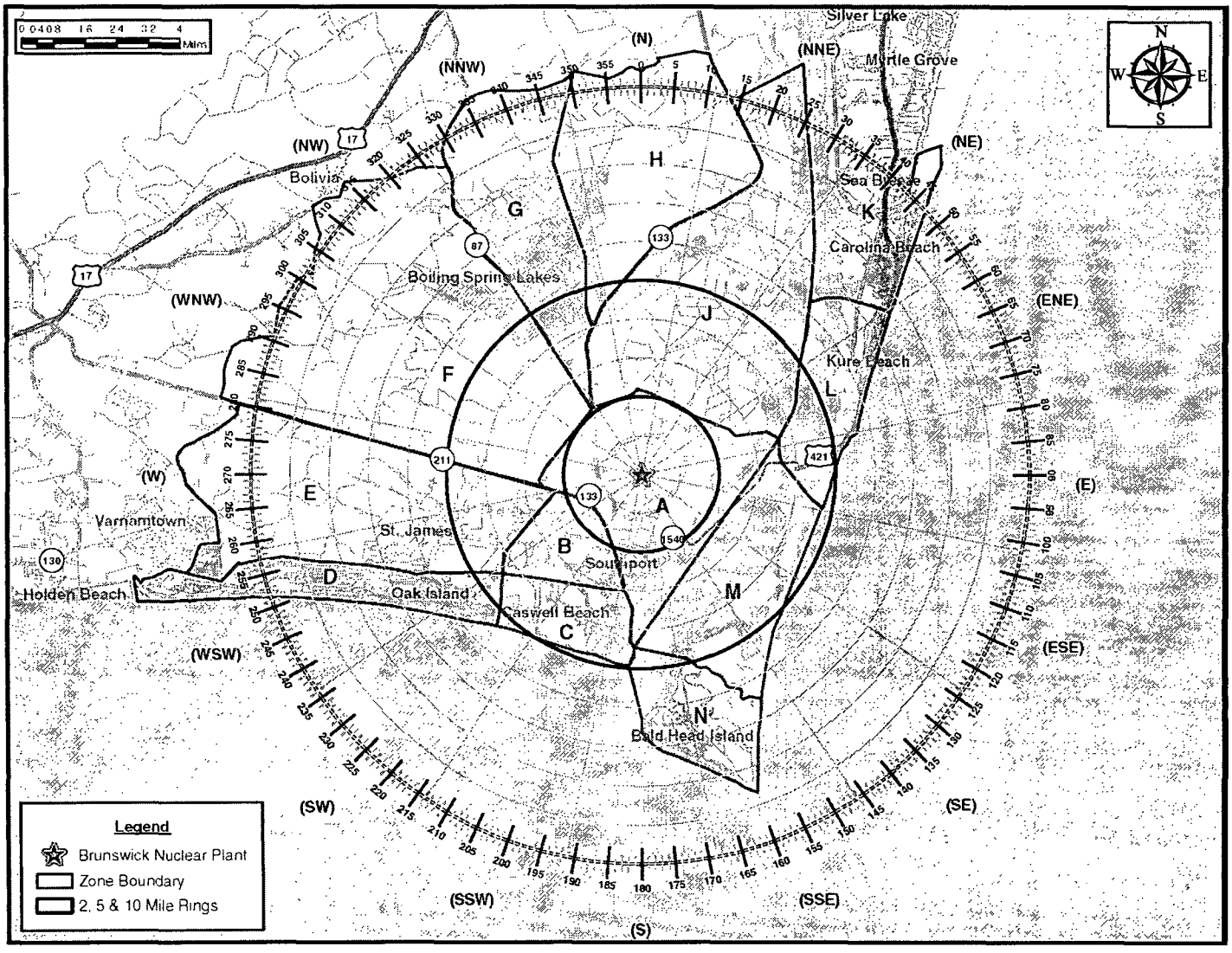


Brunswick County:

ZONE A: Bordered on the north by Sunny Point Access Road and the southern border of the Sunny Point Military Ocean Terminal; on the east by the Cape Fear River (border centered in the Cape Fear River) to the N.C. Baptist Assembly east shore (eastern tip of Oak Island); on the south along a line from the N.C. Baptist Assembly east shore north along the western side of Battery Island to Southport/Supply Road/ North Howe Street (NC 211), then west along Southport/Supply Road/North Howe Street (NC 211); and on the west to Oakview Dr (SR 1549). The western boundary follows Oakview Dr to Pineview Dr to Clearview Dr and continues northeast from the end of Clearview Dr to the intersection of NC 87 (George II Hwy), NC 133 (River Rd) and the Sunny Point Access Road. This zone includes those portions of Southport **NORTH** of Howe Street along with Snow Marsh and Battery Island.

ZONE B: Bordered on the north and east by Southport/Supply Road (NC 211) and North Howe Street (NC 87/211) to the end of the road in Southport; on the south along the north shore of the intracoastal waterway; west by Long Beach Road (NC 133). This zone includes those portions of Southport **SOUTH** of Howe Street.

ZONE C: The northern boundary follows the north shore of the Intracoastal Waterway from Long Beach Road (NC 133) to the end of Southport/Supply Road (NC 211) in Southport; then south along the western side of Battery Island to the N.C. Baptist Assembly east shore (eastern tip of Oak Island). The zone boundary moves around the N.C. Baptist Assembly east shore (eastern end of Oak Island) to meet the Atlantic Ocean. The southern border is the Atlantic Ocean coastline (Caswell Beach) to the intersection of Long Beach Rd/Country Club Dr (NC 133) and Jones Street. The western boundary moves north on Long Beach Rd/Country Club Dr (NC 133). This zone includes those portions of Oak Island **EAST** of Long Beach Rd/Country Club Dr (NC 133) along Caswell Beach Road – Community of Caswell Beach & the N.C. Baptist Assembly.

ZONE D: The northern boundary follows the north shore of the Intracoastal Waterway from the western end of Sheep Island to NC 133 (Long Beach Road). The eastern boundary follows NC 133 (Long Beach Road) to the coast (at Jones Street) on the Atlantic Ocean. The southern boundary follows the coast on the Atlantic Ocean to Lockwood Folly Inlet on the west. The boundary turns north toward the western end of Sheep Island. This zone includes those portions of Oak Island **WEST** of NC 133 (Long Beach Road) -Town of Oak Island (formerly communities of Long Beach & Yaupon Beach).

ZONE E: Bordered on the north by Southport/Supply Road (NC 211); and on the east by the Long Beach Road (NC 133) to the Intracoastal Waterway. The southern boundary follows the north shore of the Intracoastal Waterway west to the intersection of Sunset Harbor Road (SR 1112) and Lockwood Folly Rd SE. The zone boundary turns north on Sunset Harbor Road (SR 1112) to intersect with Southport/Supply Road (NC 211).

ZONE F Bordered on the north by the southern Bolivia town limits and by SR 1513 (Danford Road); on the east by NC 87 (George II Hwy) to the intersection of NC 87 (George II Hwy), NC 133 (River Rd) and the Sunny Point Access Road. The eastern boundary continues southwest from the intersection of NC 87 (George II Hwy), NC 133 (River Rd) and the Sunny Point Access Road to the end of Clearview Rd. The southern boundary is Southport/Supply Road (NC 211) moving west to the intersection of Clemmons Rd. SE (SR 1505). Zone boundary on the west is along Clemmons Rd. SE (SR 1505) and (SR 1504). Boundary line moves north along a line from the intersection of Clemmons Rd. SE (SR 1504/1505) and Gilbert Rd SE (SR 1501) to the end of Albright Rd SE (SR 1508). Boundary follows Albright Rd (SE SR 1508) and Midway Rd SE (SR 1500) and Old Ocean Hwy (US 17) to the southern Bolivia town limit. Zone includes Boiling Springs Lakes **SOUTHWEST** of NC 87.

ZONE G Bordered on the north by Funston Road (SR 1518); on the east by the Sunny Point Railroad and NC 133; and on the west by NC 87. Zone includes the Boiling Springs Lakes **BETWEEN** NC 87 and the Sunny Point Railroad.

ZONE H Bordered on the north by a line extending east from the intersection of Funston Road (SR 1518) and Daws Creek Road (SR 1521) along Daws Creek Road (SR 1521) to NC 133 about one mile south of Pinelevel; on the east and south by NC 133 to the intersection of NC 133 and the Sunny Point Railroad; and on the west by the Sunny Point Railroad. The zone includes Girl Scout Camp Pretty Pond.

ZONE J Bordered on the north by a line extending east from the intersection of Daws Creek Road (SR 1521) and NC 133 to the Brunswick/New Hanover county line (centered in the Cape Fear River) just south of Campbell Island. The zone is bordered on the east by the Brunswick/New Hanover county line (centered in the Cape Fear River) moving south to the north end of Snow Marsh island and the southern boundary of Sunny Point Military Ocean Terminal. The zone boundary moves west following the southern boundary of Sunny Point Military Ocean Terminal to the intersection with NC 133 and NC 87, and is bordered on the west by NC 133. The zone includes the Sunny Point Military Ocean Terminal, Orton Plantation and Old Brunswick Town.

Figure 1.1-2
10-Mile Plume Exposure EPZ and Boundaries
Page 4 of 5

ZONE M The northern boundary is along a line from the intersection of the New Hanover/Brunswick county line (centered in the Cape Fear River north of Snows Marsh) moving southeast to the Ft Fisher/Southport ferry landing and following the New Hanover/Brunswick county line out to the coast on the Atlantic Ocean (Corncake Inlet area). The eastern boundary moves south along the Atlantic Ocean coast to a point east of the end of Cape Creek. The southern boundary turns west along Cape Creek to the mouth of Cape and Bay Creeks and across the Cape Fear River to the northern shore of Oak Island at the NC Baptist Assembly Grounds. The western boundary moves north centered in the Cape Fear River to the intersection of the New Hanover/Brunswick county line (north of Snows Marsh). The zone includes Zeke and Striking Islands.

ZONE N This zone is comprised of Bald Head Island. The northern border is from the mouth of Cape and Bay Creek along Cape Creek with the boundary extending to the east to meet the Atlantic Ocean once Cape Creek ends. The eastern boundary then moves along the coast with the Atlantic Ocean on the east and south and then northwest until it meets the Cape Fear River. The boundary then moves across the Cape Fear River to the southern shore of Oak Island at the NC Baptist Assembly Grounds. It turns north along the eastern end of Oak Island northern shore of Oak Island and back across the Cape Fear River to the mouth of Cape and Bay Creek.

New Hanover County:

ZONE K Bordered on the north along a line from the New Hanover/Brunswick county line intersection (centered in the Cape Fear River) along Sedgley Dr to West Telfair Circle. Along West Telfair Circle to Telfair Drive and Telfair Court. From Telfair Court to Ocracoke Drive, extending east across US 421 South Seabreeze Rd to the coast on the Atlantic Ocean. The eastern boundary moves south along the Atlantic Ocean coast to Ocean Boulevard. The boundary moves west along Ocean Boulevard to the intersection of the New Hanover/Brunswick county line (centered in the Cape Fear River). The New Hanover/Brunswick county line (centered in the Cape Fear River) forms the western boundary of this zone. The zone includes Sea Breeze, Carolina Beach, and Carolina Beach State Park.

ZONE L Bordered on the north along a line from the New Hanover/Brunswick county line intersection (centered in the Cape Fear River) along Ocean Boulevard across US 421 to the coast on the Atlantic Ocean. The eastern boundary moves south along the Atlantic Ocean coast to the New Hanover/Brunswick county line (Corncake Inlet area). The boundary turns northwest toward the Ft Fisher/Southport ferry landing and continues out into the Cape Fear River to intersect the New Hanover/Brunswick county line. The New Hanover/ Brunswick county line (centered in the Cape Fear River) forms the western boundary of this zone. The zone includes Kure Beach, Fort Fisher and Federal Point.

Figure 1.1-3
Brunswick Site Building and Onsite Emergency Facility Locations
Page 1 of 1

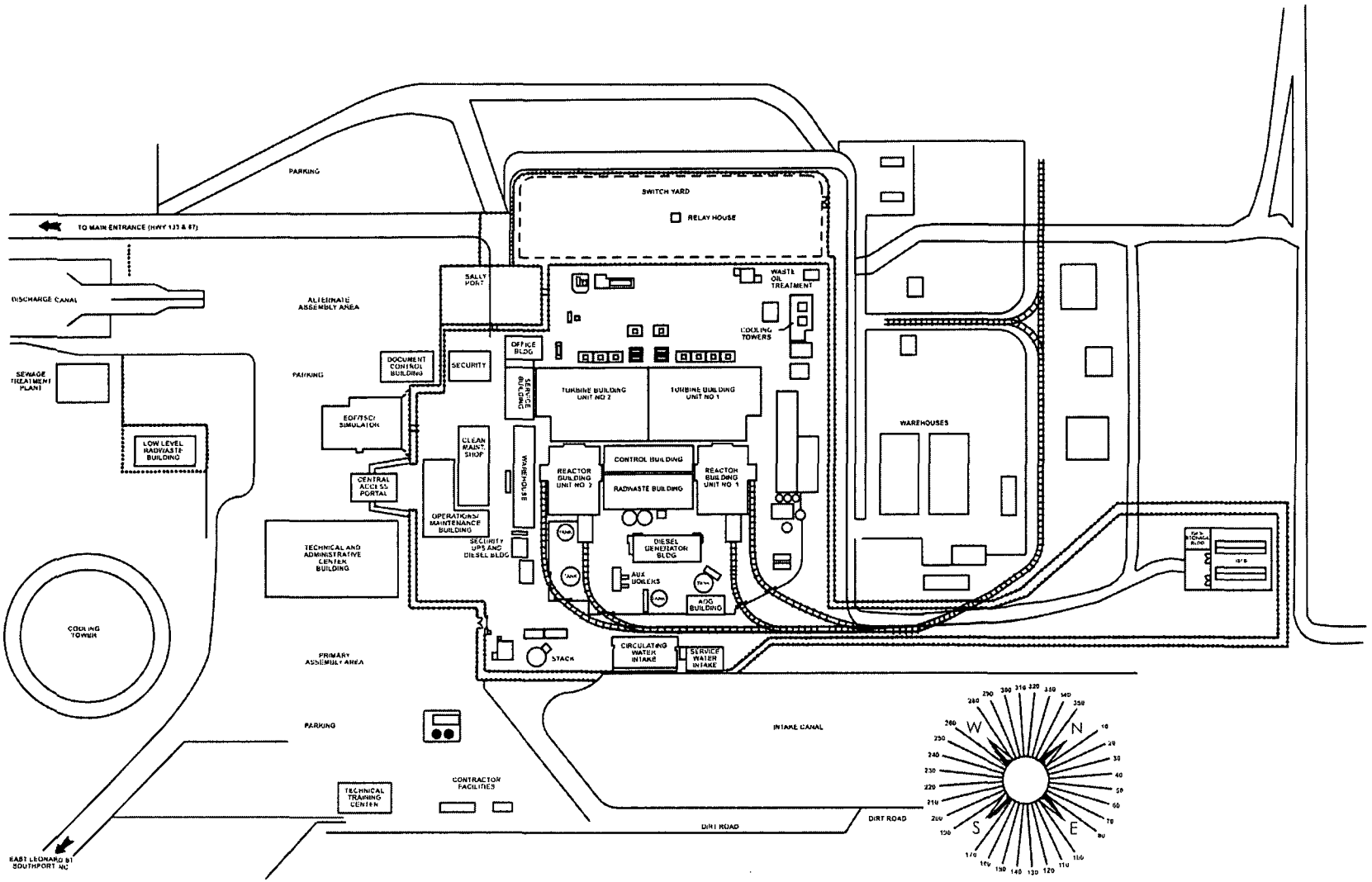
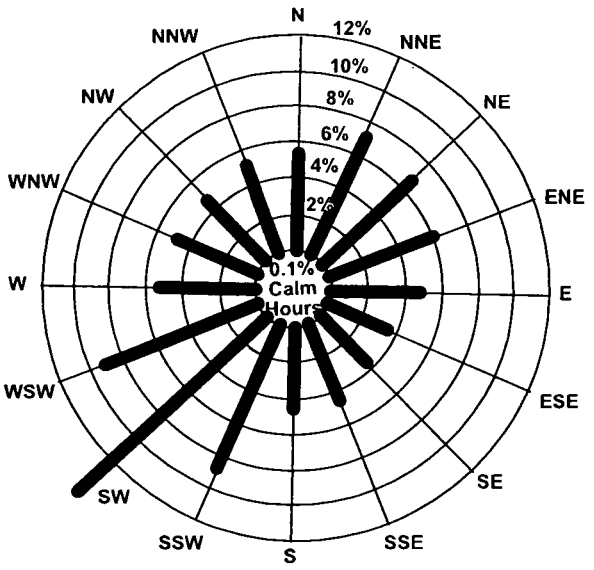
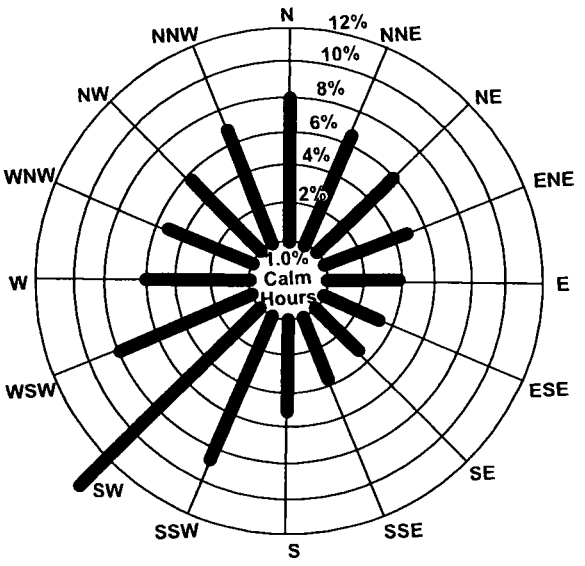


Figure 1.1-4
Wind Roses
Page 1 of 1



Upper Level Win l Rose

On-site Met Data 1976-1979
Upper Level Data = 343 feet AGL
Average Velocity = 15.16 mph
Data Recovery = 97.9%



Lower Level Wind Rose

On-site Met Data 1976-1979
Lower Level Data = 38 feet AGL
Average Velocity = 8.54 mph
Data Recovery = 97.8%

Figure 1.1-5
50-Mile Ingestion Exposure EPZ
Page 1 of 1

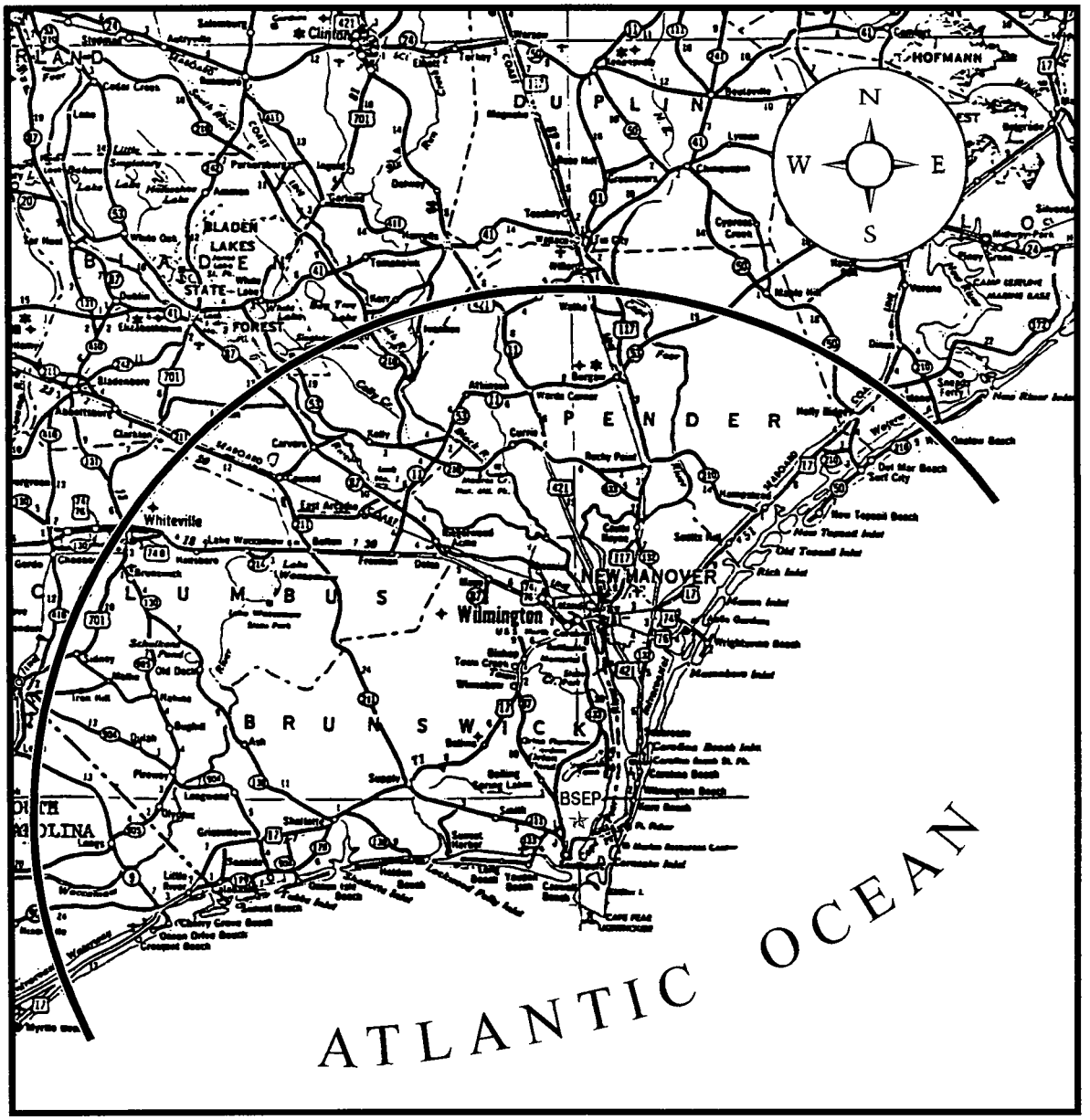


Figure 1.1-6
10 Mile Total Population
Page 1 of 1

Emergency Planning Zone Population (10 Mile EPZ)				
Zone	2008 Population			
	Permanent Residents	Peak Transients	Employees Commuting into the EPZ	Total
A	2,795	777	924	4,496
B	2,206	562	195	2,963
C	840	4,485	0	5,325
D	8,529	25,515	0	34,044
E	3,376	908	125	4,409
F	1,690	0	60	1,750
G	3,408	100	0	3,508
H	1,314	0	0	1,314
J	316	475	250	1,041
K	8,328	19,068	0	27,396
L	2,145	20,392	0	22,537
M	0	0	0	0
N	239	1,261	0	1,500
TOTAL	35,186	73,543	1,554	110,283

Source: "Brunswick Nuclear Plant – Development of Evacuation Time Estimates," prepared by KLD Associates, Inc., May 2008.

Figure 1.1-6a
10 Mile Transient Population
Page 1 of 2

2008 Estimated Transient Population within the Brunswick Nuclear Plant EPZ	
Seasonal Populations	
Pleasure Island	
Resort and Summer Residents	6,700
Recreational	25,000
Oak Island	
Resort and Summer Residents	600
Recreational	30,000
Bald Head Island	
Resort Summer Residents and Recreational	1,261
TOTAL	**63,561**
General Seasonal and Tourist Population	
Carolina Beach	2,446
Fort Fisher	
Aquarium	2,5,28
Historical Site	3,000
Orton Plantation Gardens	400
Old Brunswick Ruins	75
Progress Energy BNP Visitors Center	77
Southport	500
Deer Hunting	100
Miscellaneous (Golf Courses, Recreational Center, etc.)	1,229
TOTAL	**10,355**
Waterborne Population	
Intracoastal Waterway	160
Fort Fisher Ferry	
Summer	336
Normal	168
Ocean-going vessels	40
Small boats	
Southport Marina	93
Indigo Plantation and Marina	36
South Harbor Village Marina	108
Bald Head Island Marina	111
Blue Water Point	27
St James Marina	108

2008 Estimated Transient Population within the Brunswick Nuclear Plant EPZ (Cont.)	
Waterborne Population (Cont.)	
Carolina Beach State Park and Marina	30
Carolina Beach Municipal Marina	21
Waterfront Villas & Yacht Club	126
Ocean Marina	75
Inlet Watch Yacht Club	393
TOTAL	**1,832**
Labor Tourist Population	
Progress Energy	
Normal	
Day	688
Night	27
Outage on one unit	
Day	1,100
Night	900
Arthur Daniels Midland Company (ADM)	250
Sunny Point Army Terminal	250
Miscellaneous Employees	380
TOTAL	**3,595**
Special Facility Population	
School/Day Care Centers	4,796
Hospitals/Nursing Homes	216
TOTAL	**5,012**

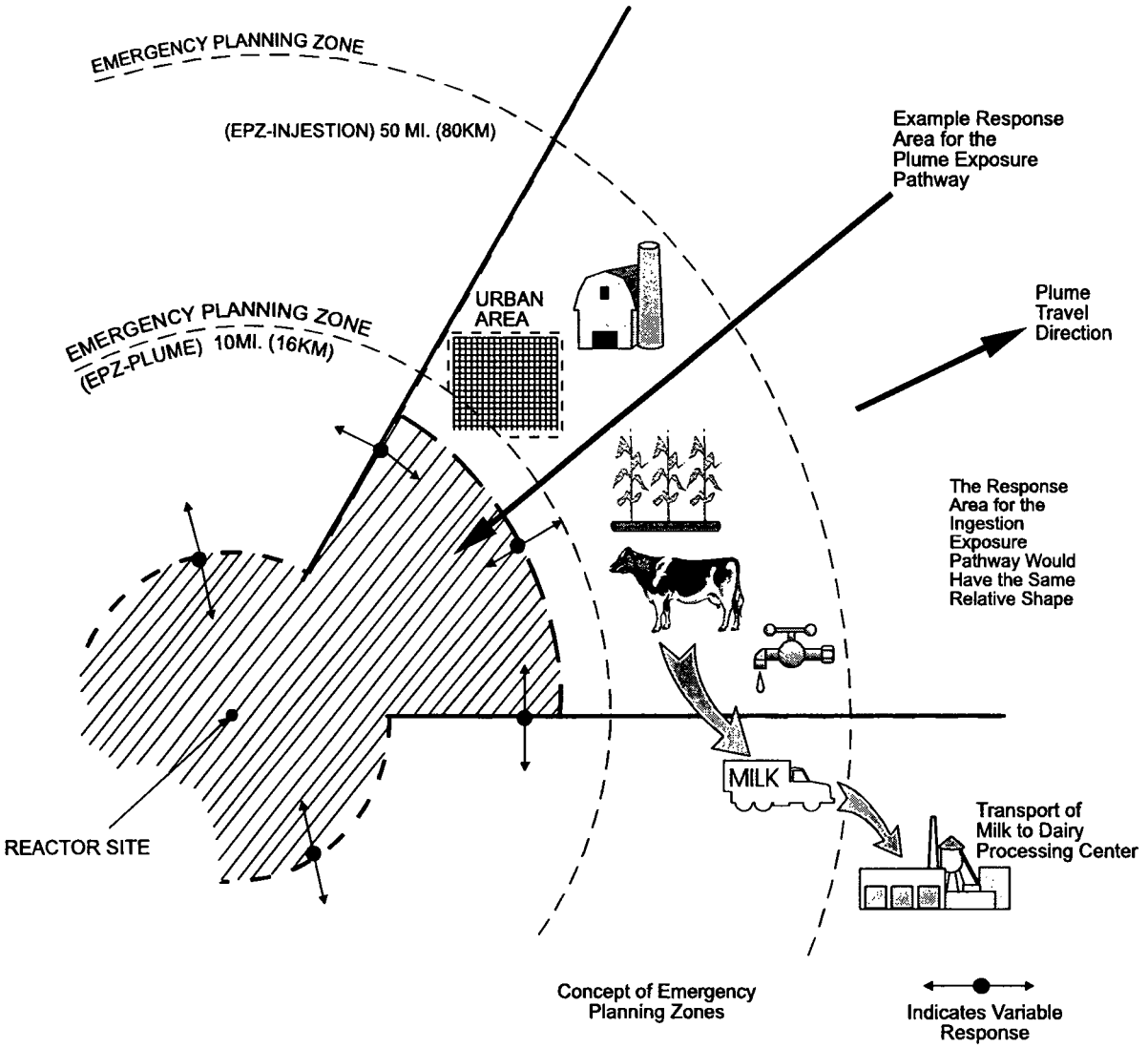
Source: "Brunswick Nuclear Plant – Development of Evacuation Time Estimates," prepared by KLD Associates, Inc. May 2008

Figure 1.1-6b
Evacuation Times
Page 1 of 1

Time To Clear The Indicated Area of 100 Percent of the Affected Population											
	Summer Midweek		Summer Weekend		Summer Midweek Weekend		Winter Midweek		Winter Weekend		Winter Midweek Weekend
Scenario	(1)	(2)	(3)	(4)	(5)	Scenario	(6)	(7)	(8)	(9)	(10)
Wind From	Midday		Midday		Evening	Wind From	Midday		Midday		Evening
	Good Weather	Rain	Good Weather	Rain	Good Weather		Good Weather	Rain	Good Weather	Rain	Good Weather
2-Mile Ring and Full EPZ											
2-mile ring	3:50	4:00	3:40	4:10	3:30	2-mile ring	3:40	3:50	3:10	3:40	3:10
Entire EPZ	6:00	6:45	8:50	9:50	5:25	Entire EPZ	5:20	6:10	5:15	6:05	5:05
2-Mile Ring and Downwind to EPZ Boundary											
180° - 195°	4:00	4:20	7:10	7:40	3:40	180° - 195°	3:50	4:00	3:30	3:40	3:30
196° - 236°	4:35	4:50	8:50	9:50	4:00	196° - 236°	3.50	4:00	3:40	4:00	3:30
237° - 271°	4:35	4:50	8:50	9:50	4:00	237° - 271°	3:40	4:00	3:40	4:00	3:30
272° - 288°	4:00	4:15	7:05	8:05	3:35	272° - 288°	3:40	4:00	3:30	3:40	3:30
289° - 316°	3:50	4:00	7:05	8:05	3:30	289° - 316°	3:40	3:50	3:20	3:40	3:30
317° - 327°	3:50	4:00	3:40	4:10	3:30	317° - 327°	3:40	3:50	3:10	3:40	3:10
328° - 009°	3:50	4:00	4:30	5:00	3:30	328° - 009°	3:40	3:50	3:20	3:40	3:20
010° - 021°	5:10	5:50	7:35	8:30	4:55	010° - 021°	4:40	5:10	4:50	5:20	4:40
022° - 038°	5:45	6:30	8:35	9:35	5:15	022° - 038°	5:10	6:00	5:15	5:55	5:00
039° - 051°	5:45	6:30	8:35	9:35	5:15	039° - 051°	5:10	6:00	5:15	5:55	5:00
052° - 090°	6:00	6:45	8:35	9:35	5:25	052° - 090°	5:20	6:10	5:15	5:55	5:05
091° - 112°	5:50	6:40	8:35	9:35	5:25	091° - 112°	5:15	6:00	5:10	5:55	5:05
113° - 179°	4:30	5:05	6:15	6:55	4:00	113° - 179°	4:05	4:45	3:55	4:30	4:00

Source: "Brunswick Nuclear Plant – Development of Evacuation Time Estimates," prepared by KLD Associates, Inc., Revision 3, April 2011

Figure 1.1-7
Concept of Emergency Planning Zones
Page 1 of 1



2.0 EMERGENCY CLASSIFICATIONS

A key element of this Plan is a preplanned system of notifying and activating various emergency response organizations. This system, in accordance with NRC recommendations, uses graded levels of emergency response where the actions specified are organized according to the general severity of the emergency condition.

This section discusses the criteria for determining the level of the emergency condition. It also illustrates how a decision is made to declare that an emergency exists by providing example initiating conditions that could correspond to each emergency class. Section 3 in turn will discuss the plans for notification of off-site agencies and mobilization of emergency teams and how they may vary with the level of the emergency.

2.1 GENERAL CLASSIFICATION SYSTEM

The operating staff is provided formal training to recognize and respond in a logical manner to off-normal plant conditions. Plant abnormal and emergency procedures are designed to allow plant personnel to mitigate the consequences of and correct an off-normal condition as quickly as possible following its occurrence. The procedures identify the conditions requiring implementation of this Plan. Figure 2.0-1 shows the basic response sequence that is followed during any off-normal condition.

The types of potential emergencies vary in probability and consequences. Accordingly, any system that categorizes emergencies must be both wide-ranged and flexible. This Plan adopts the NRC recommended standard of four general classes of emergencies and, as described below, includes the methods for determining the class in which a specific type of event should be placed.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present.

There are four basic tests or criteria that must be considered in deciding which emergency class exists. These are:

1. Radioactivity release: Is a release occurring; and if so, what is its magnitude?

2. Core damage: If no release to the environment is occurring, has there been a release of fission products from the fuel? Do the radiation levels in the coolant system or primary containment pose a potential danger to the public?

3. Plant degradation: Has the plant responded to equipment failures or external events as designed? If the plant has not responded as expected, what is the prognosis for a safe recovery, or alternately that further degradation will occur (e.g., corrective action is not likely to be successful or cannot be accomplished before a major release occurs)?

4. Site Specific Security Threats or Hostile Actions.

The categorization of events and combinations of events according to one of the four emergency classes is implemented through Emergency Action Levels (EALs). These are specific sets of plant conditions, instrument readings, and events which, unless promptly corrected, coincide with the conditions associated with one of the four emergency classes.

EALs for the Brunswick Nuclear Plant are included as an attachment to the Radiological Emergency Response Plan and are provided in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases.

The EALs have been selected with a view towards ensuring that a reasonable time is available to diagnose the specific cause of the emergency and attempt immediate corrective actions.

Once an emergency is declared, assessments of core and containment conditions, projected releases, and resultant exposures are performed. The results, along with other plant status assessments, are reported to off-site agency officials who decide, based on these inputs, whether or not protective actions for the public are to be implemented. The relationship of dose assessment values to the Environmental Protection Agency (EPA) Protective Action Guides (PAGs), and the possibility of approaching or exceeding the PAGs, will specifically be reported. Section 4 describes the relationships between emergency classes, PAGs, and various emergency measures.

Each of the four emergency classes is discussed below.

2.2 UNUSUAL EVENT

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Determination of an Unusual Event (or any emergency condition) may be accomplished in one or more of the following ways:

- Observations/inspections
- Automatic alarms (e.g., Radiation and Process Monitoring Systems)
- Communications from others (e.g., warnings of severe natural phenomena by the National Weather Service)

As in all cases, the Site Emergency Coordinator will declare an Unusual Event in any circumstance where, in his judgment, the status of the plant warrants it. Initiating conditions are established as EALs for the determination of this class. Specific EALs for an Unusual Event are listed in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases.

An Unusual Event does not require the activation of the entire on-site emergency organization, but the Site Emergency Coordinator can direct that additional personnel come to the site to support shift workers. Off-site emergency organizations shall be notified as necessary for informational purposes and aid from off-site fire fighting, medical services, and security organizations can be requested. Notifications are discussed in Section 3.9, and emergency measures to be taken are described in Section 4. Specific emergency actions to be followed during an Unusual Event are contained in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency.

2.3 ALERT

Events are in progress 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 HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Initiating conditions are established as EALs for determination of an Alert and are listed in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases. Additionally, the Site Emergency Coordinator will declare an Alert whenever he concludes that plant conditions so warrant.

Events in this class may reflect a significant degradation in the safety of the reactor. However, releases from such events will be small. Off-site mobilization and assessment actions will be initiated to ensure that emergency personnel are readily available to respond if situations become more serious and confirm that radiation levels in the environment do not require protective actions off-site. Notifications and activation of emergency organizations are discussed in Section 3.9, and the emergency measures to be taken are described in Section 4. Specific emergency actions to be followed during an Alert are contained in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency.

2.4 SITE AREA EMERGENCY

Events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent 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.

Initiating conditions are established as EALs for determination of the Site Area Emergency class and are listed in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases. Additionally, the Site Emergency Coordinator will declare a Site Area Emergency whenever he concludes that plant conditions so warrant.

The Site Area Emergency class includes Alert conditions where the plant personnel have been initially unsuccessful in restoring the facility to a safe shutdown condition. It also includes Alert conditions where subsequent additional malfunctions have occurred. The Site Area Emergency class is more severe than the Alert class because significant radiation releases may occur. However, most of the initiating conditions associated with the Site Area Emergency class do not result in an immediate release and may never result in a significant release if emergency repairs are successful.

Although immediate protective actions are not automatically required, declaration of a Site Area Emergency will set into motion all personnel on site and off site that would be required to perform actions up to and including the evacuation of a near-site area. If circumstances warrant, the process of public notification may begin as directed by the state plan. Section 3.9 discusses the planned process of notification and activation of emergency organizations. Emergency measures to be taken are described in Section 4. Specific emergency actions to be followed during a Site Area Emergency are contained in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency.

2.5 GENERAL EMERGENCY

Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results 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.

Initiating conditions predictive of a major radiological release are established as Emergency Action Levels for determination of the General Emergency class and are listed in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases. Additionally, the Site Emergency Coordinator will declare a General Emergency whenever, in his judgment, conditions exist that warrant activation of emergency response efforts including off-site monitoring and prompt public notification.

The General Emergency class includes accident conditions that involve severe core damage or melting. Such conditions will result in major releases to the primary containment and extremely high levels of contamination in the reactor coolant. Releases to the environment may be kept low unless leak paths in the primary containment develop (as from containment failure or failures in pumps, valves and other equipment which circulate reactor coolant outside primary containment). If major releases do occur, it is probable that they will occur hours to days after the onset of the emergency and that off-site exposures will approach or exceed EPA recommended protective action guides unless protective measures are instituted. Notifications and activation of emergency organizations are discussed in Section 3.9. The emergency measures to be taken are described in Section 4. Specific emergency actions to be followed during a General Emergency are contained in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency.

Figure 2.0-1
Response Sequence to Off-Normal Conditions
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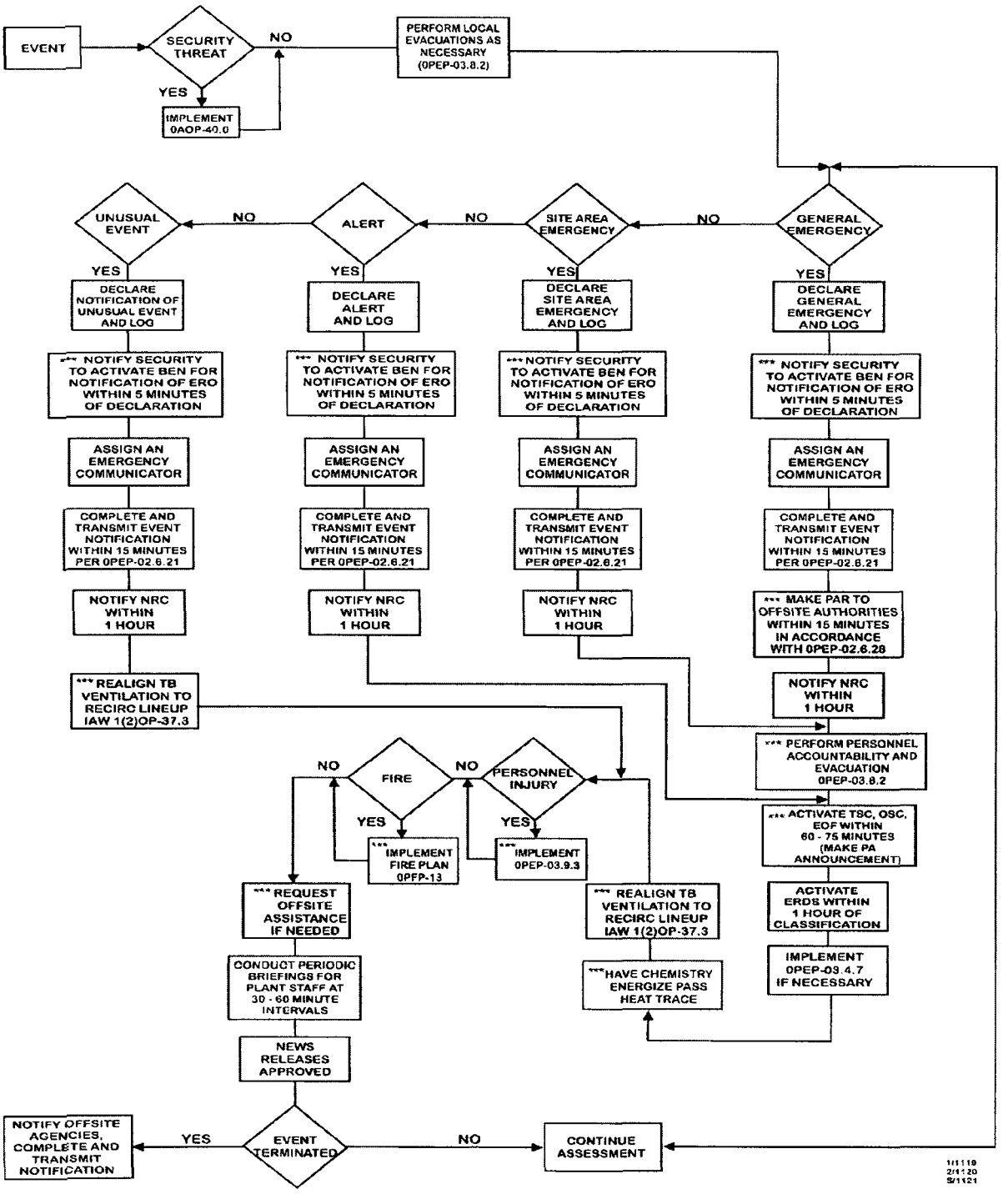

Items identified with 3 Asterisks "***" indicate that during security related events, consideration should be given in regards to personnel safety prior to performing the step. These steps may be deemed unsafe to perform due to the circumstances, and may be performed later in the event.

3.0 EMERGENCY RESPONSE ORGANIZATION

There are requirements for action in an emergency that go beyond those encountered during routine operations. To meet these extra demands and provide an effective response to the emergency, the Brunswick Radiological Emergency Plan employs an organizational concept that has four features.

1. Whenever the Plan is activated (i.e., an EAL is exceeded), a single individual is charged with the responsibility for and authority to direct all actions necessary to respond to the emergency.

2. The primary responsibility of the individual in charge is to assure that all critical actions (emergency response functions) are carried out. Upon activation of the Plan, that individual is freed of all other responsibilities and thus able to devote their entire effort to managing the emergency response.

3. Specific individuals are assigned the responsibility of carrying out predefined critical actions.

4. There is a mechanism established to provide additional resources as necessary to respond to the emergency, which provides continuity of response on each critical action.

This concept of organization is compatible with and integrated into the normal mode of operation. There are a number of procedures to guide operators in responding to equipment malfunctions and instrument alarms. There are also procedures to maintain effective control over contamination and radiation exposures. Emergency procedures basically involve an extension of these existing plant procedures.

Organizational control of emergencies is accomplished in several steps. First, as is discussed in Section 2, conditions associated with the various emergency classes are clearly defined. Second, emergency response functions are specified with levels of action appropriate to each emergency class (e.g., notification, off-site radiation monitoring, etc.). Third, individuals are assigned to be responsible for carrying out each emergency response function, with the assignments to cover all phases of the emergency--from its initial declaration to the final recovery operations.

Finally, the position of the Control Room Site Emergency Coordinator is established to be activated immediately on declaration of an emergency. To that individual is delegated the immediate and unilateral authority to act on behalf of the Company to manage and direct all emergency operations involving the facility. Upon activation of the EOF, the Emergency Response Manager assumes responsibility of overall emergency response and performs those requirements for all off-site related activities. The Technical Support Center Site Emergency Coordinator maintains overall on-site emergency response responsibilities and reports to the Emergency Response Manager.

Initially the Site Emergency Coordinator (SEC) would be the Operations Shift Manager (or other qualified Control Room personnel) who would act in that capacity until formally relieved by the designated On-Call Technical Support Center SEC or alternate (qualified SECs are listed in EPL-001) in the Technical Support Center. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but the emergency response organization On-Call Technical Support Center Site Emergency Coordinator is expected to assume management of the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency.

This section of the plan delineates the various emergency actions and separates them into groups of related functions. These functions are then assigned to designated emergency response personnel who are responsible to the Site Emergency Coordinator for the performance of the activities required to fulfill those functions.

Upon the declaration of an emergency, specified on-shift personnel assume the responsibility for performing the required emergency response actions until properly relieved by another emergency response organization member qualified for the position. All emergency response organization members are trained as described in Section 6.1.1.

If necessary, the Site Emergency Coordinator will allocate available resources based on existing plant conditions. Where necessary, additional personnel will be notified and requested to augment on-site personnel.

A current call list of emergency response organization members is maintained in the Control Room and procedures are available to make this notification.

3.1 NORMAL OPERATING ORGANIZATION

The greatest number of people on site occurs during day shift operations. The plant crew available to respond to an emergency provides a broad spectrum of specialties including operations, maintenance, engineering, radiochemistry, health physics, fire protection and security. The Plan, as will be discussed, utilizes the basic plant organizational structure and cadre of available manpower as the principal means of responding to an emergency condition. This is accomplished by assigning the management of various emergency response functions to individuals in accordance with their routine operational responsibilities. To illustrate, Radiological Emergency Teams will be directed by Environmental & Radiation Control, management personnel, who are the individuals responsible for directing day-to-day radiation control programs. In the event of an emergency, they report directly to the Control Room Site Emergency Coordinator and continue to be responsible for radiological matters.

There are, of course, times when the full complement of staff is unavailable, just as there are times when one or a few key supervisory officials are away from the plant. Therefore, the shift organization as described in the Administrative Controls section of the BNP Technical Specifications must be prepared to provide the initial response to an emergency. The following on-shift expertise will be maintained 24 hours per day:

Each operating shift will normally consist of a Control Room Site Emergency Coordinator normally filled by the Shift Manager or other qualified Control Room personnel, two Senior Reactor Operators, four Reactor Operators, nine Auxiliary Operators, three Health Physics Technicians, two Chemistry Technicians, two Mechanical Maintenance Technicians, three I&C/Electrical Maintenance Technicians, and one Shift Technical Advisor (STA). See Figure 3.1-1, Brunswick Shift Organization. Shift crew composition may be less than the minimum requirements for a period of time not to exceed two (2) hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the requirements specified as referenced in UFSAR Table 13-1. Document any deviation from Figure 3.1-1 in the corrective action program.

As will be described below, the general approach is to assign all necessary emergency response functions to the individuals on site. Each individual, on declaration of an emergency, would be responsible for carrying out one or more emergency actions until additional personnel arrive on site. It should be noted that they are initially responsible under all circumstances, and remain so until relieved. This arrangement provides for a clear and uniform assignment of responsibility and provides a mechanism to assure that all important emergency response functions are dealt with from the very beginning of the accident

3.2 ON-SITE EMERGENCY ORGANIZATION

The minimum on-site emergency organization for non-normal working hours, backshifts, and holidays for the Brunswick Plant is described above in Section 3.1. Compliance with the requirements of NUREG-0654 Table B-1 has been assured, see Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012. Guidance for augmenting the emergency organization is found in the notification checklists of the plant emergency procedures. Individuals' names and roles in the emergency organization, phone numbers, and alternates are described in the Emergency Phone List, EPL-001. EPL-001 lists the individuals and alternates qualified to fill the positions described for the TSC, OSC, and EOF.

The Company is committed to provide staffing to effectively contain any emergency which might occur at its nuclear facilities. Depending on the emergency at hand, personnel will be contacted with required expertise on a priority basis. A Staffing Analysis was completed in December, 2012 which validated adequate on-shift staffing is available for worst case scenarios postulated at Brunswick Nuclear Plant. See Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012, for details of on-shift staffing 24/7. The on-site organization will continue to be augmented such that within 60-75 minutes after notification, additional personnel will be added to provide the necessary support and will meet the intent of Table B-1 of NUREG-0654. Additional personnel will continue to supplement the plant emergency organization as necessary to meet the requirements of this Plan. Periodic drills will be conducted to determine that this augmentation schedule can be maintained.

As an aid toward assuring that critical emergency actions are given proper attention, the plant's emergency procedures provide for emergency response personnel to carry out specific types of functions such as accident assessment and off-site notification. As discussed below, emergency response organization personnel have been selected with an aim toward making a smooth and rapid transition to the emergency mode of operation. The Emergency Response Organization is shown in Figures 3.2-1, 3.4-1, and 3.6-1.

The functions specifically assigned to each element of the Emergency Response Organization are intended to encompass all critical response functions, from command and control to communications. One function assigned to each is that of record keeping. Typical of the records to be maintained are the emergency communications, the radiation records, (i.e., surveys, projected dose calculations, personnel/population-at-risk evacuations, etc.), the sequence of events (i.e., the managerial decisions and essential occurrences that evolve throughout the emergency), and the security/accountability records (i.e., who is presently on each team or at each center and any security threats). The following sections describe the specific emergency assignments, which are in the Plan's implementing procedures. The Emergency Response Organization personnel telephone numbers are available in the Control Room. In all emergencies, the on-duty Shift Manager, or other qualified individual, is authorized and qualified to implement the Plan and to classify the emergency condition.

3.2.1 Site Emergency Coordinator

As discussed in Section 3.1, direction and coordination of emergency actions on-site (and off-site until relieved by the Emergency Response Manager) are prime responsibilities of the Site Emergency Coordinator (SEC) in the Control Room. The initial determination that an emergency exists will be made in the Control Room, based on measured plant parameters. Therefore, the Shift Manager, or other qualified Control Room personnel, is initially the SEC. If the Shift Manager, or other qualified Control Room personnel, becomes incapacitated for any reason, another Control Room SEC qualified individual may assume this responsibility. This individual will be in command of the on-site emergency organization until relieved by a designated On-Call SEC. The Shift Manager will be relieved by the first qualified SEC to arrive on site so that their attention may be devoted to plant operations. The Shift Manager remains responsible for the decision making of Severe Accident Management Guidelines strategies.

Names and phone numbers of qualified Site Emergency Coordinators (SEC) are available in EPL-001. The SEC will also appoint an Emergency Communicator who will relay messages and maintain notification records throughout the emergency.

Any individual who may be required to serve, even temporarily, in the capacity of a Site Emergency Coordinator (SEC) must be qualified and trained in accordance with the training program described in Section 6.1.1.

The primary responsibilities of the Site Emergency Coordinator include the following:

1. Coordinating and directing the combined activities of Brunswick personnel in the Control Room, Technical Support Center, Operational Support Center, and elsewhere on the site.

2. Classifying the emergency.

3. Notifying off-site plant, corporate, and local agency personnel, as well as on-site personnel, as delineated in the procedures which implement the Plan. (Upon activation of the Emergency Operations Facility, the Emergency Response Manager provides liaison between the Site Emergency Coordinator and all off-site agencies.)

4. Issuing instructions to emergency response personnel and assuring that the appropriate procedures are being followed.

5. Initiating protective actions to be taken on site, if required.

6. Determining the advisability of re-entry operations during or immediately following an emergency situation.

7. Directing health physics activities until the arrival at the site of the Radiological Control Director.

8. Assuring continuity of on-site resources.

9. Declaring the emergency over.

Until relieved by the Emergency Response Manager, the Site Emergency Coordinator may not delegate the responsibility to make the decision to notify and make recommendations to authorities responsible for off-site emergency measures. Further, while he may consult with others, he may not delegate the responsibility to upgrade or downgrade the emergency classification or to declare that the emergency has been terminated. He may delegate the responsibility to announce that the emergency has been terminated. He may delegate the responsibility and authority for mobilization of recovery efforts while that emergency still exists provided that such efforts in no way interfere with or detract from the response to the emergency. (Responsibility for mobilization of recovery efforts transfers to the Emergency Response Manager upon activation of the EOF.)

Other responsibilities may be delegated to other emergency organizational units as necessary for expeditiously carrying out the requirements of the Plan and procedures which implement the Plan.

3.2.2 Plant Operators

During an emergency, the Plant Operators (including the Shift Manager) are the nucleus of the initial effort to control the plant and take steps to protect the public.

The Plant Operators' primary responsibility is to carry out assigned actions necessary during an emergency to provide initial emergency response per established emergency procedures and perform initial calculations of projected off-site consequences. The Operators are responsible for implementing actions (including Severe Accident Management Guidelines) as directed by the Shift Manager. Specific emergency response duties of the Plant Operators are found in the Plant Emergency Procedures which implement the Plan and in other Operations procedures.

3.3 Technical Support Center

The Site Emergency Coordinator, as discussed above, is responsible for managing a wide range of activities at the plant. To assist the Site Emergency Coordinator in this effort and to implement his directives, a Technical Support Center has been established. Upon declaration of an Alert, Site Area Emergency, or General Emergency, the Technical Support Center will be notified to immediately assemble. The SEC and other TSC staff members perform monitoring and evaluations required for Severe Accident Management Guidelines, and provide advice and recommendations to the Shift Manager and Reactor Operators.

The various technical and administrative functions to be performed at the plant have been grouped into five categories similar to the organization for routine operations. These are as follows:

Plant Operations
NRC Communications
Radiological Control
Technical Assessment
Security

Directors are assigned to be responsible for activities within each category.

The Directors within the Technical Support Center may be relieved by designated qualified plant personnel (phone numbers are listed in EPL-001).

The TSC SEC position will also assemble at the Alternate Emergency Facility for a Security Threat and provide support per 0PEP-02.6.30, Activation and Operation of the Alternate Emergency Facility, until safe access to the site is assured.

3.3.1 Plant Operations Director

The Plant Operations Director is responsible to the Site Emergency Coordinator for providing liaison with the Reactor Operators, Shift Manager, and Technical Support Center. This individual is responsible for providing technical and administrative assistance to the Reactor Operators. This position also performs monitoring and evaluations required for Severe Accident Management Guidelines. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.3.2 Radiological Control Director

The Radiological Control Director is responsible to the Site Emergency Coordinator for managing the radiological monitoring and assessment aspects of the plant during an emergency; managing activities to control radiation exposure; providing technical and administrative direction to the Radiological Emergency Teams; and providing liaison with the Emergency Operations Facility and with the Radiological Control Manager. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.3.3 Technical Assessment Director

The Technical Assessment Director is responsible to the Site Emergency Coordinator for providing technical and administrative direction to the Accident Assessment Team and for providing liaison with the Technical Analysis Manager after the EOF is activated. The Technical Assessment Director is responsible for performing the monitoring and evaluations required for Severe Accident Management Guidelines. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.3.4 Security Director

The Security Force is composed of personnel qualified in security, personnel accountability, and evacuation procedures and practices.

The Security Director is responsible to the SEC for providing direction to the Security Force during a declared emergency and providing liaison with the state and local law enforcement agencies. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.3.5 Communications Director

The Communications Director in the TSC reports to the Site Emergency Coordinator. This position is responsible for making plant-wide announcements over the Public Address System, ensuring NRC notifications are performed, and supervising the administrative staff. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center and 0PEP-02.6.21, Emergency Communicator.

3.3.6 Radiological Control Communicator

The Radiological Control Communicator is responsible to the Radiological Control Director for expediting communications between the director and the Radiological Emergency Teams. The responsibilities and objectives of the Radiological Control Communicator are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.3.7 Accident Assessment Team Leader

One of the principal groups housed within the Technical Support Center is the Accident Assessment Team. The specific responsibilities of the Accident Assessment Team are as follows:

A. Analyze mechanical, electrical, instrument and control problems and determine alternate solutions.

B. Analyze thermohydraulic and thermohydrodynamic problems and develop alternate courses of action to resolve them.

C. Analyze and evaluate accident conditions and develop guidance for the Site Emergency Coordinator and Operations personnel on protection of the core.

D. Perform monitoring and evaluations to support Severe Accident Management Guidelines.

The Accident Assessment Team Leader is responsible to the Technical Assessment Director and provides technical and administrative direction to the Accident Assessment Team. Responsibilities of this position are contained in 0PEP-02.6.26, Activation and Operation of the Technical Support Center.

3.4 Operational Support Center

3.4.1 Emergency Repair Director

The Emergency Repair Director is responsible to the Site Emergency Coordinator for the management of efforts to repair and maintain equipment during an emergency, install emergency structures, systems and components, and perform mitigation and cleanup activities during an emergency. These responsibilities include providing technical and administrative direction to any emergency repair team that may be formed during the emergency and to the Operational Support Center Mission Coordinator. Responsibilities of this position are contained in 0PEP-02.6.12, Activation and Operation of the Operational Support Center.

3.4.2 Operational Support Center Mission Coordinator

Upon the decision of the Site Emergency Coordinator to activate the Operational Support Center, an OSC Mission Coordinator will report to the Emergency Repair Director. This individual will direct the activities of the mechanical, electrical, and I&C personnel requested to report to the OSC. Responsibilities and objectives of this position are contained in 0PEP-02.6.12, Activation and Operation of the Operational Support Center. This position will coordinate OSC response activities with the E&RC and Operations Coordinators.

3.4.3 Operations Coordinator

Upon the decision of the Site Emergency Coordinator to activate the Operational Support Center, an Operations Coordinator will report to the Emergency Repair Director. This individual will coordinate the activities of Operations and Fire Brigade personnel with the OSC Mission Coordinator and E&RC Coordinator. Responsibilities and objectives of this position are contained in 0PEP-02.6.12, Activation and Operation of the Operational Support Center.

3.4.4 Environmental & Radiological Control (E&RC) Coordinator

Upon the decision of the Site Emergency Coordinator to activate the Operational Support Center, an E&RC Coordinator will report to the Emergency Repair Director. This individual will direct the activities of the radiological controls (HPs) and chemistry personnel requested to report to the OSC. This position will coordinate OSC response activities with the OSC Mission Coordinator and the Operations Coordinator. Responsibilities and objectives of this position are contained in 0PEP-02.6.12, Activation and Operation of the Operational Support Center.

3.4.5 Radiological Emergency Teams

The Radiological Emergency Teams consist of members of the Environmental & Radiation Control organization and of other plant or off-site personnel who have received necessary training. Members of the teams who have not completed such training may be assigned to tasks in which they assist a qualified team member under their direct guidance.

The general functions of the various Radiological Emergency Teams include:

1. Determine and report on-site radiological conditions.

2. Determine and report off-site radiological conditions.

3. Establish areas to which access should be controlled for the purpose of minimizing personnel exposures.

4. Issue protective equipment and personnel gear.

5. Personnel decontamination services.

6. Determine and maintain records of personnel exposure.

Radiological emergency teams are formed from the pool of available personnel who assemble in the Operational Support Center. These teams are in addition to the emergency repair teams that are formed from the pool of mechanics, electricians, and instrument technicians to perform repair missions in the plant.

The radiological emergency teams formed are determined by the radiological conditions that require their services. The following teams may be necessary:

1. Plant Monitoring - responsible for conducting in-plant and inside the protected area monitoring to include air sampling, direct radiation monitoring, and smear surveys to determine radiological conditions.

2. Post Accident Sample - responsible for obtaining and analyzing highly radioactive gas and/or liquid samples necessary for source term determination and core damage assessment.

3. Personnel Protection and Decontamination - responsible for monitoring and verifying that personnel and vehicles exiting the protected area and the site are free of radioactive contamination.

3.4.6 Fire Brigade

When conditions require activation of the emergency facilities, the on-shift Fire Brigade is incorporated into the Operational Support Center.

The Fire Brigade consists of a Shift Incident Commander, and a minimum of four fire brigade members who provide fire brigade, first aid, search and rescue, chemical/hazardous materials response, and confined space entry services. Fire Brigade members will be the on-shift operators, or other personnel qualified as Fire Brigade members. The Fire Brigade, when incorporated into the OSC, functions as a team under the direction of the Operations Coordinator. The Fire Brigade is staffed on a 24-hour basis.

3.5 Emergency Operations Facility

The Emergency Operations Facility is activated by the On-Call Emergency Response Manager when notified by the Site Emergency Coordinator that an Alert or higher emergency condition exists at Brunswick. Guidance for activation and operation of the EOF is contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.5.1 Emergency Response Manager

The Emergency Response Manager is responsible for providing liaison between the Site Emergency Coordinator and off-site support personnel (Corporate Headquarters, Joint Information Center, state and federal agencies) and marshalling off-site support as required to support the Site Emergency Coordinator. This position also assembles at the Alternate Emergency Facility for a Security Threat. The responsibilities and objectives of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.5.2 Administrative and Logistics Manager

The Administrative and Logistics Manager is responsible to the Emergency Response Manager for providing assistance to the Emergency Response Manager and site personnel in administrative, logistics, communications, and personnel support, as requested. The responsibilities and objectives of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.5.3 Technical Analysis Manager

The Technical Analysis Manager is responsible to the Emergency Response Manager for coordinating technical information coming from the Technical Support Center, supplying the Emergency Response Manager with an assessment of the emergency, and providing interface for the Emergency Response Manager to consultants, regulatory agencies, architect-engineers, and General Electric. The responsibilities and objectives of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.5.4 Radiological Control Manager

The Radiological Control Manager is responsible to the Emergency Response Manager for coordinating off-site radiological and environmental assessment and recommending to the Emergency Response Manager protective actions necessary to protect the public health and safety. This position also assembles at the Alternate Emergency Facility for a Security Threat. The responsibilities and objectives of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.5.5 Environmental Monitoring Team Leader

The Environmental Monitoring Team Leader is responsible to the Radiological Control Manager when the EOF is activated, for providing technical and administrative direction to the Environmental Monitoring Team. Two Environmental Monitoring Teams will be made available for deployment. If additional monitoring teams are needed, they may be requested from the Shearon Harris Plant, Crystal River 3, or the H. B. Robinson Plant. The responsibilities and objectives of the environmental monitoring team are contained in 0PEP-02.6.6, Environmental Monitoring Team Leader.

3.5.6 Dose Projection Coordinator

The Dose Projection Coordinator is responsible to the Radiological Control Manager and provides technical and administrative direction to the Dose Projection Team when the EOF is activated. Responsibilities of the Dose Projection Team include radiological dose projections and source term determination, contained in EMG-NGGC-0002, Off-Site Dose Assessment, and acquisition and distribution of meteorological data for dose assessment and environmental monitoring purposes. The responsibilities and objectives of the Dose Projection Team are contained in 0PEP-02.6.20, Dose Projection Coordinator.

3.5.7 Communications Managers

The Communications Managers report to the Emergency Response Manager. They function as liaison between the off-site organizations and agencies and the on-site emergency organization. Specifically, they relay messages between the ERM in the EOF, Technical Support Center, and the State Emergency Response Team, using the communication equipment discussed in Appendix A of this plan. This position also assembles at the Alternate Emergency Facility for a Security Threat. The responsibilities of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility and 0PEP-02.6.21, Emergency Communicator.

3.5.8 Assistant to the Emergency Response Manager (AERM)

The Assistant to the Emergency Response Manager is responsible to the Emergency Response Manager for coordination of information within the Emergency Operations Facility. Reporting to the Assistant AERM are County EOC Representatives (utility representative) that respond to the New Hanover and Brunswick County EOCs. The responsibilities of this position are contained in 0PEP-02.6.27, Activation and Operation of the Emergency Operations Facility.

3.6 Joint Information Center

The Joint Information Center is activated by the Emergency Response Manager when he is notified that a Site Area Emergency or General Emergency condition exists at Brunswick. Activation is discretionary for lesser emergency classifications. (Figure 3.6-1)

3.6.1 Company Spokesperson

The Company Spokesperson is responsible to the Emergency Response Manager for the coordination of plant information with County, State, and Federal representatives for dissemination to the news media and general public. The responsibilities of this position are contained in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC).

3.6.2 JIC Director

The JIC Director is responsible to the Company Spokesperson as the primary interface with State, County, and Federal Public Information Coordinators and for the preparation and coordination of all news releases. The responsibilities of this position are contained in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC).

3.6.3 Company Technical Spokesperson

The Company Technical Spokesperson is responsible to the JIC Director for the acquisition, coordination, and interpretation of plant technical information disseminated to the news media and general public. The responsibilities of this position are contained in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC).

3.6.4 Administrative Coordinator

Administrative Coordinators are responsible to the JIC Director for initial JIC facility setup, and the coordination of logistical, security, and administrative duties. The responsibilities of this position are contained in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC).

3.6.5 Public Information Director

Public Information Directors are responsible to the JIC Director for monitoring and coordinating the flow of media and general public information in the Joint Information Center. The responsibilities of this position are contained in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC).

3.7 OFFSITE ORGANIZATION ASSISTANCE

Should conditions at the plant degrade to the extent that further on-site assistance is needed, assistance is available from Corporate personnel, contracted services, and certain locally available service groups, as described in the following subsections.

3.7.1 Contracted Services

A number of active outside contracts are maintained in order to ensure continuing access to qualified personnel when and if they are needed to supplement Progress Energy resources. These contracts provide the capability of obtaining, on an expedited basis, additional maintenance support personnel (such as mechanics, electricians, and I&C Technicians), other technical personnel (such as E&RC Technicians), and engineering and consulting services. For example, contracts are maintained with General Electric (the NSSS vendor for the Brunswick plant) and URS Energy and Construction (formerly United Engineers the architect-engineer for the Brunswick plant).

General Electric will form a Technical Support Team upon request. The team will be composed of personnel with the appropriate technical disciplines that can be dispatched to the plant site. General Electric will also establish dedicated telephone communications for data transmission until the arrival of the team.

The Institute of Nuclear Power Operations (INPO) serves as a clearinghouse for industry wide support during an emergency. When notified of an emergency situation at a nuclear plant, INPO will provide emergency response as requested. INPO will be able to provide the following emergency support functions:

a. Assistance to the affected utility in locating sources of emergency manpower and equipment.

b. Analysis of the operational aspects of the incident.

c. Dissemination to member utilities of information concerning the incident.

d. Organization of industry experts who could advise on technical matters. If requested, one or more suitably qualified members of the INPO staff will report to the Emergency Response Manager and will assist in coordinating INPO's response to the emergency.

If requested, one or more suitably qualified members of the INPO staff will report to the Emergency Response Manager and will assist in coordinating INPO's response to the emergency.

3.7.2 Local Services Support

The Brunswick Plant is equipped and staffed to cope with many types of emergency situations. However, if a fire or other type of incident occurs that requires outside assistance, such assistance is available as described in the following subsections.

3.7.2.1 Medical Assistance

Dosher Memorial Hospital has medical facilities immediately available for the treatment of contaminated and non-contaminated injured personnel.

New Hanover Regional Medical Center will serve as a backup for Dosher Memorial if necessary.

In addition, medical assistance is available on, or off-site from physicians in the Southport area who have agreed to provide medical assistance to contaminated patients. (See Appendix E, Medical Treatment and Assistance, for more details.)

3.7.2.2 Ambulance Service

The City of Southport Rescue Squad and Brunswick County EMS has agreed to respond to all emergency calls from the plant, just as they respond to other calls from the surrounding area. A copy of the response agreement is included in Appendix B.

3.7.2.3 Fire Assistance

Agencies with fire protection resources in the vicinity of Brunswick are as follows:

Southport Fire Department
Boiling Spring Lakes Fire Department
Yaupon Beach Volunteer Fire Department
Oak Island Fire/EMS
Sunny Point Fire Department

The Southport Fire Department is the primary fire protection response agency for the Brunswick Plant and will coordinate assistance activities, if required, of the other above agencies. Copies of agreements with local fire departments are contained in Appendix B.

3.8 COORDINATION WITH PARTICIPATING GOVERNMENTAL AGENCIES

A summary of each governmental organization having major responsibilities for the planning and response to Brunswick Plant radiological emergencies is described below; comprehensive summary tables of emergency response organizations are included in Appendix C; and a detailed description of the authority, responsibilities, and duties of each organization is presented in their respective emergency plans. Each of these organizations having response duties is capable of providing such on a 24-hour-per-day basis.

3.8.1 State of North Carolina

3.8.1.1 Governor's Office

The Governor has the authority to direct and control the State Emergency Management Program. During a declared State of Disaster, the governor has the authority to utilize all available state resources reasonably necessary to cope with emergencies. The governor's representatives coordinate as necessary with Progress Energy, the Governor of South Carolina, and with local government officials.

3.8.1.2 Department of Crime Control and Public Safety

The Department of Crime Control and Public Safety functions as the State of North Carolina Emergency Planning Coordinator. In that capacity the Department has overall management responsibility for North Carolina's radiological emergency response planning, development, and updating of North Carolina's emergency response plan, and coordination with Progress Energy. The Department coordinates emergency response activities for the State of North Carolina and other government response agencies.

3.8.1.3 Department of Environmental Health and Natural Resources, Division of Radiation Protection

The Radiation Protection Division performs radiological field monitoring and laboratory analysis of field samples. This section is responsible for dose assessments and projections and personnel radiological monitoring outside the Brunswick site and other functions as described in the State Emergency Plan.

3.8.2 Brunswick County

3.8.2.1 Emergency Management Agency

The Brunswick County Emergency Management Agency has overall responsibility for Brunswick County's radiological emergency response planning, development, and updating of Brunswick County's emergency response plan, and coordination between the county and Progress Energy and other local government response agencies. It functions as the lead county agency for radiological monitoring and decontamination activities as directed by the State of North Carolina's Division of Radiation Protection. It also operates the county warning point on a 24-hour basis.

3.8.2.2 Brunswick County Sheriff's Department

The Sheriff's Department emergency response functions are:

A. Coordinate all local law enforcement and traffic control.

B. Provide immediate assistance to facility management and local authorities during initial onset of the emergency.

C. Provide traffic control in support of evacuation.

D. Establish road blocks, re-route traffic around contaminated areas and report traffic problems to the County Emergency Operations Center.

E. Provide traffic control in the vicinity of shelter areas.

F. Provide assistance to municipal law enforcement agencies in warning and evacuating persons in designated zones.

G. Provide security for county property.

3.8.3 New Hanover County

3.8.3.1 Emergency Management Agency

A. The New Hanover County Emergency Management Agency has overall responsibility for New Hanover County's radiological emergency response planning, development, and updating of New Hanover County's emergency response plan, and coordination between the County, Progress Energy, and other local government response agencies. It functions as the lead county radiological response agency and provides any required radiological monitoring and decontamination activities as directed by the State of North Carolina's Division of Radiation Protection.

B. Operate the county warning point on a 24-hour basis.

3.8.3.2 New Hanover County Sheriff's Department

The Sheriff's Department emergency response functions are:

A. Coordinate all local law enforcement and traffic control.

B. Provide immediate assistance to facility management and local authorities during initial onset of the emergency.

C. Provide traffic control in support of evacuation.

D. Establish road blocks, re-route traffic around contaminated areas, and report traffic problems to the County Emergency Operations Center.

E. Provide traffic control in the vicinity of shelter areas.

F. Provide assistance to municipal law enforcement agencies in warning and evacuating persons in designated zones.

G. Provide security for county property.

3.8.4 Federal Agencies

3.8.4.1 Department of Energy, Savannah River Operations Office

The Savannah River Operations Office coordinates, under the Federal Radiological Monitoring and Assessment Center (FRMAC) or Consequence Management Response Team (CMRT), federal resources as required to: minimize accidental radiation exposure; minimize the spread of radioactive materials into the environment; and carry out countermeasures to control and eliminate radiation hazards. Upon request of the State of North Carolina, Department of Environmental Health and Natural Resources, Division of Radiation Protection, or the Nuclear Regulatory Commission (NRC); the Department of Energy will: provide equipment, supplies, and personnel to evaluate radiological hazards and to minimize radiation exposures; assist in carrying out emergency response operations and implementing protective actions; and provide an aerial radiological measuring system for mapping radioactive plumes. The Site Emergency Coordinator or Emergency Response Manager after activation of the Emergency Operations Facility may request this assistance via the NRC or the State. Resources available in the area to facilitate federal assistance include the New Hanover International Airport, located approximately twenty miles from the Brunswick Plant near Wilmington, North Carolina, which has two runways capable of supporting large commercial aircraft. Also located at the New Hanover International Airport is a National Guard Armory. This area could be used as a Federal Command Post meeting the requirements of FRMAC or CMRT.

3.8.4.2 Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency coordinates, through the Atlanta, Georgia Regional IV Office, federal response as required to supplement that provided by FRMAC or CMRT. A representative from FEMA Region IV will be present at the SERT to coordinate any federal response requested by the state.

3.8.4.3 Nuclear Regulatory Commission (NRC)

The Nuclear Regulatory Commission provides resident inspectors at Brunswick. At the request of Progress Energy, NRC provides additional technical advice, technical assistance, and personnel during and following a radiological emergency. The Director of Regulatory Operations will be notified of radiation incidents in accordance with 10CFR20.2202 and will conduct appropriate investigative activities. The NRC has the capability for independent assessment of plant conditions within approximately 1 - 2 hours via data acquisition, and within approximately 6 hours with an on-site team.

3.8.4.4 U. S. Coast Guard (USCG)

The Coast Guard controls access of navigable waterways in the vicinity of the Brunswick Plant and provides public warning and notification as described in the State Emergency Plan.

3.8.4.5 Meteorological Service

Meteorological Services are under contract with Progress Energy to provide meteorological services during day to day and/or emergency operations.

3.8.4.6 Weather Service

The National Weather Service in Wilmington, North Carolina will provide meteorological information during emergency situations, if required. Data available will include existing and forecasted surface wind directions, wind speed with azimuth variability, and ambient surface air temperature.

3.8.4.7 Department of Homeland Security (DHS)

The Homeland Security Act of 2002 established DHS to prevent terrorist attacks within the United States; reduce the vulnerability of the United States to terrorism, natural disasters, and other emergencies; and minimize the damage and assist in the recovery from terrorist attacks, natural disasters, and other emergencies. The act also designates DHS as "a focal point regarding natural and manmade crises and emergency planning." The Department of Homeland Security (DHS) is responsible for overall coordination of all actual and potential Incidents of National Significance. Incidents of National Security for commercial nuclear power plants include a declaring of a general emergency at a nuclear power plant resulting from an accident, an emergency declaration (Alert or higher classification at a nuclear facility resulting from a terrorist incident. Terrorist incidents outside a nuclear facility boundary involving improvised nuclear device, radiological dispersal device, and/or radiological exposure device.

3.8.5 Agreements

Appendix B presents copies of letters of agreement with agencies that would not normally be available for assistance through existing state or federal plans but will make certain services available.

3.9 NOTIFICATION AND ACTIVATION

Notification and activation of the on-site and off-site emergency response organizations is dependent upon the emergency classification and is listed in Table 3.5-1. Details of notification responsibilities, communications systems utilized to make the notifications, information required to be transferred to off-site agencies, and notification verification techniques are specifically described in the Plant Emergency Procedures (PEPs) and Appendix A of this Plan. Additional individuals and organizations who might be required to activate are contained in EPL-001.

Any time that an emergency is reclassified, the initial notification scheme will apply.

The State of North Carolina and the Counties of Brunswick and New Hanover are responsible for the process of notification of the public. The initial instructions to the public will consist of preestablished emergency messages which will be tailored to reflect whether the event is a Site Area Emergency or General Emergency classification. The following information is typical of that which would be provided in the initial message:

1. Identification of the agency issuing the information.

2. A statement that an emergency condition exists at the Brunswick Nuclear Plant.

3. Brief description of the type of emergency and the nature of the hazard.

4. Identification of the communities or geographical areas affected by the emergency.

5. Recommendations with regard to specific protective measures to be taken by residents of the affected areas.

6. A statement concerning how the public will receive further emergency information.

Prewritten emergency messages to be used for public notification are contained in the procedures of the State of North Carolina, and Brunswick and New Hanover Counties.

Figure 3.1-1
Brunswick Shift Organization
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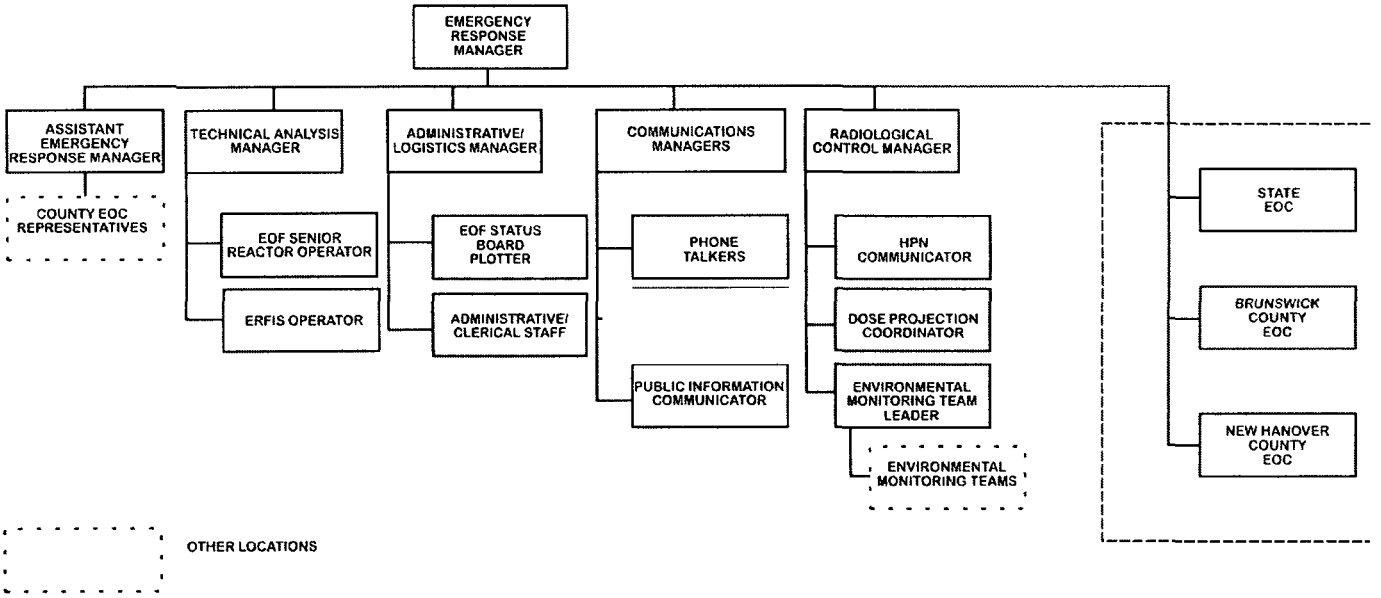
Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size
1. Plant Operations and Assessment of Operational Aspects	Control Room Staff	Shift Manager (SM) Control Room Supervisor Reactor Operators Non-Licensed Operators	1 2 4 9
2. Emergency Direction and Control	--	SEC-MCR (SM) ERM SEC-TSC	1[(a)] -- --
3. Notification & Communication	Emergency Communicator	Non-Licensed Operator	1[(e)(d)]
4. Radiological Assessment	Offsite Dose Assessment	Dose Projection Coordinator	--
	Offsite Surveys	Environmental Monitoring Team Personnel	--
	Onsite Surveys	Radiological Control Team Personnel	--
	In-plant Surveys	Health Physics Technician	1
	Chemistry	Chemistry Technician	2
5. Plant Engineering Repair and Corrective Actions	Technical Support	Shift Technical Advisor	1
		Core Performance Engineering	--
		Mechanical Engineering	--
		Electrical Engineering	--
	Repair and Corrective Actions	Mechanical Maintenance	2
		Electrical/I&C Maintenance	3
6. In-Plant Protective Actions	Radiation Protection	Health Physics Technician	2
7. Fire Fighting	--	--	5[(a)(b)(e)]
8. First Aid and Rescue Operations	--	Plant Personnel	2[(a)(f)]
9. Site Access Control	Security & Accountability	Security Team Personnel	(c)
		TOTAL (Less Security):	**27**

(a) May be provided by shift personnel assigned other functions.
(b) Fire Brigade per BNP FPP-031, includes four (4) Fire Brigade members and one (1) Shift Incident Commander (all Non-Licensed Operators)
(c) Per Security Plan
(d) Non-Licensed Operators also responsible for Notifications and Communications (1)
(e) Included in census of Non-Licensed Operators above.
(f) 1st Aid & Rescue is a collateral duty of Fire Brigade/Non-Licensed Operators.

Figure 3.2-1
Brunswick Emergency Organization
Page 1 of 1



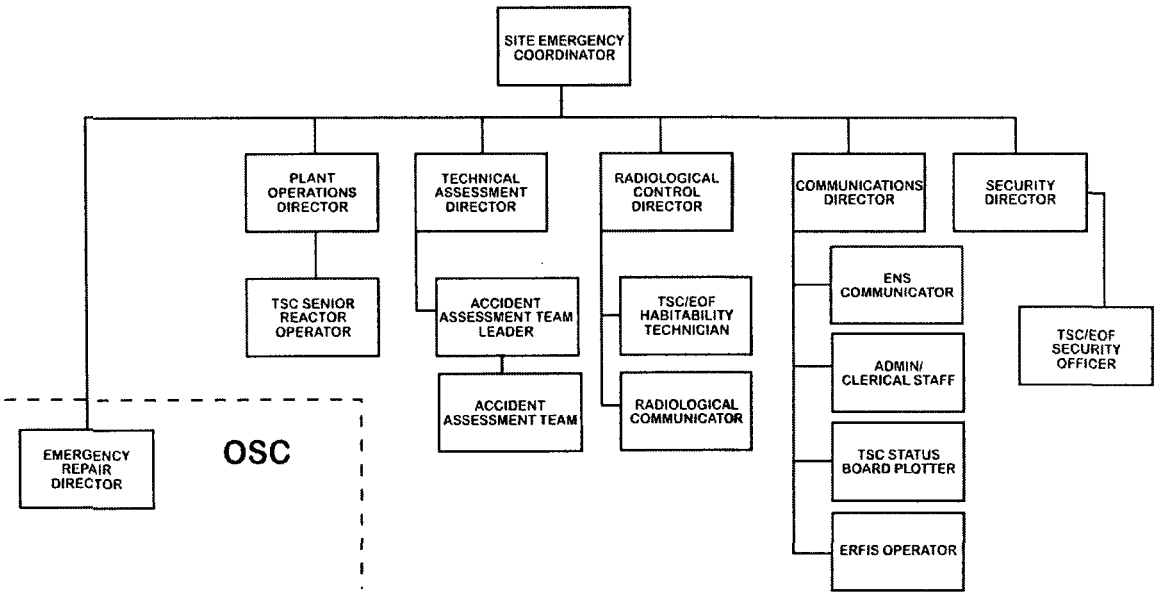
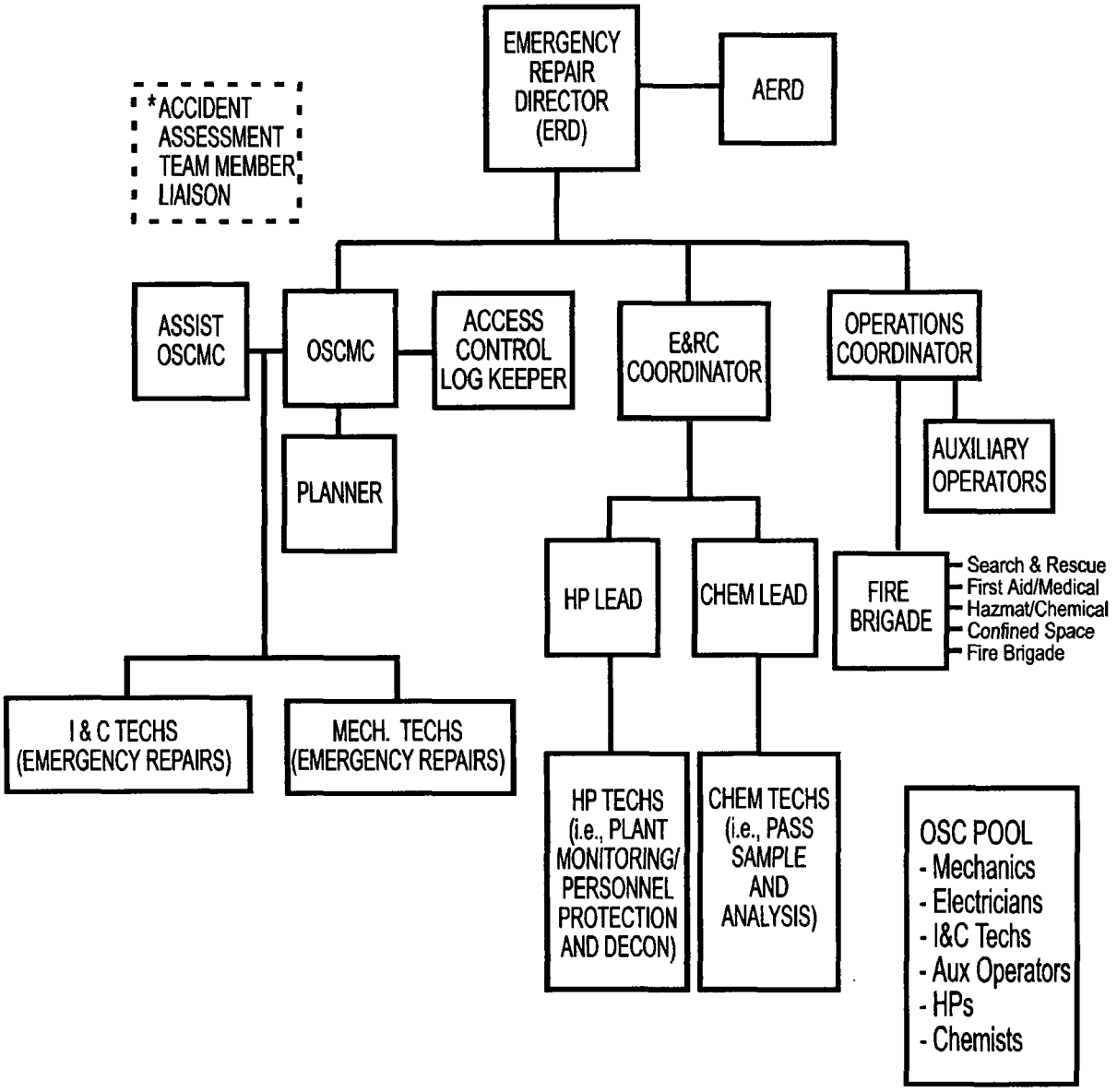
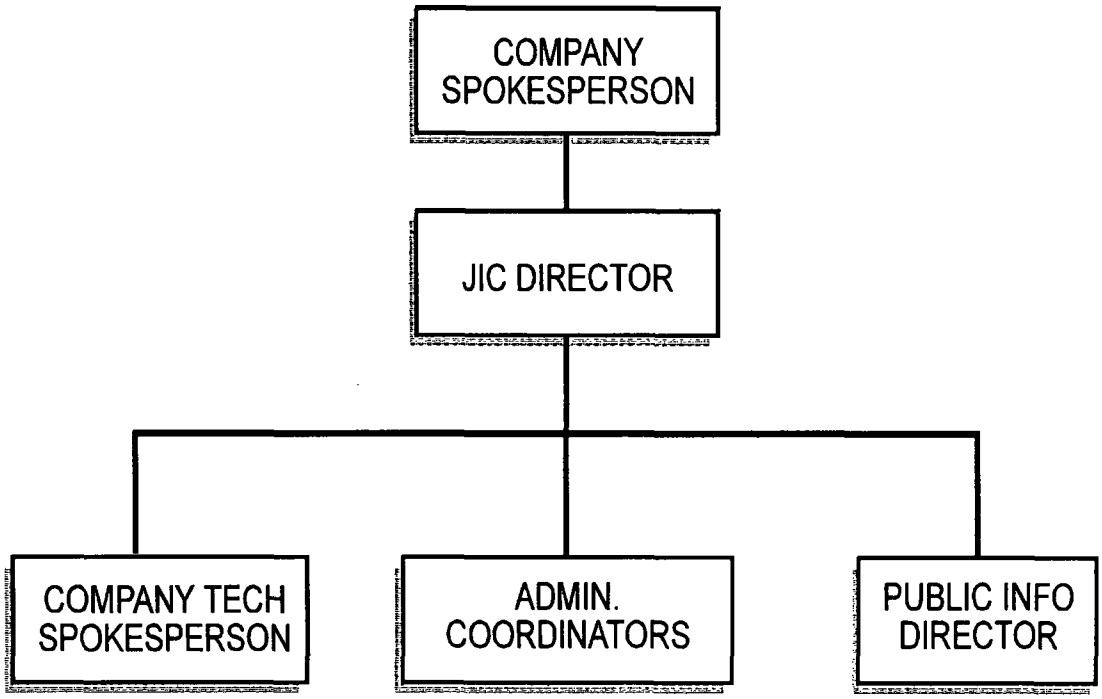


Figure 3.4-1
Operational Support Center (OSC)
Page 1 of 1



* REPORTS TO ACCIDENT ASSESSMENT TEAM LEADER IN TSC.

Figure 3.6-1 Joint Information Center (JIC)
Page 1 of 1



BRUNSWICK
TABLE 3.5-1

NOTIFICATION AND ACTIVATION OF PRINCIPAL EMERGENCY RESPONSE ORGANIZATIONS
Page 1 of 1

Agency	Unusual Event	Alert	Site Emergency	General Emergency
On site: Progress Energy				
Plant Operators	Continuously Staffed	Continuously Staffed	Continuously Staffed	Continuously Staffed
Radiological Emergency Teams	(a), (c)	(a)	Activate	Activate
Technical Support Center	(a), (c)	Activate	Activate	Activate
Operational Support Center	(a), (c)	Activate	Activate	Activate
Emergency Operations Facility	(a), (c)	Activate	Activate	Activate
Corporate Headquarters	Notify (a)	Notify (a)	Activate	Activate
Fire Brigade	(a)	(a)	(a)	(a)
Off site:				
Joint Information Center	(a), (c)	(a), (c)	Activate	Activate
State of North Carolina	Notify	Notify (a)	Activate	Activate
Brunswick County	Notify	Notify (a)	Activate	Activate
New Hanover County	Notify	Notify (a)	Activate	Activate
USNRC	Notify	Notify	Activate	Activate
American Nuclear Insurers		Notify	Notify (a)	Activate
U. S. Coast Guard	(c)	(c)	Notify (a)	Activate
Dosher Memorial Hospital	(b)	(b)	(b)	(b)
Southport Fire Department	(b)	(b)	(b)	(b)
Southport Rescue Squad	(b)	(b)	(b)	(b)
General Electric	(c)	Notify (a)	Activate	Activate
INPO	(c)	Notify	Notify	Notify

(a) Mobilize, if deemed necessary.
(b) Request assistance, if required.
(c) Notify if deemed necessary.

4.0 EMERGENCY MEASURES

This section identifies the measures to be taken for each class of emergency described in Section 2. The measures presented in this section are used as the basis for the detailed Plant Emergency Procedures which define the specific actions to be taken for each emergency class. Emergency measures begin with the recognition and declaration of an emergency class, notification of the applicable agencies for that emergency class, and mobilization of the appropriate portions of the emergency organization. Subsequent measures include damage assessment, corrective actions, protective actions, and aid to affected personnel. Recovery activities are discussed in Section 7.

4.1 ACTIVATION OF EMERGENCY ORGANIZATIONS

4.1.1 General

The Plant Operating Manual contains Emergency Operating Procedures (EOPs). These are intended to aid the plant operators in responding to an accident. The EOPs identify actions which should automatically occur to safely terminate the accident and manual actions which should be taken to verify that the automatic actions have produced the desired results. The EOPs also provide, for the operator's use, guidelines which alert the operators to conditions where inadequate cooling of the core exists or where radioactivity releases may occur. Accordingly, if it should appear that any of the Emergency Action Levels are exceeded, as described in 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases, the Site Emergency Coordinator (SEC) is instructed to activate the Emergency Plan.

The Shift Manager, or other qualified Control Room personnel, shall activate the Emergency Plan, and assumes the SEC responsibilities, initially classifies the emergency, and ensures that the required notifications are made. The SEC will activate portions of, or the entire emergency organization, as warranted for the emergency situation. A more detailed discussion of the methodology that is used in activating the emergency organizations during each class of emergency is provided below and in the Plant Emergency Procedures. Additional detail of the communications networks to be used for notification requirements, for information reporting, and for decision-making with respect to taking protective action on site and for the general public is contained in Appendix A of this plan and 0PEP-03.1.3, Use of Communication Equipment.

4.1.2 Unusual Event

The Shift Manager, or other qualified Control Room personnel, when informed of conditions that meet emergencies that are classified as an Unusual Event, confirms that an Emergency Action Level has been exceeded and implements 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, General Emergency. That individual is then responsible for assuming the role of the Site Emergency Coordinator and for notifying and activating those portions of the emergency organization as appropriate to the emergency class which then exists. The Site Emergency Coordinator can augment the on-site shift personnel by activating additional emergency personnel described in Section 3. Typical of the personnel that may be notified are OSC personnel and the Security Force.

4.1.3 Alert

Section 2, Emergency Classifications, 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases, describe the types of emergencies that are classified as an Alert. Since the conditions in this emergency class indicate an actual or potential substantial degradation of the level of safety of the plant and has the potential for limited releases of radioactive material to the environment, off-site groups will be notified to standby so that if the emergency level is escalated, the essential off-site emergency organizational groups can be notified and readily mobilized to augment the on-site emergency groups.

Upon declaration of an Alert emergency classification the Shift Manager, or other qualified Control Room personnel, assumes the role of the Site Emergency Coordinator until relieved by a designated, qualified emergency response organization member. The transfer of the Control Room Site Emergency Coordinator responsibilities to the Technical Support Center (TSC) Site Emergency Coordinator occurs simultaneously with the activation of the Technical Support Center (TSC).

The Site Emergency Coordinator implements 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, General Emergency, and notifies the appropriate individuals or groups.

The Control Room Site Emergency Coordinator initiates the activation of the Technical Support Center, Operational Support Center, and the Emergency Operations Facility (EOF). The radiological emergency teams will be activated, as appropriate.

The appropriate county and state emergency group leaders will be requested to remain in a readiness condition in case additional augmentation of support personnel is needed and alerting the population-at-risk is warranted.

A decision to go beyond the initial response associated with an Alert class would be based on further degradation of plant parameters, operational experience, or radiation releases that are projected to escalate beyond the Emergency Action Levels for an Alert.

4.1.4 Site Area Emergency

Section 2, Emergency Classifications, 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases, describe the types of emergencies classified as a Site Area Emergency. The Site Emergency Coordinator, when classifying the emergency, takes appropriate predefined steps to correct the situation as described in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, General Emergency.

If not done earlier, the Shift Manager, or other qualified Control Room personnel, assumes the role of the Site Emergency Coordinator (SEC) until formally relieved. The SEC activates the necessary emergency organizations and directs that the essential emergency personnel be notified.

If they have not been previously requested to do so, the off-site groups will be mobilized as soon as possible; the Technical Support Center, Operational Support Center, and the Emergency Operations Facility will be activated. Radiation monitoring teams may be augmented to permit an expanded on-site and near site monitoring program.

The Joint Information Center will be activated for the purpose of providing information to the public.

If the plant parameters indicate possible further degradation of plant safety or projected radiation levels which exceed the recommended values, the emergency will be escalated to the General Emergency level.

4.1.5 General Emergency

Section 2, Emergency Classifications, 0PEP-02.1, Initial Emergency Actions, and 0PEP-02.2.1, Emergency Action Level Technical Bases, describe the types of emergencies classified as a General Emergency. The Site Emergency Coordinator (SEC) upon classifying the situation as a General Emergency takes appropriate, predefined steps to respond to and correct the situation as described 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, General Emergency. This includes arranging for personnel to be available, both on site and off site, to perform actions up to and including evacuation of the affected sectors of the 10-mile EPZ.

If not done earlier, the Shift Manager, or other qualified Control Room personnel, assumes the role of the SEC until formally relieved. The SEC activates the necessary emergency organizations and directs that the essential emergency personnel be notified.

The activation and notification process should have begun well before a General Emergency is declared. Recommendations will be made for sheltering and/or evacuation in accordance with the guidelines in 0PEP-02.6.28, Off-Site Protective Action Recommendations.

4.2 ACCIDENT ASSESSMENT ACTIONS

4.2.1 General

Effective coordination and direction of all elements of the emergency organization require continuing accident assessment throughout an emergency situation. The process of accident assessment involves several different types of activities, in-plant and off-site, depending on the nature and severity of the emergency.

The magnitude of releases of radioactive material can be determined using effluent and process monitors, meteorological data and other sources of information. Additionally, an independent confirmation of the magnitude of the release can be obtained based on the measured dose rates in the environment. Given these measured releases or environmental levels and estimates of the amount of dispersion between the plant and the various points of interest, projected doses can be estimated for other locations. These doses can then be compared to Protective Action Guides. The various steps in this process are discussed in the following sections and in the Plant Emergency Procedures. In the absence of measurable off-site dose rates, protective action recommendations will be made based on the guidelines 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, General Emergency.

4.2.2 Source Term Assessment

Source terms for assessment of off-site dose consequences to the public can be determined by using effluent and radiation monitor readings, evaluating plant conditions against predetermined scenarios, using analysis results of plant effluent samples, and by manually estimating curie inventories. A thorough discussion of source term development is provided in Appendix F.

4.2.2.1 Effluent and Radiation Readings

The most direct indication of a radiological emergency is a high reading in the effluent radiation monitors. The radiation monitoring system monitors the airborne gaseous and particulate activity released from the Reactor Building and Turbine Building. Additional channels of the radiation monitoring system also monitor the gaseous activity in the air ejectors, primary containment (drywell atmosphere) ventilation system, and main steam line monitors. These channels indicate, record, and alarm in the main control room. The radiation monitoring system gives early warning of a plant malfunction and warns plant personnel of increasing radiation activity which might result in a radiation hazard. (See 0PEP-03.6.3 for procedures on source term assessments and estimates of core damage.)

These monitors are also the primary means of determining that an emergency exists for accidents involving spills or leaks of contaminated liquids or gases from systems housing radioactive materials. Such leaks could lead to a release to the environment. In such instances, the following types of emergency actions would take place:

1. The Control Room would be notified.

2. Personnel from the affected plant area would be evacuated, if required.

3. Access to the plant area involved would be restricted.

4. All plant personnel directly involved would be monitored for contamination.

5. A determination would be made of the potential for an off-site release.

6. The Plant Emergency Procedures would be activated if an emergency is declared.

4.2.2.2 Potential Consequences Based on In-Plant Conditions

The source term can be estimated by evaluating the plant condition against a number of preselected scenarios that best describes the effectiveness of containment, cleanup systems, subcooled, or saturated conditions in the torus, and other relevant parameters. A more thorough discussion of the determination of source terms from plant conditions is described in Appendix F.

4.2.2.3 Post Accident Sampling and Analysis of Reactor and Containment

To aid in the assessment of core damage, area-type monitors utilizing ion chamber detectors are available to monitor radiation levels in the drywell. These monitors have a range of up to 10^7 Rem/hr. The range of monitoring equipment in various locations of the plant is sufficient (e.g., high range noble gas vent monitor and improved procedures for iodine analyses) to monitor the applicable release point. This information can be used, together with the analyses of primary coolant system contamination levels, to develop an assessment of the types and quantities of various materials that have been released.

Additionally, capabilities have been provided to permit sampling for chemical and radioanalysis under a wide range of accident conditions. Samples can be taken from effluent streams such as the plant stack to determine total release quantity and radionuclide mix, or they can be taken from the RCS, drywell, and torus to determine radionuclide mix. The collection and analysis of samples can be performed without incurring radiation exposures to individuals in excess of 10CFR20.1201 limits.

The procedures for obtaining samples of gases and liquids during normal operation (such as a sample of primary coolant) can also be safely used during a wide spectrum of accident conditions. However, there are situations involving gross damage to the core where access to the sampling stations and handling of samples may be limited due to high radiation levels. Procedures have been developed and equipment has been installed at the sample panels to minimize the time required to obtain samples and to reduce the radiation levels during transport and analysis of samples. Beyond these measures, post accident sampling stations are located in the breezeway on the 20-foot level. This permits the collection of samples even if access to the Reactor Building is lost. This station can be used to safely withdraw samples of reactor coolant from the recirculation instrument racks in parallel with the jet pump flow indicator and to withdraw samples of water in the torus.

4.2.3 Dose Projection and Meteorological Systems

Once the source term is estimated, exposures to on-site and off-site individuals can be estimated as described in 0PEP-03.4.7, Automation of Off-Site Dose Projection Procedures, 0PEP-03.4.8, Offsite Dose Projections for Monitored Releases, and EMG-NGGC-0002, Off-Site Dose Assessment. The technical basis for the methodology for performing dose projection is described in Appendix F. Prior to receipt of information from the environmental monitoring teams, exposure rates at various locations on site and off site will be estimated from the airborne concentrations of radioactive material as calculated from plant radiation monitors and the atmospheric dispersion characteristics.

Meteorological measurements, specifically the change in temperature with height and wind velocity, are used to determine the atmospheric dispersion conditions. Normally, the plant computer will provide a readout of the stability condition, but alternate methods are available. Rapid evaluation of potential radiation levels of any downwind area can be made through the use of calculated dispersion factors and the calculated release rate of airborne radioactive material from the plant.

The Brunswick Nuclear Plant has an on-site meteorological station with a backup source of additional meteorological data to provide sufficient information for utilization in a dose assessment capability. This system is further described in Section 5.7.2.

Currently, the BNP staff has an automated dose projection capability as described in 0PEP-03.4.7, Automation of Off-Site Dose Projection Procedures, 0PEP-03.4.8, Offsite Dose Projections for Monitored Releases, and EMG-NGGC-0002, Off-Site Dose Assessment. By entering critical plant data and meteorological information obtained from the on-site meteorological station, dose projections can be made for various locations using the dose assessment program. This function has been designed and implemented to allow for the rapid determination of centerline doses for immediate use by plant personnel.

Additionally, contract meteorologists may be contacted by plant personnel.

Meteorological data display is available for remote integration as part of the Emergency Response Facility Information System (ERFIS). This satisfies the NUREG-0654, Rev. 1 criteria for meteorological evaluation and remote interrogation.

4.2.4 Emergency Environmental Monitoring

The Site Emergency Coordinator is responsible for quickly evaluating meteorological conditions existing at the time of the incident and, where releases are or soon will be occurring, for dispatching monitoring teams to specified, predetermined downwind locations. The prime objective of the initial emergency off-site monitoring is to confirm or modify the initial projections of the consequences of any release of radioactive material into the environment.

The Environmental Monitoring Teams collect samples and survey data and transmit information to and/or receive instructions from the Radiological Control Manager of the EOF staff (or Radiological Control Director, if the EOF is not activated).

Calculational aids, site maps, and actual radiation survey data collected by off-site survey teams define affected areas and assess the extent and significance of the release. Information is required for decision making with as little delay as possible; therefore, the initial environmental surveys involve simple-to-perform measurements so that the dose assessments based on plant parameters can be quickly confirmed or modified. Subsequent environmental monitoring efforts will be aimed at further defining the off-site consequences including estimates of total population exposure and instituting an expanded program to enable prompt assessments of any subsequent releases from the plant. Progress Energy Environmental Monitoring Teams will coordinate expanded environmental monitoring efforts to assist the agencies identified in Section 3.8. Field monitoring equipment will have at least the capability to detect and measure radioiodine in the vicinity of the plant site as low as 5×10^{-8} $\mu Ci/cm^3$. The collected air sample can easily be measured by hand held survey meters, a simple test that can serve as an initial check of projected releases based on plant data and can confirm that significant quantities of elemental iodine have been released (the chemical form that would pose a health hazard). More detailed measurements (e.g., Sodium Iodide scintillation counters) can be quickly brought into service to provide the longer term higher capabilities to detect and measure very low levels of contamination in the environment, as would be planned for subsequent radiation monitoring efforts.

At least two environmental monitoring teams will initially be activated from the plant staff upon activation of the EOF by the Emergency Response Manager.

4.2.5 Emergency Response Data System (ERDS)

The Emergency Response Data System will supply the NRC with selected ERFIS data points on a near real time basis. This function will be activated by the Shift Technical Advisor within an hour of the declaration of an Alert or higher classification. The selected data points are transmitted via Virtual Private Network (VPN) to the NRC at approximately 1-minute intervals. If the primary ERFIS system fails (failover) the backup ERFIS system will resume sending the data to the NRC.

4.3 CORRECTIVE ACTIONS

Corrective actions that may be taken to mitigate the circumstances of various levels and types of emergencies identified in this plan are given in the Plant Operating Manual. Generally, corrective actions include any actions that are taken to repair damaged equipment, to install emergency structures, systems, and components, or to reduce the releases of radioactivity.

In order to maintain proficiency in implementing the various procedures and plans, there are training and retraining programs which in some cases are augmented by periodic drills and exercises. A description of this specialized training is given in Section 6.1.1.

4.4 PROTECTIVE ACTIONS

Protective actions are defined for each emergency class. Protective actions must take into consideration the potential risks of implementing such measures versus the reduction of the radiological risk achieved by their use. Analyses of the spectrum of emergencies show that only those in the General Emergency class are expected to have consequences in excess of one Rem whole body (TEDE).

Protective action recommendation guidelines for the general public are described in 0PEP-02.6.28, Off-Site Protective Action Recommendations. Protective actions planned for on-site personnel are described in Section 4.4.2. Protective actions for the off-site population-at-risk are the responsibility of state and local agencies; however, representative actions at various dose levels are described in Section 4.4.7. The evaluation of Protective Action Guidelines for the intermediate phase and for ingestion pathways are the responsibility of the state.

4.4.1 Protective Action - Off Site

Notification of off-site agencies will take place when EALs are exceeded (see Section 3.9). Any incident that is projected to result in radiation doses to the general public in excess of the Protective Action Guidelines listed in 0PEP-02.6.28, Off-Site Protective Action Recommendations, requires the Site Emergency Coordinator to declare a General Emergency. The Emergency Response Manager will recommend to the state and counties protective measures for the public.

4.4.2 Protective Action - On Site

4.4.2.1 Warning and Notification

The on-site PA system and appropriate alarms will be used to alert/warn and notify on-site personnel of an emergency and necessary protective actions as described in 0PEP-02.1.1, Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency. In addition to the alarms, PEPs and security instructions provide guidance for on-site warning and notification. Such warning and notification will include persons at the Media and Visitors Center and the recreation area(s). Outside the plant protected area, and adjacent buildings, warning will be accomplished as described in Section 4.4.6 for the public.

4.4.2.2 Evacuation & Personnel Accountability

For emergencies requiring protective actions in accordance with 0PEP-03.8.2, Personnel Accountability and Evacuation, personnel will proceed by the safest, most direct route to the designated assembly locations or as directed by the Site Emergency Coordinator.

1. Shift operating personnel will assemble in the Control Room.

2. All personnel not specifically involved in responding to the emergency (non-essential) will assemble as directed.

3. All visitors will report to the Security Office at the protected area central access control point.

A personnel accountability check will be carried out in accordance with 0PEP-03.8.2, Personnel Accountability and Evacuation. This procedure also provides instruction for the return of dosimeters and identifies the locations where contaminated individuals can be decontaminated.

Onsite medical care will be performed in accordance with 0PEP-03.9.3, First Aid, Medical Care and Transport for Injured Personnel.

Search for missing persons and rescue will be performed as described in 0PEP-03.9.6, Search and Rescue.

On-site personnel will evacuate the area when directed using transportation that was employed to arrive at the site. Personnel without transportation will be identified during the assembly phase and provided transportation.

The secondary access road and the main plant access road may be used to depart from the site as advised, and evacuation from the 10-mile EPZ will be by way of evacuation routes identified in Figures 1.1-1, 1.1-2, and 4.4-1.

4.4.3 Control of Personnel Radiation Exposures

Although an emergency situation transcends the normal requirements for limiting exposures to ionizing radiation, guideline levels are established in 0PEP-03.7.7, Onsite Radiological Controls, for exposures that may be acceptable in emergencies. The maximum whole body (TEDE) dose received by any worker should not exceed established regulatory limits. Every reasonable effort will be used to ensure that an emergency is handled in such a manner that no worker exceeds these limits. The ERM or SEC can authorize exposure to radiation in excess of 10 CFR 20 limits.

The administration of radioprotective drugs such as potassium iodide (KI) to Progress Energy personnel may also be useful in mitigating the consequences of inhalation of radioactive materials such as radioiodines during an emergency.

Procedures for the administration of radioprotective drugs to Progress Energy and vendor employees are described in 0PEP-03.7.6, Emergency Exposure Controls.

Decision making is based on conditions at the time of an emergency and should always consider the probable effects of an exposure prior to allowing any individual to be exposed to radiation levels exceeding the established occupational limits. The probable high radiation exposure effects are:

1. Up to 50 Rem EDE in 1 day - no physiological changes are likely to be observed.

2. 50 to 100 Rem EDE - no impairment likely but some physiological changes, including possible temporary blood changes, may occur. Medical observations would be required after exposure.

3. 100 to 300 Rem EDE - some physical impairment possible. Some lethal exposures possible.

The following subsections describe the criteria to be considered for life-saving and facility protection actions.

4.4.3.1 Exposure Control Under Emergency Conditions

Dose limit guidelines for workers in an emergency are taken from EPA 400-R-92-001, Manual of Protective Actions and Protective Action Guidelines for Nuclear Incidents, U. S. Environmental Protection Agency, May 1992. Much of the discussion in this section is taken in whole from that document.

In emergency situations, workers may receive exposure under a variety of circumstances in order to assure protection of others and of valuable property. These exposures will be justified if the maximum risks or costs to others that are avoided by their actions outweigh the risks to which the workers are subjected.

The Emergency Worker Dose Limit Guidelines are as follows:

Dose Limit [1] (REM TEDE)	Activity	Condition
5	All	
10	Protecting valuable property	Lower dose is not practicable
25	Lifesaving or protection of large populations	Lower dose is not practicable
>25	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved

Routine dose limits shall not be extended to emergency dose limits for declared pregnant individuals. As in the case of normal occupational exposure, doses received under emergency conditions should be maintained as low as reasonably achievable.

1 Doses to the lens of the eye should be limited to three times the stated TEDE value and doses to any other organ (including skin and body extremities) should be limited to ten times the stated TEDE value.

In the context of these guidelines, exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.

Persons undertaking any emergency operation in which the dose will exceed 25 Rem TEDE should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effect.

4.4.3.2 Exposures During Repair/Reentry Efforts

Each emergency worker entering a high radiation area shall wear dosimetry capable of measuring the expected exposure to be received.

Emergency teams that must enter areas where they might be expected to receive higher than normal doses will be fully briefed regarding their duties and actions and what they are to do while in the area. They will also be fully briefed as to expected dose rates, stay time, and other hazards. All such entries will include one Health Physics Technician, or other person adequately trained in health physics. All team members will use protective devices as specified by the Radiological Control Director. The team members will be instructed not to deviate from the planned route unless required by unanticipated conditions, such as rescue or performance of an operation that would minimize the emergency condition. If the monitored dose rates or stay times encountered during the entry exceed the limits set for the operation, the team will communicate with the OSC Mission Coordinator or will return to the area from where they were dispatched.

Once their operation has been completed, the team personnel will follow established monitoring and personnel decontamination procedures as specified by the Radiological Control Director.

4.4.4 Radioactive Contamination

4.4.4.1 On-Site Personnel

Radiation safety controls are established to contain the spread of loose surface radioactive contamination. Personnel leaving the contaminated areas are monitored to ensure that they or their clothing are not radioactively contaminated. Additionally, in the event of a site evacuation, no personnel will be allowed to leave the plant Owner Controlled Area (OCA) until they have been checked for contamination. In addition to the decontamination area of the Service Building, additional areas can be set up inside the entrance to the TSC/EOF Building.

Contaminated clothing or personal articles will be decontaminated or replaced. Drinking water and food supplies will be monitored and, during an emergency, permitted only in specified clean areas. Contamination on personnel will be removed in accordance with established E&RC procedures. If normal decontamination procedures do not reduce contamination to acceptable levels, the case will be referred to a competent medical authority.

4.4.4.2 Equipment and Vehicles

Equipment and tools will be released for use outside of the contaminated areas only if loose surface radioactive contamination is within acceptable limits. All tools and items of equipment must be checked for contamination before being taken from a known contaminated area. If the item is found to be contaminated and decontamination is not practical, the item must remain in that area. In the event of a site evacuation, vehicles will be surveyed for contamination before they are allowed to leave the plant site. Contaminated vehicles will be decontaminated before being released. If the Low Level Radwaste Warehouse is not a suitable decontamination site due to radiological concerns, vehicles will be directed to an alternate area for decontamination. Brunswick County Emergency Management may provide assistance in this area.

4.4.5 Treatment of Injured and Contaminated Persons

Personnel showers and chemical decontamination agents are available on site and, except in cases of life-threatening/serious injury, established decontamination procedures will be employed on site prior to medical treatment. Decontamination showers and supplies are provided in the Service Building. Shower and sink drains in the Service Building are routed to the miscellaneous waste processing system where the liquid is processed and monitored prior to discharge.

Arrangements and facilities for medical treatment of injured plant personnel are described in detail in Appendix E - Medical Treatment and Assistance and in 0PEP-03.9.3, First Aid, Medical Care and Transport for Injured Personnel. Depending on the nature and severity of injury, injured personnel may be treated in-plant by individuals trained in first aid, treated in-plant by a physician, or transported to the hospital for treatment (see 0PEP-03.9.3, First Aid, Medical Care and Transport for Injured Personnel).

In cases of severe injury, lifesaving first aid or medical treatment will take precedence over personnel decontamination. In general, the order of medical treatment will be:

1. Care of severe physical injuries.

2. Personnel decontamination.

3. First aid to other injuries.

4. Ambulance Service

5. Definitive medical treatment and subsequent therapy as required.

Definitive medical treatment, therapy, and evaluation may include radioprotective drugs; urinary bio-assays or whole body counts on persons suspected of inhaling or ingesting a significant amount of radioactive material or may include surveillance and therapy for persons receiving a large whole body dose.

4.4.6 Public Warning and Notification

In the event of an emergency, the plant will notify designated emergency officials in Brunswick and New Hanover counties as well as state and federal officials in accordance with 0PEP-02.6.21, Emergency Communicator.

During the ALERT phase of an emergency, the appropriate county and state emergency group leaders will be requested to remain in a readiness condition to alert the population at risk if needed. The plant will recommend protective actions for the public upon declaration of a General Emergency.

Public warning when deemed necessary will be accomplished as described in the North Carolina Emergency Response Plan in Support of the BNP. Warning will be given by such methods as sirens supplemented by radio, television, sound trucks, bullhorns, and knocking on doors. The Coast Guard will be used in notifying people along the coast and other large bodies of water where appropriate and necessary.

Sirens mounted on utility poles have been installed by Progress Energy at 38 locations within a 10-mile radius of the Brunswick Nuclear Power Plant. Since the average ambient noise level throughout the EPZ is about 49dBA, the siren system is planned to provide a 59dBA minimum signal. The warning signal will be a 3-to-5-minute steady tone on the sirens.

Sirens will not be sited in the Sunny Point Army Terminal. Brunswick County will notify the terminal which will alert its personnel using on-site warning methods.

Sirens will not be sited in areas of no or low population. Large areas of Brunswick County consist of swamps and forests with no or low population. These areas include such tracts as the Orton Plantation, the western section of Boiling Springs Lakes, and some areas south of Route 211. Based on land use history, they show little promise of development. However, the warning system will be reviewed annually and upgraded when conditions warrant.

Activation of the sirens will be accomplished from the Brunswick and New Hanover Counties Emergency Operation Centers. The sirens in each county are independently controlled, but may be activated by Progress Energy with permission from the counties. A feedback system immediately alerts Progress Energy and both counties of any siren failure. The U.S. Coast Guard will perform the warning of people on bodies of water under their jurisdiction.

The population at risk in the 10-mile Emergency Planning Zone (EPZ) is subdivided into three general categories: resident (permanent) population, transient population, and special facility population as described in Brunswick Nuclear Plant Development of Evacuation Time Estimates, prepared by KLD Associates, May 2008. The total resident population affected within the 10-mile EPZ is approximately 35,186. During the summer months, June through August, the daytime population of the EPZ is approximately 110,283 (see Figure 1.1-6, 1.1-6a and 1.1-6-b). The population is concentrated along the coast and a relatively few inland roads.

4.4.7 Protective Actions - Off Site/Public

4.4.7.1 Public Education and Information

Occupants in the plume exposure pathway Emergency Planning Zone (EPZ) will be provided information prepared by Progress Energy in conjunction with the state and county agencies. This public education and information program is intended to ensure that members of the public are: (a) aware of the potential for an occurrence of a radiological emergency; (b) able to recognize a radiological emergency notification; and (c) knowledgeable of the proper, immediate actions to be taken upon notification.

This will be accomplished by: (1) distribution of the annual safety information brochure which contains educational information on emergency preparedness, sheltering, sirens, radiation, and telephone numbers of agencies to contact for more information; (2) availability of qualified personnel to address civic, religious, social and occupational organizations; and (3) distribution of news material to the media and numerous community and business newsletters.

Emergency information will be made available to transient populations through the distribution of safety information brochures to commercial establishments in the 10-mile EPZ.

During an actual emergency, provisions will be established through the Joint Information Center to make available and distribute information to the news media. The Joint Information Center will also implement provisions for a number of telephones which members of the public, who hear rumors, can call for factual information.

The public education and information program is further described in Section 6.1.4.

4.4.7.2 General

For emergencies requiring protective actions for the general public in designated off-site areas, state agencies will determine the advisability of any necessary evacuation or sheltering. Local agencies will conduct the protective actions as warranted. Assembly points would vary depending on the severity of the incident and on the prevailing weather conditions. To assist in this effort, Progress Energy will provide up-to-date assessments of the condition of the plant and of the quantity and rate of release of radioactivity. Progress Energy will also assist by performing dose assessments which will be compared to the protective action guidelines.

The protective actions that Progress Energy recommends to the state will be based upon current meteorological data such as wind direction, speed and stability class, and other factors.

Releases affecting off-site areas may not be of the magnitude requiring evacuation, areas within the 10-mile EPZ that do not evacuate will be recommended to shelter.

Detailed procedures for public protective actions are contained in the North Carolina Emergency Response Plan in Support of BNP.

4.4.7.3 Evacuation

In the event that evacuation of the 10-mile EPZ is required, the evacuation routes shown in Figure 1.1-2 and Figure 4.4-1 will be used by on-site and off-site personnel.

The time required to evacuate personnel from the 10-mile EPZ varies depending on whether a part of the EPZ is to be evacuated or all of it, on the time of year such as winter or summer, etc., as illustrated in Figure 4.4-2 and on other factors as shown in Table 4.4-1.

It should be noted that the evacuation process in itself involves risk to the public. Risks resulting from evacuation are discussed in US EPA Report, EPA 400-R-92-00, Appendix C.

4.4.7.4 Shelter

All sectors that are not recommended to evacuate will be recommended to shelter. The state may consider sheltering for special populations or hazardous environmental conditions. Special populations may include institutionalized or infirm persons. Hazardous environmental conditions may include the presence of severe weather or competing disasters.

The local housing consists primarily of wood framed dwellings, 1 and 2 stories that are over 10 years old. Very few houses have basements. There are a number of brick veneer dwellings of later construction and a fairly small even distribution of house trailers.

The term Protection Factor (PF) refers to a number used to express the relationship between the amount of gamma radiation that would be received by an unprotected person and the amount that would be received by a person in shelter. An occupant of a shelter with a PF of 40 would be exposed to 1/40 (2.5 percent) of the dose or dose rate to which he would be exposed if his location were unprotected (Sheltered Dose = Unsheltered Dose ÷ PF).

Protection factors for various shielding materials are given in Figure 4.4-3 and for various structures and vehicles in Tables 4.4-2, 4.4-3, and 4.4-4.

4.4.7.5 Respiratory Protection

It is unlikely that effective public respiratory protection can be provided by improvised devices. This problem will be studied and provisions incorporated in this plan in the event satisfactory systems are found.

TABLE 4.4-1
FACTORS RELATED TO WARNING/EVACUATION TIME
Page 1 of 1

1. Facility to Off-site Agencies Alert Phase

   a. Decision-making time
   b. Physical actions/calling time

2. Governmental Agencies to Public Alert Phase

   a. Decision-making time
   b. Physical actions/calling-alerting time

3. Public Alert and Notification Phase

   a. Hear signal
   b. Recognize signal
   c. Seek confirmation of signal meaning and validity
   d. Find confirmation of signal meaning
   e. Relate signal meaning to self
   f. Decide to act.

4. Movement Preparation Phase

   a. Time between deciding to act and departing location
   b. Shutting off utilities
   c. Packing bags
   d. Deciding on destination and routes
   e. Taking care of livestock, etc.
   f. Collecting other family members
   g. Loading the automobile and departing

5. Movement/Travel Phase

   a. Movement time is a function of road distance to the boundary of the evacuation area, vehicle used for evacuation, and auto traffic conditions (traffic volumes, road capacity, weather conditions, etc.).
   b. Road capacity under emergency conditions per FEMA CPG-2-8-C, are assumed to be 850 vehicles per hour (vph) per lane; under foul weather conditions 450-500 vph.
   c. Traffic volume is determined by: (1) dividing the EPZ population by the average number of persons per dwelling unit; or (2) obtaining statistical data on number of vehicles registered in the EPZ, or; (3) other.

6. Evacuation Verification Phase

   a. Marker Technique (NRC NUREG-0654)
      Auto check - Total road distances ÷ Ave. 15 mph
      Aircraft check
   b. Telephone poll: 0.5 min. per residence

TABLE 4.4-2
REPRESENTATIVE SHIELDING FACTORS FOR SURFACE DEPOSITED RADIONUCLIDES*

Structure or Location	Representative Shielding Factor[a]	Representative Range
1 m above ordinary ground	0.70	0.47-0.85
Cars on 50-ft. road:		
Road fully contaminated	0.5	0.4-0.7
Road 50% decontaminated	0.5	0.4-0.6
Road fully decontaminated	0.25	0.2-0.5
Trains	0.40	0.3-0.5
One- and two-story wood-frame house (no basement)	0.4[b]	0.2-0.5
One- and two-story block and brick house (no basement)	0.2[b]	0.04-0.40
House basement, one or two walls fully exposed:	0.1[b]	0.03-0.15
One story, less than 2 ft of basement, walls exposed	0.05[b]	0.03-0.07
Two stories, less than 2 ft. of basement, walls exposed	0.03[b]	0.02-0.05
Three- or four-story structures,		
5000 to 10,000 ft^2 per floor:		
First and second floors	0.05[b]	0.01-0.08
Basement	0.01[b]	0.001-0.07
Multistory structures, > 10,000		
ft^2 per floor:		
Upper floors	0.01[b]	0.001-0.02
Basement	0.005[b]	0.001-0.015

(a) The ratio of dose received inside the structure to the dose that would be received outside the structure.
(b) Away from doors and windows.
(c) Shielding Factor = Shielded Dose Rate / Unshielded Dose Rate

*From: SAND 77-1725, Public Protection Strategies for Potential Nuclear Accidents, Sandia Laboratory

TABLE 4.4-3
REPRESENTATIVE SHIELDING FACTORS FROM GAMMA CLOUD SOURCE

Structure or Location	Shielding Shielding Factor[(a)]	Representative Range
Outside	1.0	--
Vehicles	1.0	--
Wood-frame house[(b)] (no basement)	0.9	--
Basement of wood house	0.6	0.1 to 0.7[(c)]
Masonry house (no basement)	0.6	0.4 to 0.7[(c)]
Basement of masonry house	0.4	0.1 to 0.5[(c)]
Large office or industrial building	0.2	0.1 to 0.3[(c,d)]

(a) The ratio of the dose received inside the structure to the dose that would be received outside the structure.

(b) A wood frame house with brick or stone veneer is approximately equivalent to a masonry house for shielding purposes.

(c) This range is mainly due to different wall materials and different geometries.

(c) The shielding factor depends on where the personnel are located within the building (e.g., the basement or an inside room).

(d) Shielding Factor = Shielded Dose Rate / Unshielded Dose Rate

*From: SAND 77-1725, Public Protection Strategies For Potential Nuclear Reactor Accidents, Sandia Laboratory

TABLE 4.4-4
PF OF VARIOUS VEHICLES AND STRUCTURES

	Average PF
Aircraft Light (Cessna - 172 type)	1.25
Bus - Scenic Cruiser	7
" - Commercial Type	1.7
" - School	1.6
Car - Passenger	1.6
Foxhole (3 ft. diameter x 4 ft. deep)	10.0

If an area 3 or 4 feet wide around the foxhole is kept free of fallout material, a protection factor of 100 or more is possible.

House, Wood Frame (Cape Cod/Colonial Types)	
First Floor Center of House	2.0
Basement	10.0
Corner of Basement, Under Table with 8"	100.0
Concrete on top	100.0
House, Brick (Cape Cod/Colonial Type)	
First Floor Center of House	10.0
Basement	30.0
Locomotive, Heavy, Engineers Seat	3.3
Normal Living, Home and Work as Usual	2.0
Trucks	
l/4 Ton	1.3
3/4 Ton	1.4
2 l/2 Ton	1.7
4 to 7 Ton	2.0
Fire Truck, Drivers Side	2.9
Fire Truck, Standing Area in Back	1.7
Roadway Underpass	2 to 5
Urban Areas (In Open)	1.4
Woods	1.25

NOTE: Protection Factor (PF) = Unshielded Dose Rate ÷ Shielded Dose Rate. Above data pertains to deposited particulate radioactive material with gamma energy approx. 0.7 mev

Figure 4.4-1
BNP Evacuation Routes
Page 1 of 1

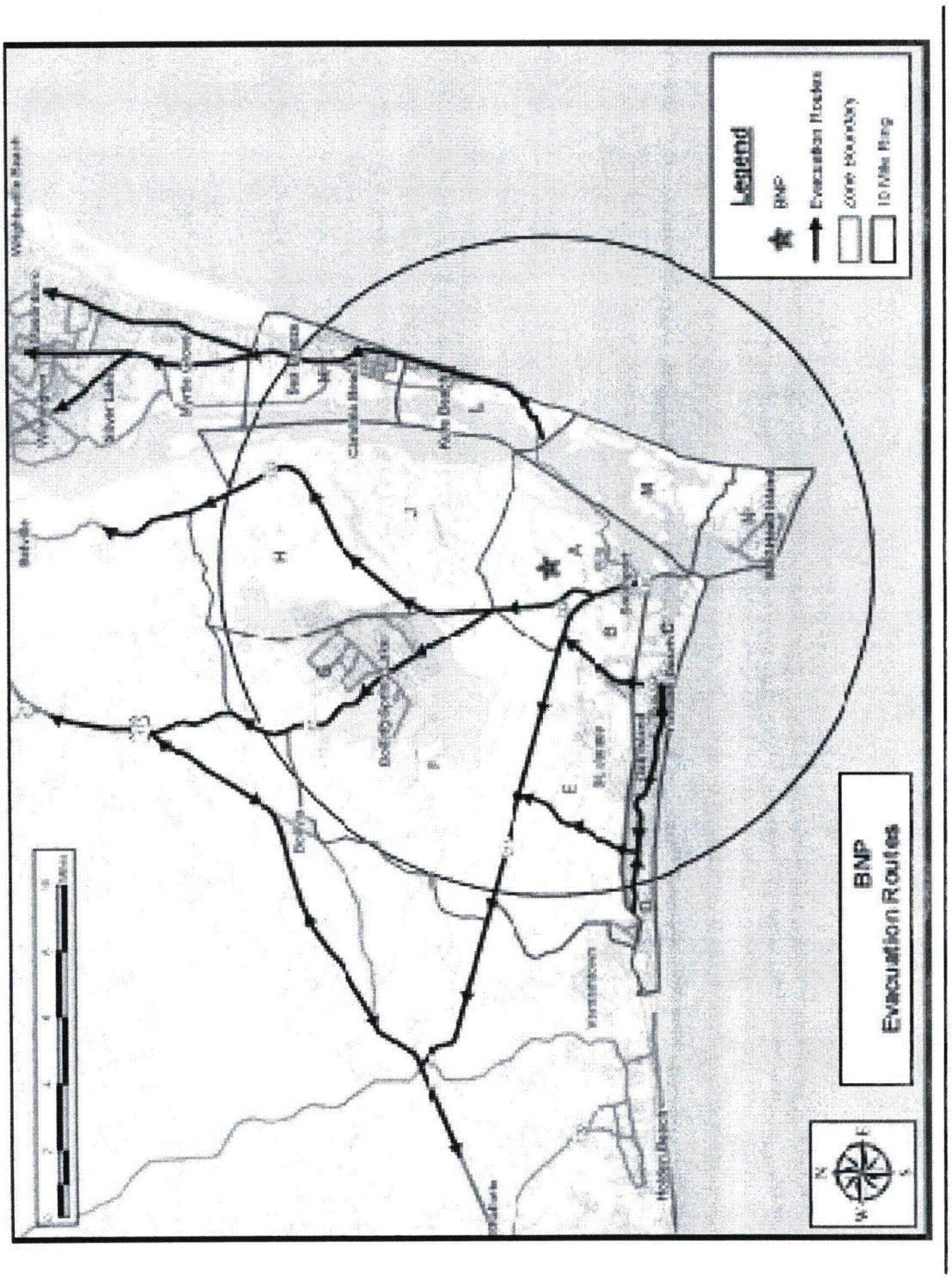


Figure 4.4-2
Evacuation Times – Brunswick EPZ
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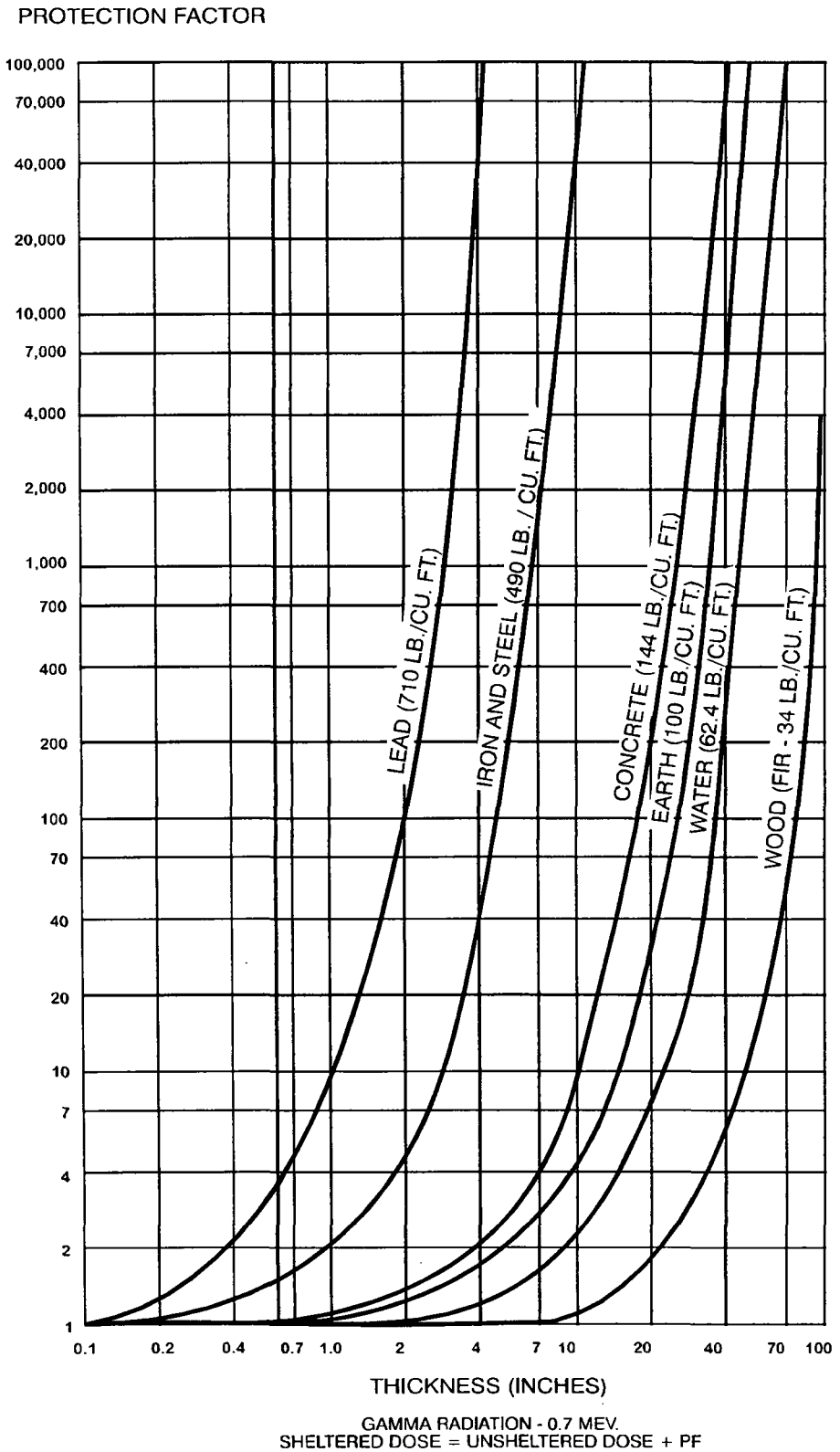
Local Planning Zones Evacuated	Evacuation Time (hours / minutes)[a]	
	Summer	Winter
A,B,G,H,J,K	7:40	4:00
A,B,H,J,K,L	9:50	4:00
A,B,J,K,L,M	9:50	4:00
A,B,J,L,M	8:05	4:00
A,B,L,M,N	8:05	3:50
A,B,M,N	4:10	3:50
A,B,C,M,N	5:00	3:50
A,B,C,D,M,N	8:30	5:20
A,B,C,D,E,M,N	9:35	6:00
A,B,C,D,E	9:35	6:00
A,B,C,D,E,F	9:35	6:10
A,B,D,E,F	9:35	6:00
A,B,E,F,G,H,J	6:55	4:45
A,B,C,D,E,F,G,H,J,K,L,M,N	9:50	6:05

a. This range of evacuation times covers 10 scenarios:
1. Winter Midweek Midday Good Weather
2. Winter Midweek Midday Rain
3. Winter Weekend Midday Good Weather
4. Winter Weekend Midday Rain
5. Winter Midweek/Weekend Evening Good Weather
6. Summer Midweek Midday Good Weather
7. Summer Midweek Midday Rain
8. Summer Weekend Midday Good Weather
9. Summer Weekend Midday Rain
10. Summer Midweek/Weekend Evening Good Weather

Figure 4.4-3
Protection Factors of Shielding Materials
Page 1 of 1



GAMMA RADIATION - 0.7 MEV.
SHELTERED DOSE = UNSHELTERED DOSE + PF

5.0 EMERGENCY FACILITIES AND EQUIPMENT

To facilitate efficient and effective control and coordination of the numerous actions required during emergency situations, several facilities have been designated as emergency centers for Brunswick. These facilities are linked by a comprehensive communications network to allow accurate and timely communications between the facilities, outside agencies, and the public. The communications network uses AT&T systems, fiber optic, Progress Energy microwave net, data links, and radio to provide: (a) voice communication through normal telephone use, automatic ringdown between selected facilities, conference call capability, speaker phones and operator assistance where required; (b) radio communications between selected Progress Energy vehicles and appropriate fixed locations, as well as with state mobile units and fixed locations; (c) facsimile and computer local and wide area networks. (A detailed listing of the Brunswick emergency communications systems is presented as Appendix A.)

The purpose of emergency response facilities is to provide centralized locations for organized coordination and control of on-site and off-site activities during an emergency. Each emergency response organization must assure that a location is provided from where they may direct the activities for which they are responsible, while providing for coordination of activities with other organizations.

Facilities are needed to function as a center for the licensee's command and control functions of on-site operations, including coordination of all licensee activities, on site and off site. Also needed is a center for the analysis of plant effluent monitors, meteorological conditions, and off-site radiation measurements, and for off-site dose projections. As discussed in Section 3 additional facilities are needed where information regarding current and projected plant status needed by federal, state, and local authorities for implementation of off-site emergency plans can be transmitted, where key representatives of the agencies can meet and where the press can operate.

The above functions are carried out by the interaction of the Control Room, the Operational Support Center, the Technical Support Center, the Emergency Operations Facility, the Joint Information Center, and the State and Local Emergency Operations Centers. These centers are connected with a comprehensive, redundant communications network.

In the emergency facilities, decisions and responses are based upon approved procedures and controlled drawings. Uncontrolled drawings and other documents may be used for reference if identified with "FOR INFORMATION ONLY" or "FOR TRAINING USE ONLY." Material identified as "FOR INFORMATION ONLY" or "FOR TRAINING USE ONLY" will not be used in place of approved procedures or controlled drawings.

The functional capabilities of the Brunswick emergency facilities are presented in Table 5.0-2, and the physical locations of on-site emergency facilities are shown on Figure 1.1-3. Specific information about the facilities and equipment available for dealing with emergencies at Brunswick is presented in the following sections.

5.1 CONTROL ROOM

The function of the Control Room is plant control. All plant-related operations are directed from the Control Room. The Control Room is designed to meet habitability standards as described in the Brunswick UFSAR.

Nuclear plant instrumentation, including area and process radiation monitoring system instrumentation, is provided in the Control Room to give early warning of a potential emergency and provides for a continuing evaluation of the emergency situation. The Control Room contains the controls and instrumentation necessary for operation of the reactors and turbine generators under normal and emergency situations.

Additional equipment such as portable radiation survey instruments, readout of meteorological instrumentation and communication equipment is available in the Control Room. A supply of protective clothing, respiratory equipment, and self-contained breathing apparatus will also be maintained in the Control Room.

5.2 TECHNICAL SUPPORT CENTER

The Technical Support Center (TSC) provides a location to house personnel who are responsible for management and technical support of plant operations during emergency conditions. The TSC also functions to relieve the Reactor Operators of peripheral duties and communications not directly related to reactor system manipulations and preventing congestion in the Control Room. In the event of a loss of power, an auxiliary diesel generator is located near the building to supply an alternate source of power.

The TSC will be activated for an alert or higher classification. Activation for an unusual event is optional.

If it should become necessary to expedite travel between the TSC and Control Room, Security has provisions in place to provide direct access between the TSC and the protected area.

The TSC and EOF share a common building which has been designed to have the same habitability as the Control Room, except that the TSC and EOF building does not have chlorine detectors. The north wall is 18 inches thick and the other walls and roof are 14 inches thick. The ventilation system is described in Section 5.2.1.

In the event the TSC is evacuated the Control Room will serve as the alternate location. If travel to the site is unsafe or may endanger personnel, the TSC staff will report to the Alternate Emergency Facility.

5.2.1 TSC/EOF EMERGENCY VENTILATION SYSTEM

The TSC/EOF Building Ventilation System is equipped with two (2) filter systems (containing both HEPA and charcoal filters), one for each of the two ventilation intake locations (Mechanical Rooms 134 and 165). The TSC/EOF Building Ventilation System is equipped with two intake air monitors which are Eberline SRM-100 monitors with SPA-8 probes. The probes are installed in the intake air ducts where detection of a high level of radiation can automatically trigger the HVAC system to actuate emergency fans to direct intake air through the filter trains.

The intake air radiation monitors are provided with an audible local alarm that is located on the radiation monitor. When the alarm setpoint is reached, the monitor will energize its associated radiation monitor relay, which will automatically activate an emergency fan to redirect the intake air through the associated filtering system.

5.2.2 TSC/EOF EMERGENCY CONTAMINATED DRAIN SYSTEM

During an emergency, contaminated drainage could occur at the decontamination shower. An emergency drain system is provided to isolate potential contaminated drainage which can be collected in a 1,000 gallon holding tank. For normal operating conditions, all drainage would be collected by the sanitary drain lines. The holding tank is located underground on the west side of the building. Manually operated valves allow the rerouting of potentially contaminated liquid to the 1,000 gallon holding tank.

5.3 OPERATIONAL SUPPORT CENTER

The purpose of the Operational Support Center (OSC) is to minimize congestion in the Control Room during emergencies by providing a location, separate from the Control Room, where plant maintenance, operations, E&RC, and other plant emergency support personnel will assemble and stand by to assist as needed. The Operational Support Center is located in the O&M Building.

When the OSC is activated, dosimetry, respiratory protection, radiation survey equipment, and RWPs will be provided. In the event of a personnel contamination, decontamination will be performed in the area normally designated for this purpose. In the event the OSC is evacuated, a backup can also be provided in the Simulator. The Simulator is within the habitability envelope of the TSC/EOF.

5.4 EMERGENCY OPERATIONS FACILITY

The Emergency Operations Facility (EOF), located on site provides space for management of overall emergency response including coordination with federal, state, and local officials, coordination of off-site radiological and environmental assessment, and determination of recommended public protective actions. The EOF is activated at an alert or higher level. The EOF is in the same habitability envelope as the TSC. If the Joint Information Center (JIC) is not activated, conditions permitting, the media may go the BNP Media Center to be updated.

If radiological conditions prevent EOF personnel from traveling to the EOF for activation, the Brunswick County Emergency Services Facility in Bolivia, N.C. will serve as a meeting place for personnel until radiological conditions permit travel to the facility. The Brunswick County Emergency Services Facility may also be used as an alternate reporting location for TSC, OSC, and EOF personnel in the event of a security threat, and function as an Alternate Emergency Facility, until safe movement of personnel to the plant is assured.

5.5 JOINT INFORMATION CENTER

The Joint Information Center (JIC), located in the Brunswick Community College Complex near Bolivia, N.C., will serve as the primary location for the accumulation of accurate and current information regarding emergency conditions, and dissemination of information to news media and the general public. Work stations are provided for Company personnel and a media briefing room is available. Telephones are available for use by news media personnel. The center also contains work space and phones for public information personnel from the state, counties, NRC and industry-related organizations. Additional information can be found in 0PEP-02.6.29, Activation and Operation of the Joint Information Center (JIC). If the JIC is not activated, conditions permitting, the media may go to the BNP Media Center to obtain current information regarding emergency conditions.

5.6 OFF-SITE EMERGENCY FACILITIES

5.6.1 North Carolina Emergency Operations Center

The North Carolina Emergency Operations Center (EOC) is located in Raleigh, North Carolina. When necessary, it will be activated and staffed to assist in coordinating emergency operations in support of the Brunswick Nuclear Plant.

5.6.2 Brunswick County Emergency Operations Center

The Brunswick County Emergency Operations Center is located in the Brunswick County Administration Complex in Bolivia, North Carolina, about fifteen miles from the Brunswick site. It provides a location where Brunswick County authorities can direct off-site activities in Brunswick County. If radiological conditions prevent EOF personnel from traveling to the EOF for activation, the Brunswick County Complex in Bolivia, N.C. will serve as a meeting place for personnel until radiological conditions permit travel to the facility. This facility presently has direct communications links with the Brunswick Nuclear Plant TSC and EOF, and will allow free interchange of information between government officials and those persons located in the TSC and EOF responsible for dose projection and management decision making. The Brunswick County Complex may also be used as an alternate reporting location for TSC, OSC, and EOF personnel in the event of a security threat, and function as an Alternate Emergency Facility, until safe movement of personnel to the plant is assured.

5.6.3 New Hanover County Emergency Operations Center

The New Hanover County Emergency Operations Center is located in the New Hanover County Law Enforcement Center in Wilmington, North Carolina, about 20 miles from the Brunswick site. It provides a location where New Hanover County authorities can direct off-site activities in New Hanover County. This facility presently has direct communications links with the Brunswick Nuclear Plant TSC and EOF, and will allow free interchange of information between government officials and those persons located in the TSC and EOF responsible for dose projection and management decision making.

5.7 ASSESSMENT CAPABILITIES

5.7.1 General

The instrumentation and control systems monitor, provide indication and recording, and automatically regulate the variables necessary for safe and orderly operation of the plant. These systems provide the operators with the information and controls needed to start up, operate at power, and shut down the plant. They further provide means to cope with all abnormal operating conditions. Plant control and display of information from these various systems are centralized in the Control Room at locations convenient to the operator. This instrumentation, in conjunction with projected off-site doses, provides the basis for initiation of protective actions.

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5.7.2 Meteorological Instrumentation and Procedures

The Brunswick Nuclear Plant has a permanent meteorological monitoring station located within the site area boundary for display and recording of wind speed, wind direction, and temperature differences for use in making off-site dose projections, etc. Meteorological information is presented in the Control Room by means of the plant computer system. The meteorological parameters measured on the tower at the 10-meter and 100-meter levels above ground are listed in Table 5.7-1. In addition, barometric pressure, solar radiation, precipitation and dew point temperature data are recorded at the station to provide supplemental information on local meteorological conditions. This information is remotely interrogatable using a computer or other data access terminal.

The meteorological sensors used at the BNP meteorological monitoring station are calibrated at least twice during an annual calendar year (approximately six months between calibrations). Meteorological sensors which are removed from service are replaced with a recalibrated unit having met original equipment manufacturer specifications. Between calibrations, an electronic verification of system performance will be made and, if necessary, adjustments to the system will be performed. This electronic verification shall be performed at least once between calibrations. BNP personnel will make periodic visits to the monitoring station to assure that components are functioning as anticipated. Further checks of the data are made by remote interrogation of the monitoring station by a meteorological service provider, where the data is reviewed by the meteorological staff to determine system performance and the acceptability of the reported information. Historical records and data will be maintained with the Environmental Unit for effluent reporting.

The meteorological instrumentation which Progress Energy uses at the BNP meteorological monitoring station meets the requirements of NRC Regulatory Guide 1.23 (Rev. 0) and provides the meteorological parameters to the locations specified within NRC Regulatory Guide 1.97 (Rev. 2), Table 1 and Table 2. As specified within Section 8.2 of the Supplement Number 1 to NUREG-0737, Progress Energy maintains telephone numbers for voice communications to the nearest National Weather Service first order observation station (Wilmington, NC) for twenty-four hour per day access to this backup meteorological information should the on-site system fail. This backup source of meteorological data is the closest location which can provide reliable representative meteorological information for the BNP site.

Should the on-site meteorological data collection system exhibit suspect information, loss of data due to computer or instrument failure, or plant personnel require additional technical assistance, meteorologists are available to provide needed expertise. Meteorologists can independently access on-site meteorological data, contact the National Weather Service to obtain additional synoptic scale weather data and compile a site specific atmospheric diffusion assessment for BNP site.

5.7.3 Seismic Monitoring

The Brunswick Seismic Monitoring System senses and records earthquake ground motion received in the Unit 2 Reactor Building.

The Seismic Monitoring System consists of a Passive Subsystem and an Active Subsystem. The Passive Subsystem has no immediate visual indication of an event, whereas the Active Subsystem actually displays an immediate visual indication.

The Passive Subsystem consists of three self-contained Multi-Element Triaxial Peak Accelerographs and are located as follows:

1. Unit 2 Reactor Building Basement/Equipment Drain Tank (Elevation -17 ft).

2. Unit 2 Reactor Building RHR Heat Exchanger Support (Elevation 20 ft).

3. Unit 2 Reactor Building Refueling Area (Elevation 117 ft).

The peak shock recorders measure and record the acceleration of the structure. The peak shock recorder senses and permanently records the information defining a response spectrum.

The Unit 2 Active Seismic Monitoring System senses and records earthquake ground motion in two areas of the Unit 2 Reactor Building where remote accelerometers are installed:

1. Basement foundation in North Core Spray Room (Elevation -17ft).

2. Containment structure (Elevation +89ft).

The Active Seismic Monitoring System that receives ground motion signals from the remote accelerometers consists of a central controller, LCD display monitor, alarm and interconnect panel, battery backup dual recorder unit, printer, and UPS battery backup power supply for the central controller. The Seismic Monitoring System remains in a standby condition until an earthquake causes the remote accelerometers to activate the recording unit.

Earthquakes produce low frequency accelerations which, when detected by the remote sensing devices, will be recorded at the remote locations as well as by the accelographs located in the electronic equipment rooms.

A considerable array of seismometers is located in the region. A central point of contact to obtain information about a seismic event is the National Earthquake Information Center in Golden, Colorado.

5.7.4 Radiological Monitors

The radiation monitoring system is available to give early warning of a possible emergency and provides for a continuing evaluation of the emergency situation in the Control Room. Radiation monitoring instruments are located at selected areas within the facility to detect, measure, and record radiation levels. In the event the radiation level should increase above a preset level, an alarm is initiated in the Control Room. Certain radiation monitoring instruments also alarm locally in selected areas of the facility. The radiation monitoring system is divided into four subsystems:

1. Process radiation monitoring system monitors various fluid streams in operating systems.

2. Area radiation monitors that monitor radiation levels at various locations within the operating area that can be read in the Control Room.

3. Continuous air monitors measure airborne particulate and/or airborne iodine activities at various locations within the operating areas.

4. Radiation monitoring equipment with readouts in various plant locations.

The types, ranges, and locations of monitors are listed in Tables 5.7-2 to 5.7-4. Typical portable radiation monitors are listed in Table 5.7-4. The radiation monitors are designed to permit monitoring of activity releases during a broad spectrum of postulated emergency situations.

The locations of the off-site and on-site environmental monitoring stations and the location of the emergency TLD monitoring stations are contained in plant Environmental and Radiation Control Procedures and 0PEP-04.6, Radiological Emergency Kit Inventories.

5.7.5 Process Monitors

Instrumentation used to monitor vital plant parameters is described in Section 7 of the Brunswick FSAR. This instrumentation is continuously monitored in the Control Room. Essential process monitoring (Critical Plant Variables) will also be available in the Technical Support Center.

5.7.6 Laboratory Facilities

Support of the radiation monitoring and analysis effort is provided by an on-site laboratory. The on-site laboratory includes equipment for chemical analyses and for analysis of radioactivity.

The wet chemistry equipment is used to perform a variety of analyses (pH, conductivity, boron content of reactor coolant, etc.). It is also used to perform radiochemical analyses (preparation of samples to permit analysis of the radioactivity content).

Equipment used to analyze the type and amount of radioactivity in filters, smears, etc., is located adjacent to the chemistry lab. This includes a multichannel analyzer (Ge-Li) used to determine the isotopic content in a sample, a liquid scintillation counter for tritium analyses, and gas proportional counter for gross alpha, and gross beta activity.

Much of this equipment is rack mounted; some is readily portable. Additional facilities for counting and analyses of Brunswick samples can be provided by laboratory facilities at the Harris Nuclear Plant, including the Harris Energy and Environmental Center (HEEC) located near New Hill, North Carolina, and by the Robinson Nuclear Plant located in Hartsville, South Carolina.

As described in the State of North Carolina Radiological Emergency Response Plan, the Division of Radiation Protection maintains a mobile radiological laboratory.

5.7.7 Dose Projection

The magnitude of releases of radioactive material can be determined from effluent and process monitors based on 0PEP-03.4.7, Automation of Off-Site Dose Projection Procedures 0PEP-03.4.8, Offsite Dose Projections for Monitored Releases and EMG-NGGC-0002, Off-Site Dose Assessment. Additionally, an independent confirmation of the magnitude of a release can be obtained by environmental monitoring as described in 0PEP-02.6.6, Environmental Monitoring Team Leader and 0PEP-03.5.5, Environmental Monitoring and Plume Tracking. Given a source term, or the duration and rate of release to the environment, and meteorological data previously described, the Control Room can make the initial dose projections and is capable of performing this function on a 24-hour-per-day basis. After activation of the EOF, the Radiological Control Manager described in Section 3.5.4 is responsible to the Emergency Response Manager for determining dose projections from readily available data. 0PEP-03.4.7, Automation of Off-Site Dose Projection Procedures, 0PEP-03.4.8, Offsite Dose Projections for Monitored Releases, and EMG-NGGC-0002, Off-Site Dose Assessment, describe computer programs which automate dose projection calculations when used in conjunction with the BNP meteorological systems.

5.8 FIRE DETECTION

The Fire Detection System is designed to quickly detect visible or invisible smoke (or other products of combustion) and/or heat in designated areas of the plant.

The Fire Detection System consists primarily of fire/smoke detectors, control panel units, and annunciator panels. A fire signal initiated by a detector flows through a control panel unit to an annunciator panel. The control panel unit is located in the same building as the detector. The annunciator panel is located in the Control Room.

The types and number of detectors have been selected in accordance with the combustible materials and electrical equipment present in the area and the physical surroundings of each area. Smoke detectors sense the presence of products of combustion before they are visible in the form of smoke. Thermal detectors are sensitive to both temperature and the rate of rise of increasing temperature. SD-41 provides a description of detector types, numbers, and locations.

5.9 PROTECTIVE FACILITIES AND EQUIPMENT

0PEP-04.6, Radiological Emergency Kit Inventories, lists emergency equipment that is available for the various Brunswick emergency facilities.

Complete personnel decontamination facilities are included in the Service Building. These facilities include two decontamination showers. Alternate means for decontamination are also available.

5.10 FIRST AID AND MEDICAL FACILITIES

First Aid is located on the first floor of the O&M Building. First aid kits and supplies are also placed at various locations throughout the plant.

Off-site medical facilities which have agreed to accept personnel are described in Appendix E, Medical Treatment and Assistance.

5.11 DAMAGE CONTROL EQUIPMENT AND SUPPLIES

In the event of an emergency, certain immediate repairs may be necessary to minimize the further release of radioactivity and also insure the protection of plant equipment. Damage control equipment and supplies that would be used to effect repair would depend on the nature of the repairs to be performed.

Damage control equipment and supplies are located in the stockroom and the maintenance shops.

5.12 OFF-SITE ENVIRONMENTAL MONITORING EQUIPMENT AND SUPPLIES

In the event of an emergency, the plant has the capability to deploy two off-site environmental monitoring teams as described in 0PEP-02.6.6, Environmental Monitoring Team Leader. Two environmental monitoring kits with the necessary equipment and supplies for off-site radiological monitoring are designated for use in the event of an emergency. Transportation for off-site environmental monitoring teams will be supplied by plant vehicles and other Company trucks as available or private autos at the site. 0PEP-04.6, Radiological Emergency Kit Inventories, lists emergency equipment that is available.

TABLE 5.0-2
FUNCTIONAL OBJECTIVES OF EMERGENCY FACILITIES

Facility Name	Location	Functional Objectives
Technical Support Center (TSC)	Brunswick TSC/EOF/Training Building	1) Assembly location for technical personnel to provide engineering and management support of plant operations following an accident. 2) Direction and coordination of overall plant emergency activities.
Operational Support Center (OSC)	Brunswick Operations and Maintenance Building	1) Reporting place for emergency support personnel. 2) Dispatching location of personnel to support actions as directed by the Site Emergency Coordinator.
Joint Information Center	Located in Brunswick Community College Complex, Bolivia, NC	1) Provide immediate access to accurate emergency related information generated by all involved agencies by media representatives. 2) Provide equipment for document reproduction, telecopying, communications, and television electrical connections.
Emergency Operations Facility (EOF)	Brunswick TSC/EOF/Training Building	1) Provide working space and communication links for the Emergency Response Manager and his staff. 2) Provide primary interface point for Progress Energy and off-site support personnel (Federal and State). 3) Provide point of coordination for off-site radiological and environmental assessment.
New Hanover County Emergency Operations Center (EOC)	Wilmington, North Carolina	1) Direction and coordination of New Hanover County emergency and protective response actions.
Brunswick County Emergency Operations Center (EOC)	Bolivia, North Carolina	1) Direction and coordination of Brunswick County emergency and protective response actions.
North Carolina State Emergency Operations Center (EOC)	Raleigh, North Carolina	1) Direction and coordination of Brunswick and New Hanover County emergency and protective response actions.

TABLE 5.7-1
ON-SITE METEOROLOGICAL INSTRUMENTATION
Page 1 of 1

Approximate Height Above Tower Base (ft)	Recorded Parameter	Instrument
344	Windspeed, direction and direction variance	Threshold less than 1 mph.
35	Windspeed, direction, and direction variance	Threshold less than 1 mph.
344	Temperature difference relative to 35 ft elevation	Resistance thermobulb in aspirated radiation shield at 344 and 35 ft elevation.
35	Ambient temperature	Resistance thermobulb in aspirated radiation shield at 35 ft elevation.

TABLE 5.7-2
AREA RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES
Page 1 of 4

Channel	Range (mRem/hr)	Designation	Detector Location (Bldg.)
1-1	0.01 - 100	Control Room Operating Area	Control
1-2	0.01 - 100	Unit 2 Mechanical Equipment Room *	Control
1-3	0.01 - 100	Unit 1 Mechanical Equipment Room *	Control
1-4	0.01 - 100	Stack Filter House	Stack
1-5	0.01 - 100	Service Building Radiochemical Lab.	Service
1-6	0.01 - 100	Service Building Personnel Decon Equipment Room	Service
1-7	0.10 - 1000	Hot Machine Shop	Hot Machine Shop
1-8	0.01 - 100	Service Building Equipment Room East/West Corridor	Service
1-9	0.01 - 100	Unit 1 Turbine Hall Control Access Corridor	Turbine
1-10	0.01 - 100	Unit 1 Feedwater Heater Bay Access Corridor	Turbine
1-11	0.01 - 100	Unit 1 Turbine Building Sampling Station	Turbine
1-14	0.1 - 1000	Unit 1 Turbine Rotor Washdown Area	Turbine
1-15	0.1 - 1000	1A Core Spray Pump Room ESS I	Reactor
1-16	0.1 - 1000	1B Core Spray Pump Room ESS II	Reactor

* Detectors are located in mechanical equipment room (Control Building ventilation air intake plenum)

TABLE 5.7-2
AREA RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES
Page 2 of 4

Channel	Range (mRem/hr)	Designation	Detector Location (Bldg.)
1-17	0.1 - 1000	1A RHR System Heat Exchanger and Pump Room ESS I	Reactor
1-18	0.1 - 1000	1B RHR System Heat Exchanger and Pump Room ESS II	Reactor
1-19	0.01 - 100	Unit 1 Reactor Building Across from TIP Room Elevation 29'6"	Reactor
1-20	0.01 - 100	Unit 1 Drywell Entrance Elevation 26'	Reactor
1-21	1.0 - 10^4	Unit 1 TIP Room	Reactor
1-22	0.01 - 100	Unit 1 Decontamination Room. Elevation 20'0"	Reactor
1-23	0.01 - 100	Unit 1 Equipment Entry Elevation 20'0"	Reactor
1-24	0.01 - 100	Unit 1 Reactor Building Sampling Station	Reactor
1-25	0.01 - 100	Unit 1 Reactor Building Air Lock Elevation 50'0"	Reactor
1-26	0.01 - 100	Unit 1 Inside New Fuel Vault Elevation 98'8"	Reactor
1-27	0.01 - 100	Unit 1 North of Fuel Storage Pool	Reactor
1-28	10^2 - 10^6	Unit 1 Between Reactor and Fuel Pool Elevation 117'4"	Reactor
1-29	0.01 - 100	Unit 1 Cask Wash Area Refuel Floor	Reactor
1-30	0.01 - 100	Unit 1 Spent Fuel Pool Cool System	Reactor

TABLE 5.7-2
AREA RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES

Channel	Range (mRem/hr)	Designation	Detector Location (Bldg.)
2-1	0.1 - 1000	Radwaste Building Elevation -3'0" North MCC and Sump Area	Radwaste
2-2	0.1 - 1000	Radwaste Building Elevation -3'0" South MCC and Sump Area	Radwaste
2-3	0.1 - 1000	Unit 2 Cond. Filter - Demin Aisle	Radwaste
2-4	0.1 - 1000	Unit 1 Cond. Filter - Demin Aisle	Radwaste
2-5	0.01 - 100	Radwaste Control Room	Radwaste
2-6	0.01 - 100	Radwaste Sampling Station	Radwaste
2-7	0.01 - 100	Radwaste Drum Capping Station	Radwaste
2-8	$1.0 - 10^4$	Radwaste Drum Storage	Radwaste
2-9	0.01 - 100	Unit 2 Turbine Hall Controlled Access Corridor	Turbine
2-10	0.01 - 100	Unit 2 Feedwater Heater Bay Access Corridor	Turbine
2-11	0.01 - 100	Unit 2 Turbine Building Sampling Station	Turbine
2-14	0.1 - 1000	Unit 2 Turbine Rotor Washdown Area	Turbine
2-15	0.1 - 1000	2A Core Spray Pump Room ESS I	Reactor
2-16	0.1 - 1000	2B Core Spray Pump Room ESS II	Reactor

TABLE 5.7-2
AREA RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES
Page 4 of 4

Channel	Range (mRem/hr)	Designation	Detector Location (Bldg.)
2-17	0.1 - 1000	2A RHR System Heat Exchanger and Pump Room ESS I	Reactor
2-18	0.1 - 1000	2B RHR System Heat Exchanger and Pump Room ESS II	Reactor
2-19	0.01 - 100	Unit 2 Reactor Building Across from TIP Room Elevation 29'	Reactor
2-20	0.01 - 100	Unit 2 Drywell Entrance Elevation 26'	Reactor
2-21	1.0 - 10^4	Unit 2 TIP Room	Reactor
2-22	0.01 - 100	Unit 2 Decontamination Room Elevation 20'0"	Reactor
2-23	0.01 - 100	Unit 2 Equipment Entry Elevation 20'0"	Reactor
2-24	0.01 - 100	Unit 2 Reactor Building Sampling Station	Reactor
2-25	0.01 - 100	Unit 2 Reactor Building Airlock Elevation 50'0"	Reactor
2-26	0.01 - 100	Unit 2 Inside New Fuel Vault Elevation 98'8"	Reactor
2-27	0.01 - 100	Unit 2 North of Fuel Storage Pool	Reactor
2-28	10^2 - 10^6	Unit 2 Between Reactor and Fuel Pool Elevation 117'4"	Reactor
2-29	0.01 - 100	Unit 2 Cask Wash Area Refuel Floor	Reactor
2-30	0.01 - 100	Unit 2 Spent Fuel Pool Cool System	Reactor

TABLE 5.7-3
PROCESS RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES
Page 1 of 2

CHANNEL	SUPPLIER	RANGE
Main Steam Line Radiation Monitors		
Channel A (D12-RM-K603A)	GE	$1\text{-}10^6$ mRem/hr
Channel B (D12-RM-K603B)	GE	$1\text{-}10^6$ mRem/hr
Channel C (D12-RM-K603C)	GE	$1\text{-}10^6$ mRem/hr
Channel D (D12-RM-K603D)	GE	$1\text{-}10^6$ mRem/hr
Condenser Off-Gas Radiation Monitors		
Log Channel A (D12-RM-K601A)	GE	$1\text{-}10^6$ mRem/hr
Log Channel B (D12-RM-K601B)	GE	$1\text{-}10^6$ mRem/hr
Linear Channel (D12-RM-K602)	GE	$1\text{-}10^6$ mRem/hr
Main Stack Radiation Monitors		
1/2-D12-RM-23S	General Atomics	$10^{-7}\text{-}10^5$ μCi/cc (Xe equivalent)
Liquid Process Radiation Monitors		
Radwaste Effluent (D12-RM-K604)	GE	$10^{-1}\text{-}10^6$ cps
Service Water Discharge (D12-RM-K605)	GE	$10^{-1}\text{-}10^6$ cps
Reactor Bldg Closed Cooling Water (D12-RM-K606)	GE	$10^{-1}\text{-}10^6$ cps
Storm Drain Collector Basin (2-DST-RM-5361)	General Atomics	$10^1\text{-}10^7$ cpm
Reactor Bldg Ventilation Radiation Monitors		
Channel A (D12-RM-K609A)	GE	0.01-100 mRem/hr
Channel B (D12-RM-K609B)	GE	0.01-100 mRem/hr

TABLE 5.7-3
PROCESS RADIATION MONITORING SYSTEM
CHANNEL IDENTIFICATION & METER RANGES
Page 2 of 2

CHANNEL	SUPPLIER	RANGE
Gaseous Analyzer Radiation Monitors		
Reactor Building Roof Vent (1/2-CAC-AQH-1264-3)	NMC	$10\text{-}10^{6}$ cpm
Turbine Building Vent (1/2-D12-RM-23)	General Atomics	$10^{-7}\text{-}10^{5}$ μCi/cc (Xe equivalent)
Drywell Primary Containment Atmosphere (CAC-AQH-1260, 1262)	NMC	$10\text{-}10^{6}$ cpm
AOG Charcoal Absorber System Effluent (AOG RM-103)	General Atomics	$10^{1}\text{-}10^{7}$ cpm
Hardened Wetwell Vent (CAC-RM-80)	Sorrento Electronics (General Atomics)	$10^{-4}\text{-}10^{5}$ μCi/cc

TABLE 5.7-4
TYPICAL PORTABLE SURVEY EQUIPMENT
Page 1 of 1

Type	Range	Type Of Radiation Measured
Teletector / MGP Telepole	0.1 mRem/hr - 1,000 Rem/hr	γ
Eberline RM-14 Radiation Monitor	0 - 50,000 cpm	β, γ
Ludlum Model 177	0 - 500,000 cpm	β, γ
AMP-100	1 mr/hr - 999R/hr	γ
AMP-200	100 mr/hr – 9,999 R/hr	γ
R02	0 mr/hr – 5,000 mr/hr	β, γ
R02A	0 mr/hr - 50 R/hr	β, γ
R020	0 mr/hr - 50 R/hr	β, γ
BICRON Micro Rem	0 - 200,000 μr/hr	γ
ASP-1 With Neutron Ball	0 - 100 Rem/hr	n
Ludlum Model 12 With Neutron Ball	0 - 10 Rem/hr	n
E530N	0 mrem/hr - 20 R/hr	γ
Ludlum Ion Chamber Model 9-3	0.2 – 50,000 mR/hr	β, γ

6.0 MAINTAINING EMERGENCY PREPAREDNESS

Emergency preparedness at Brunswick will be maintained by (a) preparing the emergency organization members and the public for proper emergency response actions through training, drills and exercises, and public education programs (Section 6.1); (b) periodic review and update of the Brunswick Radiological Emergency Plan and its implementation procedures (Section 6.2); (c) periodic inventory and calibration of emergency equipment and instrumentation (Section 6.3); and (d) cognizance of the Plant Nuclear Safety Committee over safety-related issues (Section 6.4).

The Supervisor - Emergency Preparedness is the Emergency Planning Coordinator and is responsible for maintaining Emergency Preparedness at the Brunswick Nuclear Plant, as outlined in Section 6.1.3.

Each periodic requirement in this section and elsewhere in the plan and plant emergency procedures shall be performed within the specified time below:

a. Annually - At least once per 366 days

b. Monthly - At least once per 31 days

c. Quarterly - At least once per 92 days

d. Semiannually - At least once per 184 days

e. Calendar Year - Period of time beginning January 1 and ending December 31.

For the above intervals, a maximum allowable extension is permitted subject to the following restrictions:

- The maximum allowable extension shall not exceed 25% of the specified interval.

- The combined time interval for any three consecutive intervals shall not exceed 3.25 times the specified interval.

This definition for periodic requirements applies to all intervals in the emergency plan and plant emergency procedures except for the evaluated exercise which is conducted once every two calendar years, and off-site training which is conducted once per calendar year.

6.1 ORGANIZATIONAL PREPAREDNESS

Organizational preparedness is maintained through an integrated training program that includes general orientation of all persons at the site and detailed training of individuals and groups required to perform specific functions and actions during an emergency condition. The training program provides initial training and annual retraining of the emergency response organization. Significant changes in the content of this Plan and procedures which implement this Plan are distributed by memorandum to the appropriate plant groups.

6.1.1 Training

The primary objectives of the training program are to:

1. Familiarize appropriate individuals with the Plan and the procedures that implement the Plan.

2. Instruct assigned individuals and their alternates in their duties and responsibilities.

3. When appropriate, train on significant changes in the scope or contents of the Plan or procedures which implement the Plan.

4. Provide annual refresher training and retesting to ensure that Emergency Plan personnel are familiar with their duties and responsibilities assigned by the Plan and procedures which implement the Plan.

Each individual, other than escorted personnel, is provided with initial orientation training on the notification and instruction methods used at the Brunswick plant in the event of an emergency. Appropriate actions for escorted individuals shall be the responsibility of the escort.

Each badged individual, other than escorted personnel, also receives initial orientation on the basic principles of radiological safety including the effects of radiation and the theory and use of radiation detection devices.

The Emergency Plan Training Program described in 0PEP-04.3 assures training of those individuals who may be called to respond to an emergency at the Brunswick plant by providing initial training and annual refresher training and retesting on the scope and content of the Plan and procedures which implement the Plan.

The Emergency Plan Training Program provides training for the following groups of personnel to perform the specific tasks assigned to them in the emergency organization.

Site Emergency Coordinator
TSC Staff Personnel
Security Personnel
Fire Brigade/First Aid Personnel
Dose Projection Personnel
Radiological Emergency Teams
Emergency Communicators
EOF Personnel
OSC Personnel
JIC Personnel
Plant Operators
Off-site groups who may be requested to assist in an emergency.

Training of off-site organizations is described in their radiological emergency plans. Training by Progress Energy for hospital, ambulance, rescue, police, and fire personnel will include the procedures for notification, basic radiation protection, and their expected roles. For those local services support organizations who may enter the site, training by Progress Energy will also include site access procedures and the identity (by position and title) of the individual in the Brunswick organization who will control the organization's support activities. Progress Energy will assist these off-site organizations in performing their radiological emergency response training as related to the Brunswick plant.

Progress Energy and the public information officials from the state and local governments will jointly make available an annual program to acquaint the news media with the company, state and county emergency plans and procedures. The program also includes information concerning radiation, nuclear plant operations and official points of contact for release of public information.

Severe Accident Management training and drills will be conducted in accordance with Severe Accident Management Program and Training Procedures.

6.1.2 Drills and Exercises

This section describes provisions for conducting periodic drills and exercises to test the adequacy of the Plan and implementing procedures, emergency equipment, and the preparation and training of emergency personnel.

Each exercise scenario will include the following:

1. The basic objective(s) of the exercise.
2. The date(s), time period, place(s), and participating organizations.
3. The simulated events.
4. A time schedule of simulated initiating events.
5. A narrative summary describing the conduct of the exercises to include such things as simulated casualties, off-site fire or police department assistance, rescue of personnel, use of protective clothing, deployment of radiological monitoring teams, and public information activities.
6. Arrangements for qualified observers.

6.1.2.1 Drills

Emergency drills are supervised instruction periods aimed at testing, developing and maintaining skills, and to ensure that adequate emergency response capabilities are maintained during the interval between evaluated exercises. Periodic drills will be conducted, in addition to the evaluated exercise as follows:

1. General: At least one drill shall be conducted during the interval between evaluated exercises involving a combination of some of the principal functional areas of the organization's onsite emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, protective action decision making, and plant system repair and corrective actions. During these drills, activation of all of the emergency response facilities (Technical Support Center (TSC), Operations Support Center (OSC), and the Emergency Operations Facility (EOF)) is not necessary. Participants have the opportunity to consider accident management strategies, supervised instruction is permitted, and participants have the opportunity to resolve problems (success paths) rather than have controllers intervene. The drills focus on onsite training objectives.

2. Communications Drills: A system to test the readiness of the communications network between the plant and state and county governments within the ten-mile EPZ and the NRC will be conducted monthly. Communications between the plant, federal emergency response organizations, and states within the 50-mile EPZ will be tested quarterly. Communications between the plant and state and local emergency operation centers and field assessment teams shall be conducted annually.

3. Fire Drills: Fire drills will be conducted in accordance with the Fire Protection Program.

4. Medical Emergency Drills: Medical emergency drills involving a simulated contaminated individual will be conducted annually. The actual off-site portions of these drills may be conducted once per calendar year.

5. Radiological Monitoring Drills: Radiological monitoring drills will be conducted annually. These drills will include collection of the appropriate sample media both on site and off site as the drill scenario requires.

6. In-Plant Radiation Protection Drills: Radiation protection drills, including response to and analysis of simulated elevated airborne and liquid samples and direct radiation measurements will be conducted semiannually. This may be held in conjunction with the Radiological Monitoring Drills.

7. Augmentation Drills: Augmentation Drills requiring travel to the site shall be conducted twice every calendar year.

8. SAMG drills: Severe Accident Management Guideline table-top and/or inter-facility mini-drills will be conducted periodically and will involve a combination of some of the principal functional areas of the organization's onsite emergency response capabilities similar to that described in General drills (6.1.2.1.1) above.

9. Each organization should make provisions to start a drill between 6:00 p.m. and 4:00 a.m.

The above drills will be evaluated by a drill evaluator (communication drills will not require an evaluator). The degree of participation by outside agencies in conducting these drills may vary and their action may actually be simulated. Any state or local government located within the plume exposure pathway EPZ will be allowed to participate in the drills when requested by such State or local government.

6.1.2.2 Exercises

An exercise is an event that tests the integrated capability of major response organizations. An emergency exercise will be conducted once every two calendar years and will be based on a scenario which is ultimately declared at least as a Site Area Emergency. The scenario will be varied from exercise to exercise such that all elements of the plant, county, and state plans and emergency organizations are tested within a 6-year period. The plant will demonstrate an emergency response to a Hostile Action at least once within a 6 year period. Once every six years, the exercise will be expanded to allow involvement of the federal response organizations in addition to the state and local organizations. Advance knowledge of the scenarios and the times of the exercises will be kept to a minimum to ensure a realistic participation by those involved.

Each exercise scenario will include a list of performance objectives and a description of the expected responses. Specific tasks to be evaluated are:

1. Condition recognition and reporting
2. Assessment
3. Off-site notification, including Progress Energy off-site personnel and protective action recommendations
4. Off-site response
5. Site response coordination, including logistics, center manning, information gathering and analysis, and coordination with off-site agencies
6. Corrective actions
7. Protective actions
8. Record keeping
9. Monitoring
10. Plant operation

Qualified evaluators from Progress Energy, federal, state, or local governments will observe and critique each exercise. A critique will be scheduled at the conclusion of each exercise to evaluate the ability of all participating organizations to respond. The critique will be held as soon as possible after the exercise. A formal written evaluation of the exercise will be prepared by the Emergency Planning Coordinator, or his designee, following the critique.

Exercise controllers, evaluators, and participants (if appropriate) will prepare written descriptions of the actions they observed and will comment as to how the part of the exercise they observed matched the performance criteria. The Emergency Planning Coordinator or his designee will determine the corrective actions necessary and the schedules for performing them and will evaluate the corrective actions taken.

Remedial exercises will be required if the emergency plan is not satisfactorily tested during the biennial exercise, such that NRC, in consultation with FEMA, cannot find reasonable assurance that adequate protective measures can be taken in the event of a radiological emergency. The extent of State and local participation in remedial exercises must be sufficient to show that appropriate corrective measures have been taken regarding the elements of the plan not properly tested in the previous exercises.

6.1.3 Emergency Planning Coordinator

The Supervisor - Emergency Preparedness is the Brunswick Emergency Planning Coordinator. He is responsible for coordinating on-site and off-site radiological emergency response planning. Specific responsibilities include the following:

1. Interfacing with federal, state, county, and local planners.

2. Revising and updating the Plan in response to new federal regulations, modifications identified during exercises and drills, and changes in hardware and personnel.

3. Coordinating the evaluated exercise and the periodic drills.

4. Identifying off-site training needs of state and local emergency support personnel and arranging for training to meet the identified needs.

5. Identifying corrective actions needed following an exercise, assigning responsibility for implementing these actions, specifying a schedule for completion of these actions, and evaluating the adequacy of the actions taken. These corrective actions can be tracked by means of the Corrective Action Program.

6. Maintaining and negotiating agreements with state and county response agencies, federal assistance agencies, and medical and fire support agencies.

6.1.4 Public Education

The North Carolina Department of Crime Control and Public Safety have overall responsibility for maintaining a continuing disaster preparedness public education program. Such a program, prepared by the State of North Carolina, with the cooperation of local governments and Progress Energy, is intended to ensure that members of the public are:

1. Aware of the potential threat of a radiological emergency;

2. Able to recognize radiological emergency notification; and

3. Knowledgeable of the proper, immediate actions (e.g., return to home, close windows, and tune to an Emergency Alert System station) to be taken.

A program of this type includes education on protective actions to be taken if shelter is prescribed, and the general procedures to follow if an evacuation is required. It also includes general educational information on radiation and how to learn more about emergency preparedness.

Additional information concerning public education can be found in Section 4.4.7.

6.2 REVIEW AND UPDATE OF THE PLAN AND IMPLEMENTATION PROCEDURES

The Plan and its implementation procedures are intended to provide for continuous emergency preparedness. In addition to the training, drills, and exercises, regular reviews and audits are performed. The reviews and audits are described in the following sections.

6.2.1 Plan Updates

The Emergency Planning Coordinator is responsible for coordinating the updating of the Plan and implementing procedures. He schedules an annual review of the Plan by the Plant Nuclear Safety Committee (see Section 6.4). Any proposed changes to the Plan due to regulatory revisions, experiences of drills and exercises, or other requirements are approved by the Supervisor - Emergency Preparedness. Approved changes to the Plan will be distributed to organizations and individuals with responsibility for implementation of the Plan. Phone listings in emergency procedures shall be updated quarterly, if required.

6.2.2 Independent Review

In addition to the reviews conducted at the plant, the Nuclear Oversight Section will conduct an independent review of the Plan either:

At intervals not to exceed 12 months or,

As necessary, based on an assessment by the licensee against performance indicators, and as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could adversely affect emergency preparedness, but no longer than 12 months after the change. In any case, all elements of the emergency preparedness program must be reviewed at least once every 24 months.

The review will include an evaluation for adequacy of interfaces with State and local governments and of drills, exercises, capabilities, and procedures. The results of the review, along with recommendations for improvements, will be documented, reported to the Corporate office and plant management, and retained for a period of five years. The part of the review involving the evaluation for adequacy of interface with the State and local governments will be made available to the appropriate State and local governments. Documentation of review results will be through the Corrective Action Program and/or meeting minutes. Corrective actions deemed necessary from the review will be implemented similar to the description in Section 6.1.3.5 of this Plan and the site Corrective Action Program.

6.2.3 Off-Site Agreements and Plans

Emergency response plans and agreements with supporting organizations will be reviewed and certified to be current on an annual basis and updated, if necessary. Changes will be incorporated in the annual revision of the Plan.

6.3 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT AND SUPPLIES

To ensure that equipment and supplies are maintained in a readiness state, periodic maintenance and inventories are performed as described in the following sections.

6.3.1 Emergency Equipment and Supplies

A listing of emergency equipment and supplies to be inventoried is included in 0PEP-04.6. This listing provides information on location and availability of emergency equipment and supplies.

An inventory of emergency equipment and supplies is held in accordance with 0PEP-04.6. During this inventory, radiation monitoring equipment is checked to verify that required calibration and location are in accordance with the inventory lists. Respiratory protection equipment, maintained for emergency purposes, is also inspected and inventoried.

6.3.2 Medical Equipment and Supplies

At least twice each year and after use in an emergency, the contents of emergency medical equipment and supplies located in the First Aid Office and other selected areas are to be inventoried, inspected, replaced, and replenished per 0PT-34.2.2, First Aid Supplies and Rescue Equipment Inspection/Inventory.

6.4 PLANT NUCLEAR SAFETY COMMITTEE

The Plant Nuclear Safety Committee (PNSC) is a standing committee comprised of Brunswick plant personnel that provides timely and continuing review of plant operations to assist the Plant General Manager in maintaining cognizance of plant activities, with particular emphasis on safety-related matters.

The PNSC reviews all changes to the plant, or its documentation that involve a License Amendment. In addition, the PNSC reviews plant operations to detect any potential safety hazards. Each plant supervisor will monitor the activities within their areas of responsibility to detect unsafe practices, trends, or hazards. Also, the PNSC investigates and reports on Technical Specification violations or other situations involving safety.

7.0 RECOVERY

7.1 GENERAL

Once the Site Emergency Coordinator has declared that the emergency condition has passed, steps will be taken to recover from the incident. The Emergency Response Manager will advise appropriate organizations that recovery activities are initiated and that the Recovery Organization as shown in Figure 7.2.1 will be assembled in the EOF. All recovery actions will be preplanned in order to minimize radiation exposure or other hazards to recovery personnel. Recovery activities are classified as described in Section 7.3.

The overall goals of the recovery effort are to assess the radiological consequences of the emergency and perform cleanup and repair operations necessary to restore normal access to the affected areas or identify and restrict access to those areas that must be controlled. This effort includes marshaling of the Corporate resources and interfacing with outside agencies.

7.2 RECOVERY ORGANIZATION

The recovery organization consists of the Recovery Manager, managers of support functions who are responsible to the Recovery Manager, and supporting personnel. This organization may be modified during the recovery process to better respond to the conditions at the plant. Recovery activities will be directed from the Recovery Center.

The Recovery Center at Brunswick will be established in the existing TSC/EOF/Training Building. Other site facilities may be made available as necessary, if required to support an extensive recovery effort.

Activation of the recovery organization will be initiated by the Vice President - Brunswick Nuclear Plant (or his alternate) after consultation with the Plant General Manager (or his alternate). The recovery organization will then be established at Brunswick to provide for recovery of the facility. The recovery organization may begin to develop plans for recovery of the facility while the emergency is still in progress. However, these efforts will not be permitted to interfere with or detract from the efforts to control the emergency situation. During the emergency phases of the incident, the recovery organization resources will be available to assist and provide support for the Site Emergency Coordinator. A block diagram of the typical recovery organization is presented in Figure 7.2-1.

7.2.1 Recovery Manager

The Recovery Manager is the senior position responsible for all on-site activities during the recovery phase following a radiological emergency. He is also responsible for providing the primary interface with State, local and Federal agencies including the coordination of Progress Energy resources during off-site recovery efforts. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.2.2 Plant General Manager

The Plant General Manager is responsible to the Recovery Manager for implementation of in-plant activities during the Recovery phase with the objective of maintaining a safe shutdown condition and controlling sources of radioactivity in the plant. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.2.3 Technical Analysis Manager

The Technical Analysis Manager is responsible to the Recovery Manager for technical support, specifically in the analysis and development of plans and procedures to support recovery activities and to maintain the affected unit in a safe shutdown condition in a manner which minimizes the effect on the health and safety of the public. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.2.4 Engineering Director

The Engineering Director is responsible to the Recovery Manager for directing and administratively controlling the Progress Energy Recovery Organization Engineering Staff while providing engineering, including civil, and design support to meet requirements of the recovery activities. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.2.5 Administrative and Logistics Manager

The Administrative and Logistics Manager, is responsible to the Recovery Manager for providing administrative, logistic, communications, and personnel support for recovery activities. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.2.6 Radiological Control Manager

The Radiological Control Manager is responsible to the Recovery Manager for providing radiation protection and waste disposal plans to support recovery activities. The specific responsibilities of this position are contained in 0PEP-02.7, Recovery.

7.3 RECOVERY PLANNING

For convenience in planning, the recovery activities can be classified as follows:

1. On-site recovery

2. Off-site recovery

7.4 ON-SITE RECOVERY ACTIVITIES

On-site recovery activities are performed in accordance with existing plant procedures. Radiation and contamination levels for determining the need for decontamination and for returning areas or items to normal use are included in these procedures. Additional procedures will be developed as appropriate on a case-by-case basis.

7.5 OFF-SITE RECOVERY ACTIVITIES

7.5.1 General

The Progress Energy Recovery Manager will coordinate with and assist off-site agencies in the recovery activities.

The State will be the lead organization for off-site recovery activities and put emergency regulations into effect to ensure that no food items in the contaminated area are consumed or put on the market without the required health physics monitoring, and to control access into contaminated areas. Authorization for reentry to off-site areas will be made by the senior elected official of the area concerned after consultation with the North Carolina Division of Radiation Protection.

7.5.2 Emergency Cleanup Operations

The most urgent tasks will be to clear (i.e., partially decontaminate) emergency paths to allow access to critical facilities and inhabited areas. These clearing operations will be necessary particularly to:

1. Allow health physics teams to survey the contaminated areas,

2. Allow farmers to provide emergency care for livestock that had to be left in contaminated areas or to assist them in moving the stock to uncontaminated areas.

3. Allow emergency operations of utilities and services (power, water, telephone, sewage treatment, etc.) during the cleanup operation, and

4. Allow decontamination teams to perform the emergency and priority decontamination tasks (these emergency tasks will consist primarily of fire-hosing pavements, plowing or scraping unpaved areas adjacent to roads, and spraying paint or asphalt to fix loose contamination in place).

5. Stabilize the contaminated areas so that the radioactive materials are not spread to other areas or leached into streams. In particular, if public roads run through the area, cleanup of the road will be required, and cleanup of the area to some distance from the road will be needed to minimize exposure to travelers.

After the main roads and utilities have been put back into service, the urgency of the cleanup tasks will drop. However, the population that was evacuated will be eager to return, and industrial operations that had to be shut down need to start up as soon as possible and business operations need to be resumed.

Some farmland may have to be removed from use, which would cause hardship primarily to the occupants. Thus, it may be feasible to permanently evacuate such areas and pay the owner the market value. Such a step would probably occur at contamination levels where future crops would not be marketable due to the uptake of long-lived isotopes (primarily strontium).

Some of the buildings and houses may be contaminated to such a high level that it is more economical to demolish them than to decontaminate them. Areas where this occurs can be kept vacated; in such cases, demolition and burial can be a routine task, and the work can be scheduled over a longer period of time. Decontamination of the agricultural land may or may not be feasible. Where it is feasible, the changes in agricultural operations that are required can be made on a routine basis.

7.5.3 Countermeasures*

Countermeasures will have serious impact on the economy of contaminated areas, so they must be applied judiciously. They must be no more restrictive than necessary; however, once determined, they will be applied quickly and equitably, and may consist of:

1. Reducing contamination on the surface of any fruits and vegetables that were in the field at the time of the accident by ensuring that the surfaces are washed, that the outer leaves of leafy vegetables are removed, and that more than normal preference is given to peeling.

2. Altering production, processing, or distribution practices that affect the movement of radioactive contamination through food chain and into the human body. This will include storage of some food (primarily milk products) and animal feed supplies to allow radioactive decay--particularly of Iodine 131.

3. Diverting affected products to uses other than human consumption.

* J. A. Auxier and R. O. Chester, eds., Report of the Clinch Valley Study, ORNL-4835 (January 1973).

4. Condemning food

5. Decontaminating farmland where practical.

6. Converting farmland to other uses for extended periods of time when decontamination is not practical.

7. Decontaminating industrial buildings, stores and shops, and residences and removing milk-producing cattle from the contaminated pastures should be priority items. The longer these activities are delayed, the greater will be the costs and consequently the claims.

7.5.4 Monitoring and Dose Assessment

The North Carolina Division of Radiation Protection (DRP), Department of Environment Health and Natural Resources, will be the lead agency in the collection and analysis of radiation monitoring reports and of environmental air, foliage, food, and water samples. The DRP will be assisted by qualified personnel from the BNP, and the General Electric Company Wilmington Manufacturing Division.

Total population exposure will be periodically determined through a variety of procedures including:

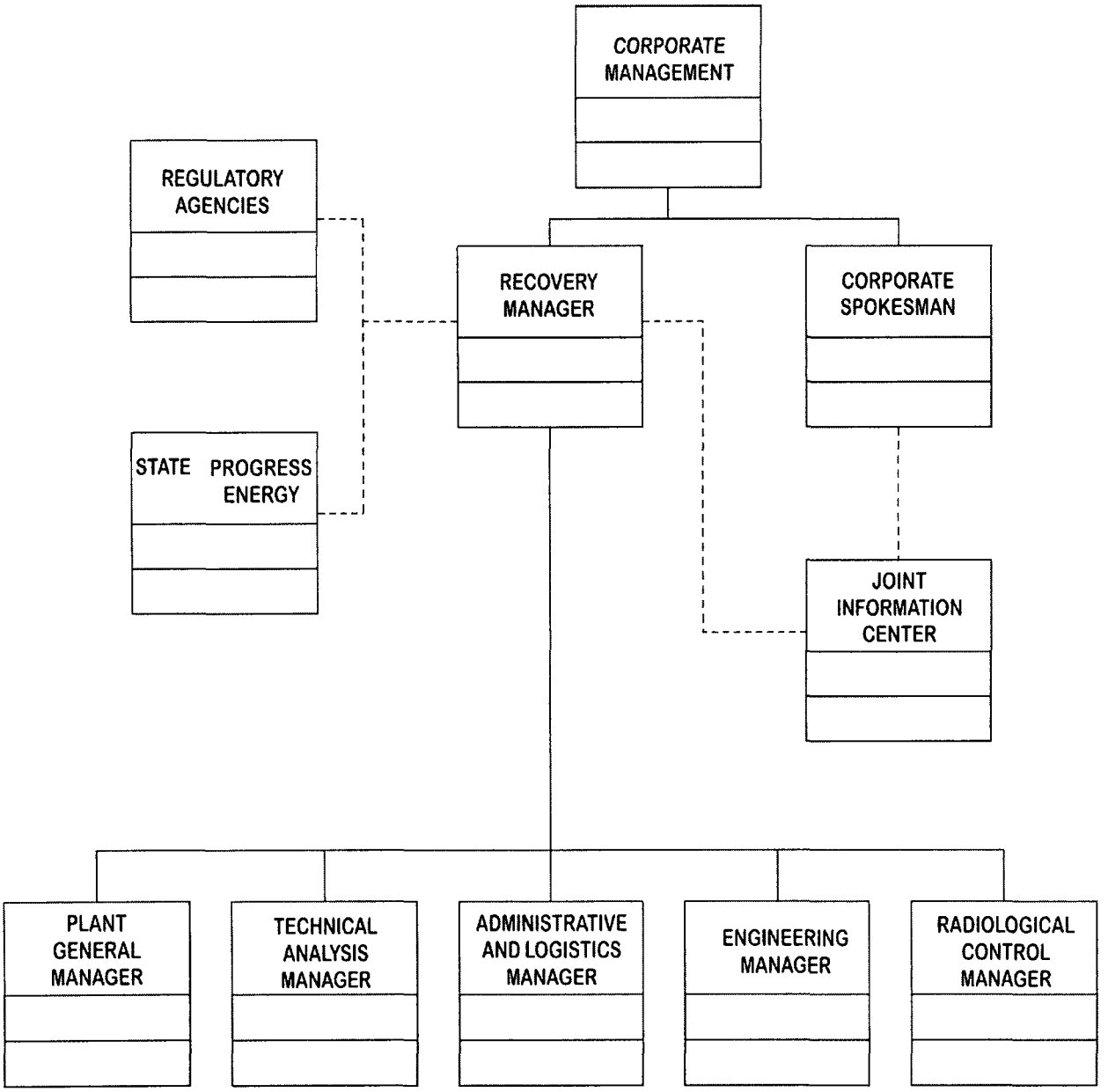
1. Examination of prepositioned TLDs.

2. Bioassay.

3. Estimates based on release rates and meteorology.

4. Estimates based on environmental monitoring of food, water, and ambient dose rates.

FIGURE 7.2.1
Progress Energy Recovery Organization
Page 1 of 1



8.0 REFERENCES

1. Brunswick Steam Electric Plant Operating Manual, Carolina Power & Light Company, (date varies by volume and by entry).

2. NGGM-PM-0002, Progress Energy Radiation Control and Protection Manual.

3. Updated Final Safety Analysis Report (FSAR), Progress Energy, Brunswick Steam Electric Plant Units 1 and 2.

4. Environmental and Fallout Gamma Radiation Protection Factors Provided By Vehicles, Health Physics, 26, Pg. 41-44, 1974.

5. EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, U. S. Environmental Protection Agency, May 1992.

6. Brunswick Nuclear Plant Development of Evacuation Time Estimates, May 6 2008.

7. North Carolina Emergency Response Plan in support of the Brunswick Steam Electric Plant.

8. NUREG-0654/FEMA-REP-I, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

9. U.S. Census Bureau data files for the year 2000.

10. NUREG-0737, Supplement 1, Clarification of TMI Action Plan Requirements.

11. NUREG/CR-1433, Examination of the Use of Potassium Iodide (KI) as an Emergency Protective Measure for Nuclear Reactor Accidents, March 1990.

12. Title 10, Code of Federal Regulations.
    a. Part 20, Standards for Protection Against Radiation.
    b. Part 50, Licensing of Production and Utilization Facilities.
    c. Part 50, Appendix E, Emergency Plans for Production and Utilization Facilities.
    d. Part 100, Reactor Site Criteria.
    e. Part 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High Level Radioactive Waste, and Reactor Related Greater than Cass C Waste.

13. NEI 91-04, Rev. 1, Severe Accident Issue Closure Guidelines.

14. Memo, Warren Dorman to PNSC, dated August 11, 1999 Subject Operations Shift Staffing.

15. Brunswick Steam Electric Plant, Units 1 and 2 - Issuance of Amendments No. 226 and 253, Elimination of Requirements for Post Accident Sampling System (Docket Nos. 50-325 and 50-324), February 11, 2003.

R 16

16. SOER 02-1, Severe Weather Rec. 3 (12/03/02).

17. NRC Bulletin 2005-02, Emergency Preparedness and Response Actions for Security Based Events, July 18, 2005.

18. Industry White Paper, Enhancements to EP Programs for Hostile Action, dated 11/15/05.

19. NEI 04-04 Revision 1, Cyber Security Program for Power Reactors.

20. NUREG/CR-6847, Cyber Security Self-Assessment Method for U.S. Nuclear Power Plants.

21. BNP Cyber Security Assessment – 177254.

22. Engineering Change EC65949, Installation of the Sodium Hypochlorite Injection System.

23. NEI 99-01 Revision 5, Methodology for Development of Emergency Action Levels, February 2008.

24. NRC Letter Dated November 6, 2009 Subject: Brunswick Steam Electric Plant, Units 1 And 2 -Revision to Emergency Action Levels (Tac Nos. Me0117 and Me0118). Which includes, Safety Evaluation By The Office Of Nuclear Reactor Regulation Proposed Revisions To Emergency Action Levels Carolina Power & Light Company Brunswick Steam Electric Plant, Units 1 And 2 DOCKET NOS. 50-325 AND 50-324.

25. NRC Letter 09-0198, Dated 12/24/2009, Subject: Brunswick Steam Electric Plant, Units 1 and 2 –Proposed Changes to the Emergency Planning Zones of the Emergency Response Plan (TAC NOS. ME1640 AND ME1641).

26. CP&L Letter, "Response to Request for Additional Information Regarding Emergency Response Plan Revision – Modification of the Emergency Planning Zones," dated November 11, 2009 (ADAMS Accession No. ML093220067).

27. NUH-003, Final Safety Analysis Report for the Standardized NUHOMS Horizontal Modular Storage System for Irradiated Nuclear Fuel, Amendment 10, December 2006.

28. NRC Regulatory Issue Summary 2009-13, Emergency Response Data System Upgrade from Modem to Virtual Private Network Appliance. September 28, 2009.

29. On-Shift Staffing Analysis for Brunswick Nuclear Plant, December, 2012. (PRR 00527296)

30. Letter from Conrad S. Burnside (Federal Emergency Management Agency) to Carolina Power & Light Company regarding provisions for Emergency Plan Backup Alert and Notification, dated November 28, 2012. (Serial Number, FED 12-0001.)

A.0 INTRODUCTION

Communications systems are designed to facilitate emergency communications within the Brunswick Plant and between Brunswick and emergency facilities. Redundant means of communication are provided to locations which provide a vital emergency response role.

A.1 PLANT COMMUNICATION SYSTEMS

A.1.1 Public Address System

The Brunswick Plant public address system provides paging and party line communications between stations located throughout the plant. Inside and outside type wall and desk-mounted stations are used to communicate between roaming personnel and fixed work locations. Plant-wide instructions are issued using the paging feature. This system is powered from the plant uninterruptible power supply which employs battery reserve as well as diesel generator emergency supply.

A.1.2 PBX Telephone System

The Brunswick Site PBX telephone system provides communication capability between telephone stations located within the plant by dialing the four-digit telephone station code. The PBX telephone system also provides for outside communications as discussed in Sections A.2.1 and A.2.2.

A.1.3 Sound Powered Telephone System

The sound powered telephone system is a communications system which uses the mechanical energy in the human voice to generate electrical pulses to power the system. It requires no outside source of power and is therefore very reliable. The system consists of phone jacks, wiring, and the sound-powered handsets. There is no separation in the circuits. A handset plugged into a jack is connected to all other handsets plugged into that circuit. Additional temporary circuits may be easily set up by attaching phone jacks to any unused cable between any points requiring sound-powered communications. Sound powered phone jacks are provided on selected instrument racks. Switch panels are provided in the control room to cross-tie any circuit with any other circuit providing sound-powered phone communications between several plant areas.

A.1.4 Brunswick Emergency Telephone and Radio System

The Brunswick Site emergency telephone system consists of dedicated telephone lines between emergency facilities at the Brunswick Plant through a switch which is provided with a primary and secondary source of power. Radio communications with mobile and portable units reserved for an emergency is possible through a repeater on a Progress Energy-assigned frequency as well as a local (UHF) short-distance frequency. A primary and secondary source of power is provided for fixed radio equipment, with mobiles and portables powered by battery.

A.1.5 Plant Security Communications

A portable radio communication system for plant use is available. Specific channel assignments are designated for security force use.

A.1.6 Emergency Response Facility Information System (ERFIS)

During an emergency, this system provides information for each unit on a Video Display Terminal simultaneously in the control room, the Technical Support Center, and the Emergency Operations Facility. The data may also be printed out in hard- copy form. Primary and secondary power sources are supplied to this system.

A.1.7 Satellite Telephone Communications

The Mitsubishi ST251 (OmniQuest) Mobile Terminal (MT) is a satellite based portable communications system and can utilize a fixed or portable antenna and AC, DC, or battery power supplies. The MT can be used in either of two modes. Using the handset, the MT operates similarly to a cellular telephone. Using the Push to Talk (PTT) microphone, the MT operates similar to a conventional trunked radio system using Net Radio Service. North Carolina Emergency Management has talk groups set up with Net Radio Service known as the Statewide Emergency Communication Network (SECN) that are used for both routine and emergency communications.

A.2 OFF-SITE COMMUNICATIONS SYSTEMS

A.2.1 Corporate Telephone Communications System (Voicenet)

Interconnected through the site PBX and the emergency telephone system, the corporate telephone system provides a means to communicate with other corporate locations with which the plant has a need to communicate. Corporate transmission facilities provide fiber optic, copper-wire, and microwave radio to ensure a high degree of system reliability. In addition to the redundancy provided by the three system options, backup power is provided for the systems.

A.2.2 Commercial Phone Lines

Commercial telephone lines, which supply public telephone communications, are employed by Progress Energy in three ways: (1) tie-ins through the PBX to any other plant location, (2) lines to plant emergency facilities, and (3) lines to the Joint Information Center for public information purposes. AT&T provides primary and secondary power for their lines at the Central Office.

A.2.3 Dedicated Telephone System to Load Dispatcher

This system provides direct links between the Control Room and the load dispatcher. Transmission facilities are microwave radio. These lines appear on several phones in the Control Room and are selected by pushing the appropriate button on a multibutton phone. The lines are automatically rung at the load dispatcher identifying Brunswick as the caller. Primary and secondary power is supplied at both ends.

A.2.4 Emergency Communications Network

The Emergency Communications Network is a system, separate from other communications systems, which provides back-up dedicated telephone facilities between emergency response centers. The purpose of these facilities is to ensure priority communications at any time from Brunswick Plant to emergency response personnel at the federal, state, local governments, and other Progress Energy facilities, and General Electric Company.

A.2.5 Plant Security

A plant security radio control station provides for radio communications to local law enforcement agencies (LLEA). Primary and secondary power is supplied.

A.2.6 Corporate Informational Data Communications

Large central computers are located at the Corporate headquarters. Smaller special purpose computers are located at other Corporate facilities, including the Brunswick Plant. The communications link between the Brunswick Plant and Corporate headquarters allows the interchange, storage, and processing of information.

A.2.7 NRC Emergency Telecommunications System

The NRC uses a Progress Energy telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Progress Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the Brunswick Control Room, Technical Support Center, and Emergency Operations Facility. There are also telephones connected to this system for use by Health Physics personnel. Primary and secondary sources of power are supplied.

APPENDIX B
AGREEMENTS

NOTE:	Existing agreements are included for this submittal. These agreements will be revised as required to be consistent with this revision of the Plan.

City of Southport
201 East Moore Street
Southport, North Carolina 28461

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges the City of Southport and Southport Fire Department's (hereafter identified as Fire Department) understanding and agreement to provide assistance in the event of an accident or emergency at the Brunswick Nuclear Plant. Specifically, we agree to be familiar with the Brunswick Emergency Plan and understand that:

1. Either party may terminate this agreement at any time upon six months written notice to the other party.

2. The Fire Department should be available to fight fires at the Brunswick Plant upon request by Progress Energy, including fires where radioactivity may be present. However, in any situation where radioactivity may be present, the BNP Shift Incident Commander shall first consult with the Chief Officer of the Southport Fire Department concerning the situation before sending any of the Fire Department into an area where radioactivity may be present. After consultation the Chief Officer of the Fire Department will comply with the Brunswick Shift Incident Commander's request and should issue the command to his personnel with respect to his department's safety.

3. In the event that the Fire Department is unavailable to respond to Progress Energy's request due to other calls or fire fighting activities, it will incur no liability to Progress Energy for failure to respond to said call.

4. The Fire Department will be under the direction of the BNP Shift Incident Commander who should issue commands to the personnel of the Fire Department through its Chief Officer. Should it be necessary for more than one Fire Company to assist in the fighting of a fire at BNP, the Fire Department will assume responsibility as the lead fire company.

5. In the event of possible radioactive contamination of the Fire Department personnel and/or equipment, qualified Progress Energy personnel will provide Fire Department personnel with appropriate monitoring or protective devices prior to engaging said personnel in a radioactive situation to ensure that the radiation level is not unreasonably dangerous.

6. In the event of a chemical fire at BNP, proper clothing will be provided by Progress Energy to Fire Department personnel prior to engagement in fire fighting.

7. Progress Energy shall provide the Fire Department personnel with all necessary instructions and training to enable the Fire Department personnel to engage in fire fighting at BNP. Fire Department personnel agree to participate in said training and in training exercises and drills. In addition, Progress Energy shall not request Fire Department personnel to engage in fighting of a chemical fire or in a fire where radioactivity may be present prior to any additional instruction or training of Fire Department personnel necessary to qualify them to engage in such activities. Both Progress Energy and the Fire Department personnel should cooperate with each other in arranging for the instruction and training of the Fire Department personnel necessary to qualify them to engage in such activities. Both Progress Energy and the Fire Department personnel should cooperate with each other in arranging for instruction and training exercises.

8. Any contaminated articles belonging to the Fire Department or its personnel, including fire trucks, will be adequately decontaminated or replaced by Progress Energy at its own expense as expeditiously as possible.

9. Progress Energy shall be liable to the Fire Department personnel for any radiation injury sustained by said personnel at BNP and shall provide nuclear insurance to cover the Fire Department personnel while engaged in fire fighting at BNP.

10. Progress Energy shall retain the right to periodically inspect, calibrate, and ensure operability of any equipment that may be furnished the Fire Department in order to enhance the performance of the support functions.

11. The Fire Department should furnish and make available to the Fire Department personnel a procedure manual for assisting the BNP Fire Brigade.

12. As compensation for services provided herein by the Fire Department, Progress Energy should pay to the City of Southport the sum of $15,000 per year payable on or before December 31, 2012, and each year thereafter.

13. Progress Energy will pay the City of Southport the sum of $90.00 per hour for each asset (ambulance, fire truck) used during training.

Sincerely,

Robert D. Howard — Date: 2/28/12
City of Southport Mayor

Gregg Cumbee — Date: 2/28/12
City of Southport Fire Chief

James R. Forstner, M.D.
4654 Long Beach Road
Southport, North Carolina 28461

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges that I, James R. Forstner, M.D., understand and agree to provide medical supervision and care for employees of the Brunswick Nuclear Plant as requested by responsible plant management personnel.

I am familiar with the Brunswick Emergency Plan and appropriate implementing procedures and understand that injuries might involve ionizing radiation.

I will provide said medical supervision and treatment within the limitations of my training.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Sincerely,

James R. Forstner, M.D.

11/23/12
Date

Peter D Almirall, M.D.
8715 E. Oak Island Drive
Oak Island, North Carolina 28465

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges that I, Peter D. Almirall, M.D., understand and agree to provide medical supervision and care for employees of the Brunswick Nuclear Plant as requested by responsible plant management personnel.

I am familiar with the Brunswick Emergency Plan and appropriate implementing procedures and understand that injuries might involve ionizing radiation.

I will provide said medical supervision and treatment within the limitations of my training.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Sincerely,

Peter D. Almirall, M.D.

1-23-2012
Date

DOSHER
Memorial Hospital

924 N. Howe Street
Southport, NC 28461
(910) 457-3800
fax (910) 457-3908
www.dosher.org

January 23, 2012

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Project
P.O. Box 10429
Southport, NC 28461-0429

Dear Mr. Crocker:

This letter acknowledges the J. Arthur Dosher Memorial Hospital's understanding of, and agreement with, actions to be taken in the event of an accident or emergency at the Brunswick Nuclear Project (BNP). Specifically, we are familiar with the BNP Emergency Plan and understand that:

1. A specially designed radiological emergency area will be maintained in state of readiness for use in the event that an accident or injury complicated by possible radiation exposure occurs to your employees. The Dosher Memorial Hospital will admit a patient from the specially designated area for further care if recommended by the supervising physician.
2. In the event of a serious radiation accident, the Hospital will assist the transfer of patients to the New Hanover Regional Medical Center in Wilmington for further treatment.
3. A Progress Energy representative will be responsible for decontamination of the equipment that is used in treating/decontaminating the person(s) and will replace all hospital equipment that cannot be decontaminated.
4. Adequate instruction of the Medical Staff to maintain familiarity with the procedure will be provided by Progress Energy.
5. Disposable articles, such as hats, masks, gowns, and floor coverings, will be provided by and disposed of by Progress Energy.

Copies of the Hospital's Plan and Procedures for the care and treatment of radiologically injured and contaminated patients are kept readily available for use by Hospital employees who will direct the necessary actions.

This memorandum of agreement will remain in effect until one of the parties terminates the agreement in writing.

Sincerely,

Edgar Haywood, III
President/Chief Executive Officer
J. Arthur Dosher Memorial Hospital

City of Southport
201 East Moore Street
Southport, North Carolina 28461

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges the Southport Rescue Squad understands and agrees to provide medical assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we are familiar with the Brunswick Emergency Plan and understand that:

1. We may be required to transport a patient who is radioactively contaminated.
2. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Southport Rescue Squad personnel with appropriate monitoring or protective devices.
3. Adequate instructions will be provided by Progress Energy to the Southport Rescue Squad staff to maintain familiarity with the necessary procedures.
4. Any contaminated articles belonging to the Southport Rescue Squad, including the ambulance, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible.
5. Either party may terminate this agreement at any time upon six months written notice to the other party.

Copies of the Southport Rescue Squad's procedures for assisting Progress Energy personnel are kept readily available for use by the Southport Rescue Squad personnel

Sincerely,

Neal Sage — 2/24/2012
Neal Sage — Date
Chief City of Southport Rescue Squad

Regina Waldman — 2/24/2012
Regina W. Alexander — Date
Interim City Manager City of Southport

JMK/JMK

Yaupon Beach Volunteer Fire Department
8500 East Oak Island Drive
Oak Island, North Carolina 28465

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 2846-0429

Dear Mr. Crocker,

This letter acknowledges the Yaupon Beach Volunteer Fire Department's understanding and agreement to provide assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we agree to be familiar with the Brunswick Emergency Plan and understand that:

1. Yaupon Beach Volunteer Fire department will be available to fight fires where radioactivity may be present.

2. Should it be necessary for more than one fire department to assist in the fighting of a fire at Brunswick, the Southport Fire department will assume responsibility as lead fire company under the direction of the Brunswick Site Incident Commander.

3. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Yaupon Beach Volunteer Fire department personnel with appropriate monitoring or protective devices

4. Adequate instruction of the Yaupon Beach Volunteer Fire Department staff to maintain familiarity with the necessary procedures will be provided by Progress Energy.

5. Any contaminated articles belonging to the Yaupon Beach Volunteer Fire Department, including the fire truck, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Sincerely,

James C. Criscoe — 3/4/12
James C. Criscoe — Date
Fire Chief
Yaupon Beach Volunteer Fire Department

Boiling Spring Lakes Fire Department
PO Box# 10718
Southport, North Carolina 28461

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges the Boiling Spring Lakes Fire Department's understanding and agreement to provide assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we agree to be familiar with the Brunswick Emergency Plan and understand that:

1. Members of the Boiling Spring Lakes Volunteer Fire Department may be requested to fight fires where radioactivity may be present.

2. Should it be necessary for more than one fire department to assist in the fighting of a fire at Brunswick, the Southport Fire Department will assume responsibility as lead fire company under the direction of the Brunswick Site Incident Commander.

3. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Boiling Spring Lakes Fire Department personnel with appropriate monitoring or protective devices.

4. Adequate instruction of the Boiling Spring Lakes Fire Department staff to maintain familiarity with the necessary procedures will be provided by Progress Energy.

5. Any contaminated articles belonging to the Boiling Spring Lakes Fire Department, including fire apparatus, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Sincerely,

Chris Grace, Sr.
Fire Chief
Boiling Spring Lakes Fire Department

3/5/2012
Date

New Hanover
Regional Medical Center

January 27, 2012

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0426

Dear Mr. Crocker:

This letter is to renew the agreement Brunswick Nuclear Plant (BNP) and New Hanover Regional Medical Center and New Hanover Regional Emergency Medical Services. This agreement will remain in effect until one of the parties terminates the agreement in writing. We agree that:

1. J. Arthur Dosher Memorial Hospital is the primary hospital to assist BNP in the event of an accident or medical emergency causing injury/illness to your employees. This letter acknowledges that New Hanover Regional Medical Center (NHRMC) and Cape Fear Campus are available to treat your employees who may become injured and/or contaminated with radioactive and/or other hazardous materials and are transported to the hospital(s). It is requested the New Hanover Regional Medical Center, main campus on 17th Street, be utilized as the primary hospital treatment site. A specifically designated radiological decontamination area will be maintained in a state of readiness. NHRMC will hospitalize persons for further care if recommended by the physician in attendance.

2. A Progress Energy trained representative will be responsible for the decontamination of equipment that is used in treating/decontaminating the person(s) and will expeditiously replace all hospital equipment that cannot be decontaminated.

Copies of your emergency response plan are maintained in the Command Center at New Hanover Regional Medical Center. As previously agreed, please send all updates to these plans to the Safety Office.

If you have questions or need further assistance please contact Mark Bennett, Manager, Hospital & Regional Disaster Operations.

Sincerely,

Edwin J. Ollie
Executive Vice President and CFO

cc: Mark Bennett, Manager, Hospital & Regional Disaster Operations
David Bellegante, Director of Facilities
Terry McDowell, Administrator Emergency Services
Christy Spivey, Director Trauma Services
Fiscal Services – Contract File

Oak Island Fire/EMS
4601 East Oak Island Drive
Oak Island, North Carolina 28465

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker.

This letter acknowledges the Oak Island Fire/EMS's understanding and agreement to provide assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we agree to be familiar with the Brunswick Emergency Plan and understand that:

1. Oak Island Fire/EMS will be available to fight fires where radioactivity may be present.

2. Should it be necessary for more than one fire department to assist in the fighting of a fire at Brunswick, the Southport Fire Department will assume responsibility as lead fire company under the direction of the Brunswick Site Incident Commander.

3. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Oak Island Fire/EMS personnel with appropriate monitoring or protective devices.

4. Adequate instruction of the Oak Island Fire/EMS staff to maintain familiarity with the necessary procedures will be provided by Progress Energy.

5. Any contaminated articles belonging to Oak Island Fire/EMS, including the fire truck, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated

Sincerely,

Craig Forlines — 3-2-12

Craig Forlines
Chief Oak Island Fire/EMS

Date

Brunswick County EMS
P. O. Box 249
Boliva, North Carolina 28422

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges the Brunswick County Emergency Medical Service understands and agrees to provide medical assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we are familiar with the Brunswick Emergency Plan and understand that:

1. We may be required to transport a patient who is radioactively contaminated.

2. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Brunswick County EMS personnel with appropriate monitoring or protective devices.

3. Adequate instructions will be provided by Progress Energy to the Brunswick County EMS staff to maintain familiarity with the necessary procedures.

4. Any contaminated articles belonging to the Brunswick County EMS, including the ambulance, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible.

Copies of the Brunswick County EMS procedures for assisting Progress Energy personnel are kept readily available for use by the Brunswick County EMS personnel.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Anthony Marzano
Emergency Management Director
Brunswick County, North Carolina

1/15/12
Date

Sunny Point Fire Department
Military Ocean Terminal - Sunny Point
Southport, North Carolina 28461

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges the Sunny Point Fire Department/EMS's understanding and agreement to provide assistance in the event of an emergency at the Brunswick Nuclear Plant. Specifically, we agree to be familiar with the Brunswick Emergency Plan and understand that:

1. Sunny Point Fire Department, if available, will provide support to fight fires where radioactivity may be present as requested by the Southport Fire Department for assistance.

2. Should it be necessary for more than one fire department to assist in the fighting of a fire at Brunswick, the Southport Fire Department will assume responsibility as lead fire company under the direction of the Brunswick Site Incident Commander.

3. If requested by the Southport Fire Department, the Sunny Point Fire Department will provide a 118' aerial apparatus for use in elevated sprays and cooling operations.

4. We may be required to transport a patient who is radioactively contaminated.

5. In the event of possible radioactive contamination, qualified Progress Energy personnel will provide Sunny Point Fire Department/EMS personnel with appropriate monitoring or protective devices.

6. Adequate instruction of the Sunny Point Fire Department/EMS staff to maintain familiarity with the necessary procedures will be provided by Progress Energy.

7. Any contaminated articles belonging to the Sunny Point Fire Department/EMS, including the fire truck and ambulance, will be adequately decontaminated or replaced by Progress Energy as expeditiously as possible.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Sincerely,

Michael Scott
Chief Sunny Point Fire Department

3/5/12
Date

50 College Road NE Bolivia
Supply, NC 28462-0030

Brunswick County Office of Emergency Management
PO Box 9
Bolivia, NC 28422

Progress Energy
Brunswick Nuclear Plant
PO Box 10429
Southport, NC 28461-0429

January 6, 2010

LETTER OF AGREEMENT

The Joint Information Center is a central location used by various emergency agencies to coordinate information to the public and the press in the event of an emergency at the Brunswick Nuclear Plant. The Joint Information Center is staffed by Progress Energy, the State of North Carolina, Brunswick and New Hanover County Emergency Management, the Nuclear Regulatory Commission, and the Federal Emergency Management Agency, as well as other emergency agencies.

This letter delineates the understanding and agreement of Brunswick Community College, Brunswick County, and Progress Energy to provide assistance during drills or exercises and in the event of an accident or emergency at the Brunswick Nuclear Plant requiring activation of the Joint Information Center (hereafter identified as the JIC).

For consideration of the mutual promises stated below, Brunswick Community College (hereafter identified as BCC), Brunswick County Emergency Management, and Progress Energy Brunswick Nuclear Plant (hereafter identified as Progress Energy) agree as follows:

1. BCC shall allow the use of the college facilities and furniture for the JIC. During an emergency, BCC shall allow the use of any facilities needed to meet the needs of the JIC. The primary locations needed for the JIC (for drills or exercises) shall be the Administration Building Teaching Auditorium, and the back entrance to the building; Building "D" North Lobby Entrance and Classrooms 102, 120, 121. The layout for the JIC can be found on the attached drawings.

2. Agencies using the JIC and not affiliated with BCC shall carry their own insurance coverage at an adequate level or provide evidence of self-insurance that is acceptable to BCC.

3. Progress Energy shall assume liability for negligent damage to college property or personal injury due to negligence in connection with the use of the JIC.

4. No liability shall be assumed by the BCC Board of Trustees or faculty/staff, individually or collectively, for personal or property injury or loss suffered by reason of using college property.

5. BCC shall provide secure storage areas for JIC equipment needed for a rapid setup of the JIC. Progress Energy agrees to pay all reasonable expenses for installation of cabinets for said equipment.

6. Progress Energy shall provide all telephone equipment needed for Building "D" Classrooms 102,120, 121, and for the Teaching Auditorium in Building "A", as well as all reasonable telephone installation fees and monthly service charges in connection with JIC telephone services. BCC agrees to allow telephone switching equipment needed for the JIC to be placed in the telephone equipment room and shall allow telephone service to be wired into the primary JIC locations listed above.

7. Progress Energy shall provide electronic equipment (computers, fax machines, small copy machines, etc,) needed for the JIC. BCC equipment may be used but is not guaranteed to be available or in working order. BCC shall allow use of tables, chairs, lighting, heating and cooling, etc., as needed for the JIC. BCC shall allow Progress Energy the use of any large copy machines owned or leased by BCC for use by the JIC in drills and emergencies.

8. BCC may allow Progress Energy to use radio equipment available to the Campus Security in order to provide a backup communications link with the Progress Energy Brunswick Plant, if available.

9. Progress Energy shall provide Visitor Parking identification to personnel in the JIC to assist BCC with parking control.

10. BCC agrees to provide campus police coverage during drills and exercises if available. BCC agrees to allow Brunswick County Sheriff's Department personnel and the North Carolina Highway Patrol to assist BCC Security personnel with access control to the college during an emergency that requires activation of the JIC.

11. In the event of an emergency requiring the activation of the JIC, BCC shall provide what manpower is available to help set up the JIC in as short a time as possible.

12. BCC agrees to provide cafeteria services for the JIC during normal college hours and to bill Progress Energy for the reasonable cost of services provided. In an emergency, food service shall be provided as best as possible by BCC depending on the nature of the event. In an emergency, if BCC is unable to provide food services, BCC shall allow the cafeteria area to be freely used by the JIC and shall not hinder other vendors from providing food services.

13. BCC agrees to provide maintenance and/or janitorial services for the JIC following use.

14. Reasonable costs incurred by BCC in connection with the JIC for labor provided by employees of the college or personnel associated with the college may be billed to the Progress Energy Brunswick Plant Emergency Preparedness Unit.

15. BCC agrees that Progress Energy shall not be charged for the use of these facilities in support of Brunswick County Emergency Management. Regularly scheduled drills and exercise dates and times shall be provided to BCC as far in advance as possible. This will allow the primary locations to be placed on the college schedule to minimize conflicts with normally scheduled college classes.

16. This agreement may not be altered or amended except by a written instrument signed by all parties hereto.

17. This agreement shall remain in place until either party gives a one year notice in writing to the other party that the agreement will be terminated. It is expected that this agreement shall be effective until the Nuclear Regulatory Commission license for the Brunswick Plant expires.

Progress Energy
Supervisor Emergency Preparedness – Brunswick Nuclear Plant

Brunswick Community College
President

Brunswick County
County Manager

Brunswick County
Emergency Management Director

Reviewed 02/06/2012

Mr. Anthony Marzano
Brunswick County Emergency Management
3325 Old Ocean Highway
PO Box#9
Bolivia, North Carolina, 28422

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Memorandum of Understanding Concerning Use of the Brunswick County EOC Complex for an Alternate Emergency Facility

Dear Mr. Marzano:

In response to recent terrorist events, the Nuclear Regulatory Commission and Brunswick Nuclear Plant Emergency Preparedness Organization identified a need to establish an Alternate Emergency Facility that is remote from the plant site. The purpose of this memorandum is to document an agreement with you to allow our use of County-approved locations inside the Brunswick County EOC Complex for this purpose.

If needed, we plan to assemble selected members of our Technical Support Center, Operations Support Center, and Emergency Operations Facility at your facility in the Garage Area and Conference Room 113. Brunswick Plant personnel will require access during normal daytime hours and off-hours, using their Progress Energy ID badges. Brunswick County 911 personnel will allow entry of personnel after hours. Personnel will require use of the Garage Area of the EOC Complex as an assembly location, and selected personnel will set up and use Conference Room 113 as the Alternate Emergency Facility. They will use basic county-owned equipment in the Conference Room and specialized equipment which has been installed by Progress Energy, including additional supplies located in a storage closet. Note: Activation of our facility will not require relocation of your EOC staff.

Additionally, we intend to periodically use the facility for drill purposes and will coordinate our drill schedule with you in advance.

This agreement shall remain in place until notice in writing by either party that the agreement will be terminated.

Kent Crocker — 02/06/2012
Kent Crocker — Date
Supervisor Emergency Preparedness
Brunswick Steam Electric Plant Unit Nos. 1 and 2

1/15/12
Anthony Marzano — Date
Emergency Management Director
Brunswick County, North Carolina

INPO®

Institute of
Nuclear Power
Operations

Suite 100
700 Galleria Parkway, SE
Atlanta, GA 30339-5943
770-644-8000
FAX 770-644-8549

October 30, 2012

Dear Ladies and Gentlemen:

This letter certifies that the plant emergency assistance agreement between INPO and its member utilities remains in effect. In the event of an emergency at your utility, INPO will assist you in acquiring the help of other organizations in the industry, as described in Section 1 of the Emergency Resources Manual, INPO 03-001, and in the United States Nuclear Industry Response Framework. If requested, INPO will provide the following assistance:

- coordinate technical information flow from the affected utility to the nuclear industry and government agencies
- coordinate the procurement and shipping of equipment and supplies
- locate personnel with technical expertise
- facilitate industry vendor and commercial supplier support
- obtain technical information and industry operating experience regarding plant components and systems
- provide an INPO liaison to facilitate interface

This agreement will remain in effect until terminated in writing. Should you have any questions, please call Steve Meng at (770) 644-8548 or e-mail at MengSW@inpo.org.

Sincerely,

Jeffrey T. Gasser
Vice President
Emergency Response

JTG:cjm

MUTUAL SUPPORT AGREEMENT CERTIFICATION

The State of North Carolina will use this Plan in response to an incident at one of the Nuclear Power facilities affecting North Carolina. In combination with associated individual County plans and procedures this plan establishes an off-site emergency operations framework to provide for integrating the State's response with that of other governmental jurisdictions and response organizations plans.

State of North Carolina

Date: 3/26/12
REUBEN F. YOUNG, Secretary
Department of Public Safety

Date: 3-22-12
H. DOUGLAS HOELL, JR., Director
Division of Emergency Management

Duke Energy

Date: 2/9/12
DHIAA JAMIL
Chief Nuclear Officer

Date: 2/6/12
MICHAEL AUSTIN
Corporate Emergency Preparedness

Progress Energy

Date: 1/9/12
JAMES SCAROLA
Chief Nuclear Officer

Date: 1/9/12
JOHN STEPHENSON
Corporate Emergency Preparedness

MEMORANDUM OF UNDERSTANDING BETWEEN
BRUNSWICK COUNTY EMERGENCY SERVICES &
PROGRESS ENERGY BRUNSWICK NUCLEAR PLANT

Introduction

Brunswick County Emergency Services provides for county-wide emergency response communications through central dispatch of emergency service provider agencies, coordination of emergency communications protocols, and operation of a county-wide emergency radio communications system. In order to enhance the County's capability to respond to incidents involving complex communications challenges, BCES intends to partner with Progress Energy Brunswick Nuclear Plant to expand and enhance communications interoperability.

Conditions of Agreement

Brunswick County Emergency Services (BCES) agrees as follows:

1. To develop and maintain a mobile communications vehicle capability for use when required to provide mobile communications interoperability.
2. Make the vehicle available for emergency response and mutual aid as requested by Progress Energy Brunswick Nuclear Plant.
3. Deploy the vehicle when requested based on the following hierarchy:

Priority 1	Classified emergencies at the Brunswick Nuclear Plant
Priority 2	Major emergencies or disasters within Brunswick County
Priority 3	Other agency emergencies pursuant to a mutual aid request
Priority 4	BNP training and exercises
Priority 5	Other local training and exercises

4. Allow the vehicle(s) to be operated only by official, trained personnel who are employed or designated by BCES as being qualified to staff and operate the vehicle. At least one such qualified staff member shall be deployed with the vehicle any time it is requested to ensure proper operation of the vehicle.
5. Conduct appropriate and effective preventative maintenance, keep the vehicle(s) in good operating condition at all times, and keep the vehicle locked in a secure location and out of the weather when not in active use.
6. Participate in monthly system tests to ensure the operability of electronic and communications equipment provided, and file reports that document the results of said tests.

Progress Energy Brunswick Nuclear Plant (BNP) agrees as follows:

1. To provide certain technologies for use on Brunswick County's mobile communications vehicle, including but not necessarily limited to:
   a. A Raytheon ACU-2000 interoperability system
   b. Radio communications equipment for interface with the ACU-2000 and Progress Energy BNP on-site radio systems

Duration

1. This Memorandum of Understanding is in effect as long as the vehicle(s) is in good working order or until one or both of the parties terminates participation.
2. Either party wishing to terminate this agreement may do so with sixty (60) days written notice to the other.
3. Upon receipt of such notice of termination and within the 60 day written notice period, BCES shall return any Progress Energy BNP equipment supplied for use on the mobile communications vehicle and indicated in the notice of termination.

Dispatch and Area of Service

1. The mobile communications vehicle provided, as described on Attachment A, is intended to provide coverage to Brunswick County North Carolina.
2. Emergency requests for vehicle deployment should be made to the Brunswick County Communications Center via 911 or at 910-253-7490 (24 hours a day).
3. Non-emergency requests for vehicle deployment (for training or exercises) should be made in writing (electronic mail preferred) to BCES. 21 day advance written notice is requested for participation in training or exercises, to allow for scheduling of resources and personnel.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals to this Memorandum as of the dates indicated below.

For Brunswick County Emergency Services:	For Progress Energy Brunswick Nuclear Plant:
1/15/12	
Signature	Signature
Anthony Mazzano	Kent Crocton
Name	Name
1/27/11	01-05-2011
Date	Date

New Hanover County Department of Emergency Management
230 Government Center Drive Suite 115
Wilmington, NC 28403

January 30, 2012

Mr. Kent Crocker
Supervisor, Emergency Preparedness
Brunswick Nuclear Plant
PO Box 10429
Southport, North Carolina 28461-0429

Dear Mr. Crocker,

This letter acknowledges that New Hanover County Department of Emergency Management has overall responsibility for New Hanover County's:

- Radiological emergency response planning, development, and updating of New Hanover County's emergency response plan, and coordination between the County, Progress Energy, and other local government response agencies.
- It functions as the lead county radiological response agency and provides any required radiological monitoring and decontamination activities as directed by the State of North Carolina's Division of Radiation Protection.
- Is responsible for the process of notification of the public within their county.
- Is responsible for operating the county warning point on a 24-hour basis.

Copies of your emergency plan and implementing procedures will be maintained current in the New Hanover County Emergency Operations Center. This agreement remains in effect until terminated in writing.

Sincerely,

Warren Lee
Director-New Hanover County Department of Emergency Management & 911
New Hanover County, North Carolina

APPENDIX C
BRUNSWICK NUCLEAR PLANT (BNP)
OFF-SITE AGENCY SUPPORT SUMMARY

Function (NUREG-0654, II.A)	Primary Responsibility	Support Responsibility
1. Command and Control		
a. Onsite	BNP	NRC
b. Offsite	State, County	FEMA, Progress Energy Corp
2. Accident Classification		
a. Onsite	BNP	NRC
b. Offsite	N/A	N/A
3. Warning		
a. Onsite	BNP	Local
b. Offsite	County	State, USCG
4. Notification		
a. Onsite	BNP	Local
b. Offsite	BNP	State, Local, Media
5. Communications		
a. Onsite	BNP	NRC Progress Energy Corp.
b. Offsite	State, County	Commercial Phone Co., Progress Energy
6. Transportation		
a. Onsite	BNP/Employees	Local
b. Offsite	Local/Residents	FEMA, State, County
7. Traffic Control Security		
a. Onsite	BNP Security	County
b. Offsite	County	State
8. Accident Assessment		
a. Onsite	BNP	HEEC, HNP, RNP
b. Offsite	State	NRC, GE, County, Progress Energy Corp., FEMA, EPA, DOE, CAP

Function (NUREG-0654, II.A)	Primary Responsibility	Support Responsibility
9. Public Information Education		
a. Onsite	BNP, Corp, Comm.	NRC, County
b. Offsite	State	Progress Energy Corp., Media, FEMA
10. Protective Response		
a. Onsite	BNP	County, Progress Energy Corp.
b. Offsite	County, State	Progress Energy Corp., FEMA, EPA, USDA
11. Radiological Exposure Control		
a. Onsite	BNP	Progress Energy Corp.
b. Offsite	State	County, FEMA, EPA, Progress Energy Corp.
12. Fire and Rescue		
a. Onsite	BNP	County/Local Organ.
b. Offsite	County	State
13. Medical		
a. Onsite	BNP	County/Local Organ.
b. Offsite	Local	State, U.S. DHHS
14. Public Health & Sanitation		
a. Onsite	BNP	State, Local, Progress Energy Corp.
b. Offsite	County	State, FEMA, U.S. DHHS
15. Social Services		
a. Onsite	N/A	N/A
b. Offsite	State	County, Red Cross, Salvation Army
16. Training		
a. Onsite	BNP	NRC
b. Offsite	County	State, Progress Energy Corp., BNP

Function (NUREG-0654, II.A)	Primary Responsibility	Support Responsibility
17. Exercises		
a. Onsite	BNP	Progress Energy Corp., NRC
b. Offsite	State	State, County, Progress Energy Corp., BNP
18. Recovery/Reentry		
a. Onsite	BNP	BNP, RNP, HNP, Progress Energy Corp., NRC, GE, FEMA
b. Offsite	State	Local, Progress Energy Corp, DOE, EPA, U.S. DHHS, USDA

Note:

BSEP	Brunswick Steam Electric Plant
CAP	Civil Air Patrol
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FEMA	U.S. Federal Emergency Management Agency
GE	General Electric
RNP	Robinson Nuclear Plant
HEEC	Harris Energy & Environmental Center
NRC	U.S. Nuclear Regulatory Commission
USCG	United States Coast Guard
USDA	U.S. Department of Agriculture
US DHHS	U.S. Department of Health & Human Services
HNP	Harris Nuclear Plant

APPENDIX D

This Appendix has been superseded by the BNP Emergency Procedures.

APPENDIX E
MEDICAL TREATMENT AND ASSISTANCE

E.1. INTRODUCTION

The Medical Treatment and Assistance Plan provides for several levels of treatment based on the severity of injury and degree of radioactive contamination involved, if any.

The first level of assistance will be given on scene or in the plant First Aid Office, if possible. Initial evaluation of the severity of the injury will be made by first-aid and medical personnel, and emergency treatment started.

Concurrently the degree of radiation exposure and/or contamination will be assessed by radiation safety personnel and decontamination begun. All injuries occurring in a contaminated area will be considered as contaminated until monitored and cleared.

If the severity of the injury requires more extensive or prolonged treatment, the patient can be transported to the second level of assistance located at the Dosher Memorial Hospital where special facilities for treatment of contaminated patients have been provided (see Section E.2.2).

Transfer from any level of assistance to the next higher level will be effected only after medical evaluation (unless the urgency of the patient's condition requires immediate action) and will be under the control of the attending physician or his alternate senior physician.

E.2. MEDICAL EMERGENCIES

E.2.1 ON-SITE FIRST AID FACILITIES

It is anticipated that contaminated personnel will not leave the facility for medical treatment except for cases thought to require immediate hospitalization. Emergency medical treatment of contaminated personnel will be handled at the Plant First Aid Office located in the O&M Building (if possible) by site medical personnel. This includes all injuries thought not to require immediate hospitalization.

E.2.2 HOSPITALIZATION

If emergency medical treatment can best be given at Dosher Memorial Hospital in Southport (or another facility as may be advised by a competent medical authority), the injured person may be transported to Dosher Memorial Hospital. Dosher Memorial Hospital is the primary hospital for treating medical emergencies occurring at the Brunswick Plant, with New Hanover Regional Medical Center being the backup. 0PEP-03.9.3, First Aid, Medical Care and Transport for Injured Personnel, will be followed to prevent the spread of radioactive contamination to off-site areas and facilities. If possible, contaminated clothing and equipment should be removed from the patient, or he should be wrapped in clean sheets or clothing to prevent contamination of the transporting personnel and vehicle.

Medical assistance is immediately available at the Southport area from two general practitioners, both of who are on the staff of Dosher Memorial Hospital, and who have agreed to provide medical assistance for contaminated patients. Also, the U. S. Department of Energy Radiological Assistance Team will provide medical assistance, if required.

E.2.3 TREATMENT FACILITY

A specially designated emergency area is maintained in readiness at Dosher Memorial Hospital for Progress Energy's use for the treatment of contaminated patients. Although this area will be utilized by the hospital when not required by Progress Energy, it will be made immediately available to Progress Energy when required. Equipment is available in the hospital for the emergency treatment of patients. With the facilities and equipment available, extensive decontamination and treatment of an injured patient could be performed, including surgical treatment that may be required.

E.2.4 ON-SITE MEDICAL SERVICES

Agreement has been reached with doctors in Southport who will provide medical services at the plant site when required. Personnel who are contaminated and who require medical treatment may be treated by a doctor in the Plant's First Aid Office.

E.2.5 EMERGENCY EQUIPMENT

An emergency kit is maintained at Dosher Memorial Hospital containing supplies and equipment for personnel monitoring and the control of radioactive contamination. This kit contains the following:

a. Radiation monitoring instruments, one low-level instrument for determining contamination levels, and one intermediate- range instrument for determining dose rates.

b. Personnel monitoring equipment such as TLDs and self-reading dosimeters.

c. Decontamination equipment and supplies for both personnel and facility.

d. Contamination control equipment and supplies such as protective clothing, signs, ropes, tags, plastic bags, etc.

E.2.6 AMBULANCE SERVICE

The City of Southport Rescue Squad has agreed to respond to all emergency calls from the plant, just as they respond to other calls from the Southport area.

NUREG-1228, Table 2.2 describes the core inventory and coolant concentrations (BWR).

Source Term Categories

Source terms are based upon the core melt sequences, four categories of core damage: 1) normal coolant leakage, 2) spiked coolant leakage, 3) gap release, and 4) in-vessel core melt. These categories have an associated release duration based upon the length of time that the core is uncovered. As a result, it is possible to construct a source term mix matrix that is dependent on two parameters, whether or not the fuel is uncovered, and the length of time that the fuel is uncovered. A separate isotopic release fraction is developed for each accident sequence. The major isotopic release fractions are those fractions of core inventory that are released either through failure of the fuel cladding and melting of the core within the reactor vessel. These fractions are values that when multiplied by the core inventory in curies of the particular isotopes, give curie amounts of isotopes immediately available for release from the containment. The effects of cleanup and engineered safety features are taken into account to the extent consistent with the failures that led to the particular accident sequence. To make the results manageable, the accident sequence and the accident isotopic release are grouped. NUREG-1465 is utilized as a means to weigh the release fractions for that sequence category. The weighted release fractions are added up to determine a "mean" in-containment release fraction.

In order to have a dose assessment capability that can be utilized under many circumstances, the vast majority of which are less consequential than a melt of the core with no removal mechanisms, the effect of engineered safety features and removal phenomena must be included in the source term mix. RTM-96, Table C-5 lists the reduction factors, and Table C-6 escape fractions are used in developing source term categories that account for removal process. In order to select the proper mix, a release pathway and estimated time duration of core uncovery is determined. Reduction factors are applied as scaling factors, as described in NUREG-1228.

There remain three source term special cases of accident mixes which are handled separately in the dose assessment process. 1) Fuel stored in a pool, and the fuel is uncovered; 2) Fuel stored in a pool that is damaged underwater; and 3) Damage to fuel cladding stored in a dry storage cask. Fuel release fractions used in these accidents are derived from NUREG/CR-6451.

References

1. NUREG-1465, Accident Source Terms for Light Water Nuclear Power Plants, Draft Report for Comment, U.S. Nuclear Regulatory Commission, Washington, DC, June 1992

2. RTM-96, Response Technical Manual, Vol. 1, Rev. 4, U.S. Nuclear Regulatory Commission, Washington, DC, October 1996-NUREG/BR 0150

3. NUREG-1741, RASCAL 3.0: Description of Models and Methods

4. NUREG-1228, Source Term Estimation during Incident Response to Severe Nuclear Power Plant Accidents. 1988

5. BNP Calc. 0B21-0556, Rev. 0

6. NUREG-1887, RASCAL 3.0.5: Description of Models and Methods

APPENDIX G
MINIMUM PROCEDURES REQUIRED TO IMPLEMENT THE SECTIONS OF THE PLAN

PLAN	PROCEDURES	
Section 1:		
Introduction	N/A	
Section 2: Emergency Classifications	0PEP-02.1	Initial Emergency Actions
	0PEP-02.1.1	Emergency Control - Notification of Unusual Event, Alert, Site Area, Emergency and General Emergency
	0PEP-02.2.1	Emergency Action Level Technical Bases
Section 3: Emergency Response Organization	0PEP-02.1.1	Emergency Control – Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency
	0PEP-02.6	Severe Weather
	0PEP-02.6.6	Environmental Monitoring Team Leader
	0PEP-02.6.12	Activation and Operation of the Operational Support Center (OSC)
	0PEP-02.6.20	Dose Projection Coordinator
	0PEP-02.6.21	Emergency Communicator
	0PEP-02.6.26	Activation and Operation of the Technical Support Center (TSC)
	0PEP-02.6.27	Activation and Operation of the Emergency Operations Facility (EOF)
	0PEP-02.6.28	Off-Site Protective Action Recommendations
	0PEP-02.6.29	Activation and Operation of the Joint Information Center (JIC)
	0PEP-02.6.30	Activation and Operation of the Alternate Emergency Facility

PLAN	PROCEDURES	
Section 3: Emergency Response Organization	0PEP-03.6.5	Collection and Analysis of Highly Radioactive Samples
	EMG-NGGC-0005	Activation of the Emergency Response Organization Notification System
Section 4: Emergency Measures	0PEP-02.1	Initial Emergency Actions
	0PEP-02.2.1	Emergency Action Level Technical Bases
	0PEP-02.1.1	Emergency Control - Notification of Unusual Event, Alert, Site Area Emergency, and General Emergency
	0PEP-03.1.3	Use of Communication Equipment
	0PEP-03.4.7	Automation of Off-Site Dose Projection Procedure
	0PEP-03.4.8	Offsite Dose Projections for Monitored Releases
	EMG-NGGC-0002	Off-Site Dose Assessment
	0PEP-03.6.1	Release Estimates Based Upon Stack/Event Readings
	0PEP-03.6.3	Estimate of the Extent of Core Damage Under Accident Conditions
	0PEP-03.7.6	Emergency Exposure Controls
	0PEP-03.7.7	Onsite Radiological Controls
	0PEP-03.8.2	Personnel Accountability and Evacuation
	0PEP-03.9.3	First Aid, Medical Care and Transport for Injured Personnel
	0PEP-03.9.6	Search and Rescue
	0PEP-04.5	Public Education and Information
	0AOP-40.0	Security Events

PLAN	PROCEDURES	
Section 5: Emergency Facilities and Equipment	0PEP-03.4.7	Automation of Off-site Dose Projection Procedure
	0PEP-03.4.8	Offsite Dose Projections for Monitored Releases
	EMG-NGGC-0002	Off-Site Dose Assessment
	0PEP-03.5.5	Environmental Monitoring and Plume Tracking
	0PEP-04.2	Emergency Facilities and Equipment
	EMG-NGGC-0005	Activation of the Emergency Response Organization Notification System
Section 6: Maintaining Emergency Preparedness	0PEP-04.1	Record Keeping and Documentation
	0PEP-04.2	Emergency Facilities and Equipment
	0PEP-04.3	Performance of Training, Exercises, and Drills
	0PEP-04.5	Public Education and Information
	0PEP-04.6	Radiological Emergency Kit Inventories
	04.08	Periodic Review of Emergency Plan
Section 7: Recovery	0PEP-02.7	Recovery

APPENDIX H
CROSS-REFERENCE BETWEEN NUREG-0654 EVALUATION CRITERIA AND BRUNSWICK RADIOLOGICAL EMERGENCY RESPONSE PLAN

NUREG-0654 Criterion	Brunswick Section(s)
A.1.a	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8 Appendix C
A.1.b	3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
A.1.c	Figures 3.1-1, 3.2-1, 3.4-1, 3.6-1
A.1.d	3.0, 3.2.1
A.1.e	3.2, 3.9
A.2.a	N/A
A.2.b	N/A
A.3	Appendix B
A.4	3.0, 3.2, 3.3, 3.4, 3.5
B.1	3.0, 3.1, 3.2
B.2	3.0, 3.2.1
B.3	3.0, 3.2.1
B.4	3.0, 3.2.1
B.5	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
B.6	Section 3 Appendices B, C, E Figures 3.2-1, 3.4-1, 3.6-1

APPENDIX H
CROSS-REFERENCE BETWEEN NUREG-0654 EVALUATION CRITERIA AND BRUNSWICK RADIOLOGICAL EMERGENCY RESPONSE PLAN

NUREG-0654 Criterion	Brunswick Section(s)
B.7	Section 3
B.7.a	3.3.5, 3.5.2
B.7.b	3.3.1, 3.3.3, 3.5.3 Section 7.0
B.7.c	3.2.1, 3.5.1
B.7.d	3.6.1
B.8	3.7.1, Table 3.5-1
B.9	3.7.2, Appendix B, Appendix C, Appendix E
C.1.a	3.8.4.1
C.1.b	3.8.4
C.1.c	3.8.1, 3.8.2, 3.8.3, Appendix A
C.2.a	N/A
C.2.b	3.5.8, Figure 3.2-1
C.3	5.7.6, 3.7.1, 3.8
C.4	3.7, 3.8, Appendix B, Appendix C, Table 3.5-1
D.1	Section 2.0, EAL-1, EAL-2
D.2	Section 2.0, EAL-1, EAL-2
D.3	N/A
D.4	N/A

NUREG-0654 Criterion	Brunswick Section(s)
E.1	3.9, 4.1, 4.4.1
E.2	3.2, 3.3, 3.4, 3.5, 3.6, 3.9
E.3	3.9, 0PEP-02.6.21
E.4.a-n	3.9, 0PEP-02.6.21
E.5	N/A
E.6	3.9, 4.4.6, 0PEP-02.6.21
E.7	3.9, 4.4.7
F.1.a	3.9, 0PEP-02.6.21
F.1.b	3.9, EPL-001, 0PEP-02.6.21
F.1.c	3.9, EPL-001, 0PEP-02.6.21
F.1.d	3.9, EPL-001, 0PEP-02.6.21, 0PEP-03.1.3
F.1.e	3.2, 3.9, EPL-001 0PEP-02.6.21, EMG-NGGC-0005
F.1.f	3.9, EPL-001, 0PEP-02.6.21
F.2	EPL-001, Table 3.5-1
F.3	4.4.6, 6.1.2.1

NUREG-0654 Criterion	Brunswick Section(s)
G.1	4.4.7.1, 6.1.4
G.2	4.4.7.1, 6.1.4
G.3.a	3.6, 5.5
G.3.b	5.4, 5.5
G.4.a	3.6.1
G.4.b	3.6
G.4.c	3.6, 4.4.7.1
G.5	4.4.7.1, 4.4.7.2, 6.7.7, 0PEP-04.3
H.1	3.3, 3.4, 5.2, 5.3
H.2	3.5, 5.4
H.3	N/A
H.4	3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.9 Table 3.5-1
H.5	5.7
H.5.a	5.7.2, 5.7.3
H.5.b	5.7.4
H.5.c	5.7.5
H.5.d	5.8

NUREG-0654 Criterion	Brunswick Section(s)
H.6.a	5.7.2, 5.7.3
H.6.b	5.7.4
H.6.c	5.7.6
H.7	5.7.4, 5.12
H.8	5.7.2
H.9	5.3, Table 5.0-2, 6.3, 0PEP-04.6
H.10	6.3.1, Procedure 0PEP-04.6
H.11	6.3.1, Procedure 0PEP-04.6
H.12	5.0, 5.7.6, 0PEP-02.6.6
I.1	Section 2, Section 5.0 0PEP-02.1, 0PEP-02.2.1
I.2	4.2, Section 5.0
I.3.a	4.2.2, 0PEP-03.6.1, PEP 03.6.3, Appendix F
I.3.b	4.2.2, 4.2.3, 0PEP-03.4.7, 0PEP-03.4.8, 0PEP-03.5.5, EMG-NGGC-0002
I.4	4.2.2, 0PEP-03.4.7, 0PEP-03.4.8, 0PEP-03.6.1, EMG-NGGC-0002
I.5	5.7.2
I.6	4.2.2.3

NUREG-0654 Criterion	Brunswick Section(s)
I.7	4.2.4
I.8	4.2.1, 4.2.2, 4.2.3, 4.2.4
I.9	4.2
I.10	4.2
1.11	N/A
J.1.a	4.4.2, 6.1.1, 0PEP-03.8.2
J.1.b	4.4.2, 6.1.1, 0PEP-03.8.2
J.1.c	4.4.2, 6.1.1
J.1.d	4.4.2, 4.4.6
J.2	4.4.2, 0PEP-03.8.2
J.3	4.4.2.2, 4.4.4.1, 4.4.4.2
J.4	4.4.2.2
J.5	4.4.2.2, 0PEP-03.8.2
J.6.a	4.4.3, 5.9
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J.6.c	4.4.3
J.7	4.1.5, 4.4.7
J.8	4.4.7.3, Table 4.4-1
J.9	N/A

NUREG-0654 Criterion	Brunswick Section(s)
J.10.a	4.4.7.3, Figures 1.1-1, 4.4-1, Figure 1.1-2
J.10.b	Figures 1.1-1, 1.1-2, 1.1-6
J.10.c	3.9, 4.4.6
J.10.d	N/A
J.10.e	N/A
J.10.f	N/A
J.10.g	N/A
J.10.h	N/A
J.10.i	N/A
J.10.j	N/A
J.10.k	N/A
J.10.l	N/A
J.10.m	See item J.7, Figure 4.4-3; Tables 4.4-2, 4.4-3, and 4.4-4
J.11	N/A
J.12	N/A
K.1.a-g	4.4.3
K.2	4.4.3
K.3.a	4.4
K.3.b	4.4

NUREG-0654 Criterion	Brunswick Section(s)
K.4	N/A
K.5.a	4.4.4
K.5.b	4.4.4.1, 4.4.4.2, 4.4.5
K.6.a	4.4.4
K.6.b	4.4.4
K.6.c	4.4.4
K.7	4.4.4, 4.4.5
L.1	5.10, Appendix B, Appendix E,
L.2	4.4.5, 5.10, Appendix B, Appendix E
L.3	N/A
L.4	3.7.2.1, 3.7.2.2, 4.4.5, Appendix B, Appendix E
M.1	0PEP-02.7, Section 7.0
M.2	7.2, Figure 7.2.1, 0PEP-02.7
M.3	7.1, 0PEP-02.7
M.4	Figure 1.1-6, 1.1-6a, 1.1-6b, 0PEP-03.4.7, 0PEP-03.4.8 EMG-NGGC-002
N.1.a	6.1.2.2
N.1.b	6.1.2.2
N.2.a	6.1.2.1.2

NUREG-0654 Criterion	Brunswick Section(s)
N.2.b	6.1.2.1.3
N.2.c	6.1.2.1.4
N.2.d	6.1.2.1.5
N.2.e	6.1.2.1.6
N.3.a-f	6.1.2
N.4	6.1.2.2
N.5	6.1.2.2
O.1	6.1.1
O.1.a	6.1.1
O.1.b	N/A
O.2	6.1.1
O.3	6.1.1
O.4.a-j	6.1.1
O.5	6.0, 6.1, 6.1.1
P.1	6.1.3
P.2	6.1.3
P.3	6.1.3
P.4	6.2.1, 6.2.3
P.5	6.2.1
P.6	6.2.3, Appendix G

NUREG-0654 Criterion	Brunswick Section(s)
P.7	Appendix G
P.8	Table of Contents
P.9	6.2.2
P.10	6.2.1

ATTACHMENT 1

BRUNSWICK NUCLEAR PLANT

ON-SHIFT STAFFING ANALYSIS SUMMARY

DECEMBER, 2012

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Attachments

Page

1. INTRODUCTION

This document describes the methodology used in the conduct of an On-shift Staffing Analysis (OSA) for Brunswick Nuclear Plant (BNP) and the results obtained by the OSA. The OSA was performed to ensure sufficient personnel are assigned to all operating shifts as required by Section IV.A.9 of 10 CFR 50, Appendix E [Ref. 1], which states that nuclear power reactor licensees shall include in their emergency plans "*a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.*" This document constitutes the "detailed analysis" required by the regulations and is based on the "Final Report – NEI 10-05 On-shift Staffing Analysis for the Brunswick Nuclear Plant" [Ref 2], which provides additional details regarding the analysis process.

A structured approach was utilized to perform this analysis using the guidance provided in NEI 10-05, Rev 0, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities" [Ref. 3]. The OSA examined the ability of the minimum staff, as identified in the site emergency plan (0ERP, "Radiological Emergency Response Plan") [Ref. 4], to perform the actions necessary to respond to each of the specified event scenarios, as well as implement the actions required by the Emergency Plan.

2. ANALYSIS SUMMARY

The on-shift staff consists of individuals necessary to support each of the following Emergency Plan functional areas:

- Plant Operations & Safe Shutdown
- Fire Fighting
- Radiation Protection & Chemistry
- Emergency Plan Implementation

NEI 10-05 indicates it is acceptable for certain identified functions to be assigned to personnel already assigned other functions/tasks. The identified functions include Repair and Corrective Action, Rescue Operations, and First Aid.

Attachment 1 provides the OSA results presented in the NUREG-0654, Table B-1 format. Augmenting emergency response organization positions are not considered within the staffing analysis and therefore do not appear in Attachment 1.

Attachment 2 provides the final NEI 10-05 staffing analysis tables, as presented in Reference 2, providing the results of each scenario analysis.

3. ANALYSIS PROCESS

NEI 10-05 separates the analysis into three phases:

- Phase I included identification of required scenarios and determination of On-Shift Minimum Staffing levels as found in 0ERP, "Radiological Emergency Response Plan." Section 4 provides a discussion of the scenario identification process.

- Phase II (referred to in NEI 10-05 as "On-Shift Staffing Analysis") was conducted by a multi-disciplined team using site procedures to determine if tasks have been sufficiently analyzed

for performance by the minimum on-shift staff as designated in the Emergency Plan. Task areas analyzed included:

- Event Mitigation (EOP/AOP, other site procedures)
- Fire Response (as determined by the scenario)
- RP/Chemistry Functions (as specified in site response procedures)
- Emergency Preparedness Functions (NUREG-0654 Table B-1)

Attachment 2 presents the results of Phase II.

- Phase III of the methodology is designed to perform task-based Time-Motion Studies, as needed, when concerns were identified in either of two areas. The first area involves emergency response function(s) that have not been previously analyzed by an existing performance-based assessment process. The second area includes functions assessed by existing JTA or performance-based assessment processes, where overlap is discovered and integrated performance of the functions has not been previously analyzed by an existing performance-based assessment process.

The emergency response to each event was determined by conducting a tabletop of the event using the emergency plan and procedures and applicable department procedures, such as Operations emergency and abnormal operating procedures.

Each scenario was reviewed by the cross-disciplinary team to identify the required operational actions and emergency plan implementation actions, based on plant procedures, prior to staff augmentation. These actions were then compared to the minimum staffing as described in the Emergency Plan, ensuring that no actions were assigned to staff members that conflicted with either their dedicated emergency plan roles or their dedicated operational roles, as appropriate. In cases where multiple tasks were assigned to an individual, the team evaluated timing of the tasks to ensure the tasks could be performed by the individual in series within any specified time requirements.

4. SCENARIO SELECTION AND ATTRIBUTES

To ensure that the on-shift staff can carry out their assigned emergency response functions until the augmenting emergency response organization (ERO) arrives, NEI 10-05 indicates that each licensee should define the events that will be used in the OSA. These events should include the following:

- Postulated Design Basis Accidents (DBAs) (Condition IV events) presented in the FSAR, as updated, and which would result in an emergency declaration. At least one DBA should result in the declaration of a General Emergency and radiological doses to the public that exceed the EPA Protective Action Guides (PAGs) and necessitate licensee Protective Action Recommendations (PARs);
- Station Design Basis Threat (DBT);
- Response actions for an "aircraft probable threat" in accordance with 10 CFR 50.54(hh)(1) and as discussed in Regulatory Guide 1.214; and
- Control room fire leading to evacuation and remote shutdown, as referenced in NRC Information Notice 95-48.

The Large Break Loss of Coolant Accident (LOCA) was selected as the DBA event to be taken to General Emergency with corresponding release exceeding EPA PAGs.

NSIR/DPR ISG-01, "Interim Staff Guidance – Emergency Planning for Nuclear Power Plants," (the ISG) [Ref. 5] specifies three additional scenarios for consideration. If those scenarios are not performed, justification must be provided in the final analysis. The three scenarios for consideration are:

- Station Blackout (Current Licensing Basis) – this scenario was performed in the Phase II analysis;
- Appendix R fire response; and
- Severe Accident Management Guideline (SAMG) Response – Response was limited to actions performed prior to activation of the Technical Support Center (TSC) and SAMG augmented personnel. This scenario was included in the Phase II analysis.

Prior to the analysis, Progress Energy's Asset Management Group conducted a review of the BNP UFSAR Chapter 15 Design Basis Accident (DBA) events. This review validated those BNP UFSAR Chapter 15 DBA events meeting the guidance in the ISG as Condition IV Design Basis Accidents. Condition II and III DBA events were excluded from the list. The Asset Management Group also evaluated additional events identified in the ISG. Those events identified for inclusion in the shift staffing analysis were the: Security DBT event; aircraft probable threat event; Control Room fire with evacuation; Station Blackout; and SAMG response prior to augmentation of the on-shift ERO. The Appendix R fire response event was not included because it is bounded by the Control Room fire with evacuation event.

The following table identifies the events requiring analysis as identified in Phase I using the NEI 10-05 methodology and by reviewing Chapter 15 of the UFSAR.

Event Type	Summary Description of Event	Plant Mode	Reference Document(s)	Event ECL
DBT	Land and/or waterborne HOSTILE ACTION directed against the Protected Area by a HOSTILE FORCE. Assume adversary characteristics defined by the Design Basis Threat (DBT).	Any	ISG IV.C; AOP-40	Site Area Emergency
ISG	Response actions for an "aircraft probable threat" in accordance with 10 CFR 50.54(hh)(1) and as discussed in RG 1.214, Guidance for Assessment of Beyond-Design-Basis Aircraft Impacts	Any	ISG IV.C; AOP-40	Site Area Emergency
ISG	Control room fire leading to evacuation and remote shutdown, as referenced in IN 95-48 "Results of On-Shift Staffing Study	Any	ISG IV; Appendix R Fire Analysis, ASSD-02	Alert

Event Type	Summary Description of Event	Plant Mode	Reference Document(s)	Event ECL
DBA	Refueling Accident	5	FSAR,15.7.1; pg.40 AOP-05 Condition IV DBA	General Emergency
DBA	Control Rod Drop Accident	1-2	FSAR, 15.4.6; pg.26 Condition IV DBA	Site Area Emergency
ISG	Station Blackout	Any	FSAR 8.3.1.1.6.1; pg.10 AOP-36.2 ISG IV.C	Site Area Emergency
DBA	Main Steam Line Main Steam System Piping Failure Event (MSLB)	1-2	FSAR, 15.6.3; pg. 31 Condition IV DBA	General Emergency
DBA	Large Break Loss of Coolant Accident (LB LOCA)	1-2	FSAR, 15.6.4; pg. 26 Condition IV DBA	Site Area – General Emergency
ISG	SAMG	Any	ISG IV.C	General Emergency

The results of the analysis for each of the scenarios are included in Attachment 2, Event Staffing Analysis Tables. The selection of DBA accidents for inclusion in this assessment was based in part on the guidance contained in the ISG, which states that only DBA accidents "which would result in an emergency declaration" should be evaluated in the staffing assessment. Each of the plant's DBAs was evaluated and classified according to its UFSAR description. Additionally, the projected accident dose rate at the site boundary was considered in classification. In cases where several projected dose rates were provided, the assessment used the radiological consequences associated with the realistic case in accordance with NEI 10-05.

Each scenario was assessed by the cross-disciplinary team to identify the plant actions and emergency plan implementation actions required by plant procedures prior to staff augmentation. These actions were then compared to the minimum shift staffing as described in the Emergency Plan, ensuring that no actions were assigned to staff members that conflicted with either their dedicated emergency plan role or their dedicated operational role as appropriate. In cases where multiple tasks were assigned to an individual in their role, the team considered task prioritization and duration to ensure that they could be performed by the individual in series within any specified time requirements.

5. GENERAL ASSUMPTIONS AND LIMITATIONS

5.1 Radiation Protection (RP) and Chemistry

The team utilized the analysis approach described by NEI 10-05 to identify tasks assigned to on-shift radiation protection and chemistry technicians. Identified tasks were plotted on a timeline considering task duration and priority.

The RP and Chemistry tasks reviewed were those directed by the Shift Manager to support actions in Abnormal Operating Procedures (AOPs), Emergency Operating Procedures (EOPs), and Plant Emergency Procedures (PEPs). Any additional tasks directed by the TSC, Operations Support Center (OSC), or Emergency Operations Facility (EOF) procedures would occur following ERO augmentation and thus were not reviewed.

5.2 Repair and Corrective Action

Per the guidance of NUREG-0654, Table B-1, repair and corrective action tasks may be performed by dedicated shift personnel or qualified shift personnel assigned other functions/tasks. Repair and corrective action is defined as:

> An action that can be performed promptly to restore a non-functional component to functional status (e.g., resetting a breaker), or to place a component in a desired configuration (e.g., open a valve), and which does not require work planning or implementation of tag out controls to complete.

In accordance with NEI 10-05, Section 2.5, the OSA included a review of the maintenance and corrective action tasks. These tasks may be performed by personnel having other Emergency Preparedness (EP) functions. For the purpose of this analysis, the tasks were considered to fall into two broad categories:

- Unplanned/unexpected actions that address equipments failures. These actions are contingent in nature and cannot be specified in advance.
- Planned/expected actions performed in support of operating procedure implementation, including severe accident management guidelines.

5.3 Rescue Operations and First Aid

In accordance with NEI 10-05, Section 2.6, the analysis also included a review of the Rescue Operations and First Aid responses. These functions may be performed by personnel assigned other EP functions. Rescue Operations and First Aid include the tasks of locating missing personnel, removing them from hazardous areas, if needed, and providing necessary initial medical treatment. These functions are performed by the Fire Brigade.

5.4 10 CFR 50.54(hh) Aircraft Threat

The analysis included a review of the implementation of the requirement to maintain continuous communications with the notification source during an aircraft threat in accordance with 10 CFR 50.54(hh) and Regulatory Guide 1.214. There are no specific qualifications required to perform this task and the function is not required to be assigned in advance. This review identified that

there are sufficient personnel on-shift to perform this action during the aircraft event.

5.5 ERO Response Time

As stated in NEI 10-05, Section 2.14, the staffing assessment methodology may be used to evaluate proposed changes to on-shift staffing levels or augmented ERO response times. The OSA team utilized the ERO response times identified in the Emergency Plan.

5.6 NEI 10-05 General Assumptions

1. Response time used for this analysis was the maximum acceptable number of minutes elapsed between emergency declaration and the arrival of an augmented ERO position holder at a location necessary to relieve an on-shift position of the emergency response task.

2. The on-shift personnel complement was limited to the minimum required number and composition as described in the site emergency plan and other site documents. If the plan commitments allow for different minimum staffing levels (e.g., a variance between a normal dayshift and a backshift), the staffing with the smallest total number of personnel was used for the analysis.

3. Although the temporary absence of a position may be allowed by Tech Specs, the analysis was performed assuming that all required on-shift positions are filled.

4. Event occurred during off-normal work hours where ERO was offsite and all required minimum on-shift positions were filled.

5. On-shift personnel reported to their assigned response locations within timeframes sufficient to allow for performance of assigned actions.

6. On-shift staff had necessary Radiation Worker qualification to obtain normal dosimetry and enter the radiological control area (RCA) (but not locked high or very high radiation areas) without the aid of an RP technician.

7. Personnel assigned plant operations and safe shutdown (SSD) met the requirements and guidance (analyzed through other programs such as operator training) and were not evaluated as part of this assessment unless a role/function/task from another major response area was assigned as a collateral duty.

8. In-plant (manual) safety-related operator actions to manipulate components and equipment from locations outside the Control Room to achieve and maintain safe shutdown was done by a member of the on-shift staff as defined in the unit's Tech Specs.

9. Fire brigade (FB) staff performance is analyzed through other station programs (e.g., fire drills) and was not evaluated as part of this assessment unless a role/function/task from another major response area was assigned as a collateral duty.

10. Individuals holding the position of RP technician or Chemistry technician are qualified to perform the range of tasks expected of their position.

11. Security was not evaluated unless a role or function from another major response area was assigned as a collateral duty.

12. Communications, briefings, and peer checks are acceptable collateral duties.

13. All on-shift staff positions were evaluated, even if they had no known collateral duties, to ensure they can perform the tasks assigned to them.

14. The OSA specified the resources available to perform "Repair and Corrective Actions" and "Rescue Operations and First Aid," but these may be assigned as collateral duty to a designated on-shift responder.

15. For assessment purposes, NRC notifications were treated as a continuous action per 10CFR50.72(c)(3) and 73.71(b)(1). This means once the initial NRC communications are established, the NRC will request that an open line be maintained with the NRC Operations Center.

16. DBA (postulated accident, Condition IV event, or limiting fault) is considered as "Unanticipated occurrences that are postulated for accident analysis purposes but not expected to occur during the life of the plant. A postulated accident could result in sufficient damage to preclude resumption of plant operation. As a result, a greater number and variety of actions would need to be implemented by plant personnel."

17. Unless otherwise specified in NSIR/DPR-ISG-01 or by the initial conditions of a DBA analysis, it was assumed that the unit was in Mode 1, Power.

18. DBT assumed a hostile force breached the protected area fence but was neutralized with no adverse consequences to plant safety. Damage inflicted on plant systems, structures and components was not sufficient to prevent safe shutdown or cause a radiological release. There was no fire significant enough to warrant firefighting efforts prior to arrival of offsite resources and/or the augmented ERO.

19. The OSA used DBA analysis assumptions, inputs, timing of events as documented in the FSAR.

20. In cases where a DBA analysis included a radiological release, and the starting point of the release was not clearly defined, the OSA assumed that the release began at the time of declaration of the initiating event.

21. Severe Accident Management Guideline (SAMG) - It is sufficient to simply assume that the accident progressed to conditions requiring a severe accident response; it did not include determining specific failures and the accident sequence.

22. SAMG - The actions analyzed included those that implement the initial site-specific actions assuming the core is not ex-vessel (i.e., no reactor vessel failure), and there is no actual or imminent challenge to containment integrity.

Reference 2 provides additional information regarding assumptions used in the staffing analysis.

6. CONCLUSIONS

Attachment 1 presents the minimum shift staffing needed to support the analyzed event scenarios, as identified by the event analysis team. Identified discrepancies were entered into the corrective action program for resolution.

As discussed in Reference 2, three concerns identified during Phase 2 were referred to Phase 3 for further analysis. The results of the Phase 3 analyses are addressed in Reference 2.

The station is required to implement temporary compensatory measures within 30 days following approval of this report and to implement permanent corrective actions within 24 months. Implementation of the corrective action process may result in the identification of corrective measures (e.g., technological or administrative measures) that will affect the final minimum shift staffing. Any such measures should be validated using the staffing analysis process and this report should be updated to reflect the identified corrective measures.

7. ATTACHMENTS

8. REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," US Nuclear Regulatory Commission, November 2011

2. "Final Report – NEI 10-05 On-shift Staffing Analysis for the Brunswick Nuclear Plant," Operations Support Services, Inc., December 2012

3. NEI 10-05, Rev 0, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Nuclear Energy Institute, June 2011

4. 0ERP, "Radiological Emergency Response Plan," Rev. 81, Progress Energy, Inc., Brunswick Nuclear Plant

5. NSIR/DPR-ISG-01, "Interim Staff Guidance – Emergency Planning for Nuclear Power Plants, " US Nuclear Regulatory Commission, November 2011

Attachment 1

Minimum On-Shift Staffing for Emergency Response

Minimum On-Shift Staffing for Emergency Response

Functional Area	Major Tasks	Emergency Positions	Minimum Shift Size
1. Plant Operations and Assessment of Operational Aspects	Control Room Staff	Shift Manager (SM) Control Room Supervisor Reactor Operators Non-Licensed Operators	1 2 4 9
2. Emergency Direction and Control	--	SEC-MCR (SM)	1[(a)]
		ERM	--
		SEC-TSC	--
3. Notification & Communication	Emergency Communicator	Non-Licensed Operator	1[(e)(d)]
4. Radiological Assessment	Offsite Dose Assessment	Dose Projection Coordinator	--
	Offsite Surveys	Environmental Monitoring Team Personnel	--
	Onsite Surveys	Radiological Control Team Personnel	--
	In-plant Surveys	Health Physics Technician	1
	Chemistry	Chemistry Technician	2
5. Plant Engineering Repair and Corrective Actions	Technical Support	Shift Technical Advisor	1
		Core Performance Engineering	--
		Mechanical Engineering	--
		Electrical Engineering	--
	Repair and Corrective Actions	Mechanical Maintenance	2
		Electrical/I&C Maintenance	3
6. In-Plant Protective Actions	Radiation Protection	Health Physics Technician	2
7. Fire Fighting	--	--	5[(a)(b)(e)]
8. First Aid and Rescue Operations	--	Plant Personnel	2[(a)(f)]
9. Site Access Control	Security & Accountability	Security Team Personnel	(c)
		TOTAL (Less Security):	**27**

(a) May be provided by shift personnel assigned other functions.
(b) Fire Brigade per BNP FPP-031, includes four (4) Fire Brigade members and one (1) Shift Incident Commander (all Non-Licensed Operators)
(c) Per Security Plan
(d) Non-Licensed Operators also responsible for Notifications and Communications (1)
(e) Included in census of Non-Licensed Operators above.
(f) 1st Aid & Rescue is a collateral duty of Fire Brigade/Non-Licensed Operators.

Attachment 2

Event Staffing Analysis Tables

Attachment 2A: Design Basis Threat (DBT)

1. **Event Summary:**

   A hostile force breaches the Protected Area fence, but is neutralized with no adverse consequences to plant safety.

2. **Event Specific Assumptions:**

   - Security response is per Station Security plan

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - AOP-40 Security Events
   - 1(2)EOP-01-RSP Reactor Scram Procedure
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #1: DBA/ISG Event #1 - Design Basis Threat **ECL: Site Area Emergency**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	0ERP Section 3.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5 / L5 T5 / L8 T5/L10	No	No
2.	Unit 1 Supervisor	0ERP Section 3.1	N/A	T2/L2	No	No
3.	Unit 2 Supervisor	0ERP Section 3.1	N/A	T2/L3	No	No
4.	Shift Technical Advisor	0ERP Section 3.1	N/A	T2/L4 T5/L11	No	No
5.	Reactor Operator #1	0ERP Section 3.1	N/A	T2/L5	No	No
6.	Reactor Operator #2	0ERP Section 3.1	N/A	T2/L6	No	No
7.	Reactor Operator #3	0ERP Section 3.1	N/A	T2/L7	No	N/A
8.	Reactor Operator #4	0ERP Section 3.1	N/A	T2/L8	No	Yes
9.	Auxiliary Operator #4 (CREC)	0ERP Section 3.1	N/A	T5/L6 T5/L7 T5/L9 T5/L13 T5/L14	No	No
10.	Auxiliary Operator #9 (CREC assist)	0ERP Section 3.1	N/A	T5/L13	No	No
11.	Security Officer #1	0SI-05	N/A	T5/L15	No	No
12.	Security Officer #2	0SI-05	N/A	T5/L16	No	No

TABLE 2 - Plant Operations & Safe Shutdown **Analysis # 1**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Analysis Controlling Method
1	Shift Manager	Shift Manager	Operator Training
2	Unit Supervisor #1	Unit 1 CRS	Operator Training
3	Unit Supervisor #2	Unit 2 CRS	Operator Training
4	Shift Technical Advisor	STA	Operator Training
5	Reactor Operator #1	Unit 1 RO 1 (OAC)	Operator Training
6	Reactor Operator #2	Unit 2 RO 1(OAC)	Operator Training
7	Reactor Operator #3	Unit 2 RO 2 (BOP)	Operator Training
8	Reactor Operator #4[1]	WCC	Operator Training

TABLE 3 – Firefighting **Analysis # 1**

Line	Performed By	Task Analysis Controlling Method
1	None per guidance in NEI 10-05	N/A

TABLE 4 – Radiation Protection & Chemistry **Analysis # 1**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1	In-Plant Survey On-Shift Position: Shift RP Technician																		
2	On-Site Survey On-Shift Position: Shift RP Technician																		
3	Personnel Monitoring On-Shift Position:																		
4	Job Coverage On-Shift Position:																		
5	Offsite Radiological Assessment On-Shift Position:																		
6	Other Site-Specific RP – Describe: On-Shift Position:																		
7	Chemistry function/task #1 – Describe: On-Shift Position: Shift Chem Tech																		
8	Chemistry function/task #2 – Describe: On-Shift Position: Shift Chem Tech																		

TABLE 5 – Emergency Plan Implementation **Analysis # 1**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	Operations Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	Operations Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	Operations Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	Operations Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	Operations Training and EP Drill Program
6	ERO notification	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
8	Complete State/local notification form	Shift Manager	Operations Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	Operations Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	Operations Training and EP Drill Program
12	Offsite radiological assessment	N/A	N/A
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #9 if needed during upgrade	Operations Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
15	Personnel accountability	Security Officer #1	Security Training and EP Drill Program
16	Access Control to ERO and TSC	Security Officer #2	Security Training and EP Drill Program

Attachment 2B: Aircraft Probable Threat

1. **Event Summary:**

Notification is received from the NRC that a probable aircraft threat exists (> 5 minutes, < 30 minutes).

2. **Event Specific Assumptions:**

- Security response is per Station Security plan.
- All non-security on-shift personnel are inside the protected area and at their normal work stations.

3. **Procedures Reviewed for Accident Response Include:**

- AOP-40 Security Events
- 0PEP-2.1 Initial Emergency Actions
- 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
- EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
- OPS-NGGC-1000 Fleet Conduct of Operations
- Physical Security Plan
- 0ERP Radiological Emergency Response Plan

Analysis #2: DBA/ISG Event #2 - Aircraft Probable Threat **ECL: Site Area Emergency**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	0ERP Section 3.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5 / L5 T5 / L8 T5/L10	No	No
2.	Unit Supervisor #1	0ERP Section 3.1	N/A	T2/L2	No	No
3.	Unit Supervisor #2	0ERP Section 3.1	N/A	T2/L3	No	No
4.	Shift Technical Advisor	0ERP Section 3.1	N/A	T2/L4 T5/L11	No	No
5.	Reactor Operator #1	0ERP Section 3.1	N/A	T2/L5	No	No
6.	Reactor Operator #2	0ERP Section 3.1	N/A	T2/L6	No	No
7.	Reactor Operator #3	0ERP Section 3.1	N/A	T2/L7 T3 / L1	No	No
8.	Auxiliary Operator #1	0ERP Section 3.1	N/A	T2 / L8 T5/L13	No	No
9.	Auxiliary Operator #2	0ERP Section 3.1	N/A	T2 / L9	No	No
10.	Auxiliary Operator #3	0ERP Section 3.1	N/A	T2 / L10	No	No
11.	Auxiliary Operator #4 (CREC)	0ERP Section 3.1	N/A	T5 / L7 T5 / L9 T5/L13 T5/L14	No	No
12.	Auxiliary Operator #5	0ERP Section 3.1	N/A	T3 / L2	No	No
13.	Auxiliary Operator #6	0ERP Section 3.1	N/A	T3 / L3	No	No
14.	Auxiliary Operator #7	0ERP Section 3.1	N/A	T3 / L4	No	No

15.	Auxiliary Operator #8	0ERP Section 3.1	N/A	T3 / L5	No	No
16.	Auxiliary Operator #9	0ERP Section 3.1	N/A	T3 / L6	No	No
17.	Mechanical Maintenance Technician #1	0ERP Section 3.1	N/A	T3 / L7	No	No
18.	E&RC Technician #1	0ERP Section 3.1	N/A	T3 / L8	No	No
19.	Security Officer #1	0SI-05	N/A	T5 / L6	No	No
20.	Security Officer #2	0SI-05	N/A	T5/L15	No	No
21.	Security Officer #3	0SI-05	N/A	T5/L16	No	No
22.	Security Officer #4	0SI-05	N/A	T3/L9	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 2**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Analysis Controlling Method
1	Shift Manager	Shift Manager	Operator Training
2	Unit Supervisor #1	Unit 1 CRS	Operator Training
3	Unit Supervisor #2	Unit 2 CRS	Operator Training
4	Shift Technical Advisor	Shift Technical Advisor	Operator Training
5	Reactor Operator #1	Unit 1 RO (OAC)	Operator Training
6	Reactor Operator #2	Unit 2 RO (OAC)	Operator Training
7	Reactor Operator #3	Unit 1/2 RO (BOP)	Operator Training
8	Auxiliary Operator #1	Equipment Operator #1	Operator Training
9	Auxiliary Operator #2	Equipment Operator #2	Operator Training
10	Auxiliary Operator #3	Equipment Operator #3	Operator Training

TABLE 3 – Firefighting **Analysis # 2**

Line	Performed By	Task Analysis Controlling Method
1.	Fire Brigade Advisor (Reactor Operator #3)	Firefighter Training Program
2.	Auxiliary Operator #5	Firefighter Training Program
3.	Auxiliary Operator #6	Firefighter Training Program
4.	Auxiliary Operator #7	Firefighter Training Program
5.	Auxiliary Operator #8	Firefighter Training Program
6.	Auxiliary Operator #9	Firefighter Training Program
7.	Mechanical Maintenance Technician #1	Mechanical Maintenance Technician #1
8.	E&RC	E&RC Training Program
9.	Security Officer #4	Security Training Program

TABLE 4 – Radiation Protection & Chemistry **Analysis # 2**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1	In-Plant Survey On-Shift Position:	N/A – The performance of an in-plant survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. In-plant surveys may be dispatched after activation of the OSC.																	
2	On-Site Survey On-Shift Position:	N/A – The performance of an on-site survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. An on-site survey team may be dispatched after activation of the OSC.																	
3	Personnel Monitoring On-Shift Position:	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4	Job Coverage On-Shift Position:																		
6	Offsite Radiological Assessment On-Shift Position:	N/A – no radiological release for this event																	
7	Chemistry function/task #1 – Describe: On-Shift Position:																		
8	Chemistry function/task #2 – Describe: On-Shift Position:																		

TABLE 5 – Emergency Plan Implementation **Analysis # 2**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	Operations Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	Operations Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	Operations Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	Operations Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	Operations Training and EP Drill Program
6	ERO notification	Security Officer #1	Security Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
8	Complete State/local notification form	Shift Manager	Operations Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	Operations Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	Operations Training and EP Drill Program
12	Offsite radiological assessment	N/A	N/A
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #1[1]	Operations Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4 (CREC) INPO within 60 Min. ANI 240 Min.	N/A
15	Personnel accountability	Security Officer #2	Security Training and EP Drill Program
16	Access Control to ERO and TSC	Security Officer #3	Security Training and EP Drill Program

Attachment 2C: Control Room Fire with Evacuation

1. **Event Summary:**

A fire occurs in the Control Room requiring the room to be evacuated and Remote Shutdown procedures to be implemented.

2. **Event Specific Assumptions:**

- Assumptions are that the MCR staff has less than five minutes to muster the Fire Brigade and scram the reactor prior to evacuating the MCR.
- There was no other plant damage and all equipment operated from the remote shutdown locations operates as designed.

3. **Procedures Reviewed for Accident Response Include:**

- 0PEP-2.1 Initial Emergency Actions
- 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
- 0PEP-2.6.21 Emergency Communicator
- 0PEP-3.8.2 Personnel Accountability and Evacuation
- PFP-013 General Fire Plan
- FPP-031 Fire Brigade Staffing roster and Equipment Requirements
- ASSD-01 Alternative Safe Shutdown Procedure Index
- ASSD-02 Control Building
- 1(2)EOP-01-RSP Reactor Scram Procedure
- EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
- OPS-NGGC-1000 Fleet Conduct of Operations
- Physical Security Plan
- 0ERP Radiological Emergency Response Plan

Analysis #3: DBA/ISG Event # 3 - Control Room Fire with Evacuation **ECL: Alert**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	0ERP Section 3.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5	No	No
2.	Unit Supervisor #1	0ERP Section 3.1	N/A	T2/L2	No	No
3.	Unit Supervisor #2	0ERP Section 3.1	N/A	T2/L3	No	No
4.	Shift Technical Advisor	0ERP Section 3.1	N/A	T2/L4 T5/L11	No	Yes
5.	Reactor Operator #1	0ERP Section 3.1	N/A	T2/L5	No	No
6.	Reactor Operator #2	0ERP Section 3.1	N/A	T2/L6	No	No
7.	Reactor Operator #3 (Per FPP-031, is not required to respond as FB advisor in ASSD-02 and 05 Fire)	0ERP Section 3.1	N/A	T2/L7 T3/L1	No	No
8.	Auxiliary Operator #1	0ERP Section 3.1	N/A	T2/L8	No	No
9.	Auxiliary Operator #2	0ERP Section 3.1	N/A	T2/L9	No	No
10.	Auxiliary Operator #3	0ERP Section 3.1	N/A	T2/L10	No	No
11.	Auxiliary Operator #4 (CREC)	0ERP Section 3.1	N/A	T5/L81 T5/L9 T5/L101 T5/L13 T5/L14	No	No
12.	Auxiliary Operator #5	0ERP Section 3.1	N/A	T3/L2	No	No
13.	Auxiliary Operator #6	0ERP Section 3.1	N/A	T3/L3	No	No
14.	Auxiliary Operator #7	0ERP Section 3.1	N/A	T3/L4	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
15.	Auxiliary Operator #8	0ERP Section 3.1	N/A	T3/L5	No	No
16.	Auxiliary Operator #9	0ERP Section 3.1	N/A	T3/L6	No	No
17.	Mechanical Maintenance Technician #1	0ERP Section 3.1	N/A	T3/L7	No	No
18.	E&RC Technician #1	0ERP Section 3.1	N/A	T3/L8 T4/L6	No	No
19.	Security Officer #1	0SI-05	N/A	T5/L6	No	No
20.	Security Officer #2	0SI-05	N/A	T5/L15	No	No
21.	Security Officer #3	0SI-05	N/A	T5/L16	No	No
22.	Security Officer #4	0SI-05	N/A	T5/L17	No	No
23.	Security Officer #5	0SI-05	N/A	T5/L18	No	No
24.	Security Officer #6	0SI-05	N/A	T3/L9	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 3**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Analysis Controlling Method
1.	Shift Manager	Site Emergency Coordinator	Operator Training
2.	Unit Supervisor #1	Unit 1 CRS	Operator Training
3.	Unit Supervisor #2	Unit 2 CRS	Operator Training
4.	Shift Technical Advisor	STA	Operator Training
5.	Reactor Operator #1	Unit 1 Rx Bldg. MCC Operator	Operator Training
6.	Reactor Operator #2	Unit 2 Rx Bldg. MCC Operator	Operator Training
7.	Reactor Operator #3	Unit 1/Unit 2 RO BOP; FB Advisor	Operator Training
8.	Auxiliary Operator #1	Diesel Operator	Operator Training
9.	Auxiliary Operator #2	Emergency Switchgear Operator	Operator Training
10.	Auxiliary Operator #3	Service Water Building Operator	Operator Training

TABLE 3 – Firefighting **Analysis # 3**

Line	Performed By	Task Analysis Controlling Method
1.	Reactor Operator #3	Firefighter Training Program
2.	Auxiliary Operator #5	Firefighter Training Program
3.	Auxiliary Operator #6	Firefighter Training Program
4.	Auxiliary Operator #7	Firefighter Training Program
5.	Auxiliary Operator #8	Firefighter Training Program
6.	Auxiliary Operator #9	Firefighter Training Program
7.	Mechanical Maintenance Technician #1	Mechanical Maintenance Training Program
8.	E&RC Technician #1	E&RC Technical Training Program
9.	Security Officer #6	Security Training Program

TABLE 4 – Radiation Protection & Chemistry

Analysis # 3

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey On-Shift Position:	N/A – The performance of an in-plant survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. On-shift personnel do not require in-plant surveys in order to perform in-plant ASSD / Shutdown actions. An in-plant survey team may be dispatched after activation of the OSC																	
2.	On-Site Survey On-Shift Position:	N/A – No radiological release for this event.																	
3.	Personnel Monitoring On-Shift Position:	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4.	Job Coverage On-Shift Position:	N/A – The performance of job coverage is not necessary for initial implementation of the Emergency Plan, and not required by any procedures. On-shift personnel do not require job coverage in order to perform in-plant ASSD / shutdown actions.																	
5.	Offsite Radiological Assessment On-Shift Position:	N/A – No radiological release for this event.																	
6.	Other Site Specific RP. Fire Brigade Support On-Shift Position: RP Technician #1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 3**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	Operations Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	Operations Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	Operations Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	Operations Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	Operations Training and EP Drill Program
6	ERO notification	Security Officer #1 – From SAS/ CAS	Security Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	N/A	N/A
8	Complete State/local notification form	Auxiliary Operator #4 (CREC) in TSC as directed by SM at RSDP	Operations Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
10	Complete NRC event notification form	Auxiliary Operator #4 (CREC) in TSC as directed by SM at RSDP	Operations Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor from TSC	Operations Training and EP Drill Program
12	Offsite radiological assessment	N/A	N/A
13	Perform NRC notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4 (CREC)	N/A
15	Personnel accountability	Security Officer #2	Security Training and EP Drill Program
16	Access Control to ERO and TSC	Security Officer #3	Security Training and EP Drill Program
17	Emergency Vehicle Escort	Security Officer #4	Security Training and EP Drill Program
18	Perimeter Control	Security Officer #5	Security Training and EP Drill Program

Attachment 2D: Fuel Handling Accident in Mode 5

1. **Event Summary:**

   A spent fuel bundle is assumed to drop from the Refueling Platform grapple and land on the upper Rx Core guide. Notification from the refueling platform SRO is received, coincident with high Refuel floor, and Rx Bldg. effluent monitor alarms.

2. **Event Specific Assumptions:**

   - There was no other plant damage and all equipment operates as designed.

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - 0PEP-03.7.7 Onsite Radio0logical Controls
   - AOP-05 Radioactive Spills, High Radiation, and Airborne Activity
   - 0EOP-04 Radiation Release Control Procedure
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #4: DBA/ISG Event - Fuel Handling Accident During Refueling Mode 5 **ECL: General Emergency**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	BNP 0ERP; Figure 3-1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5 T5/L8 T5/L10	No	No
2.	Control Room Supervisor (SRO)	BNP 0ERP; Figure 3-1	N/A	T2/L2	No	No
3.	Shift Technical Advisor	BNP 0ERP; Figure 3-1	N/A	T2/L3 T5/L11	No	No
4.	Reactor Operator #1 (OAC)	BNP 0ERP; Figure 3-1	N/A	T2/L4	No	No
5.	Reactor Operator #2 (BOP)	BNP 0ERP; Figure 3-1	N/A	T2/L5	No	No
6.	Auxiliary Operator #1	BNP 0ERP; Figure 3-1	N/A	T2/L6	No	No
7.	Auxiliary Operator #4 (CREC)	BNP 0ERP; Figure 3-1	N/A	T5/L9 T5/L13 T5/L14	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
8.	Auxiliary Operator #5	BNP 0ERP; Figure 3-1	N/A	T5/L13	No	No
9.	Health Physics Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L1 T4/L2	No	No
10.	Health Physics Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L3	No	No
11.	Health Physics Technician #3	BNP 0ERP; Figure 3-1	N/A	T4/L4	No	No
12.	Chemistry Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L6	No	No
13.	Chemistry Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L7 T4/L8	No	No
14.	Security	BNP 0ERP; Figure 3-1	N/A	T5/L6 T5/L15	No	No
15.	Unaffected Unit CRS	BNP 0ERP; Figure 3-1	N/A	T5/L12	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 4**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit Supervisor	Control Room Supervisor (SRO)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
4.	Reactor Operator #1	Reactor Operator #1 (OAC)	Operator Training
5.	Reactor Operator #2	Reactor Operator #2 (BOP)	Operator Training
6.	Auxiliary Operator #1	Auxiliary Operator #1	Operator Training

TABLE 3 – Firefighting **Analysis # 4**

Line	Performed By	Task Analysis Controlling Method
1	No actions required for this event	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 4**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey: Perform Surveys & air sampling of affected area to determine reentry for damage assessment. On-Shift Position: Shift HP Tech #1										X	X	X	X	X	X			
2.	On-Site Survey: On-Shift Position: Shift Health Physics Technician #1				X	X	X	X	X	X									
3.	Personnel Monitoring: Post and control access to the affected area to reduce exposure and contamination per applicable RP procedure AOP-05. On-Shift Position: Shift HP Tech #2				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.	Job Coverage: Chemistry Tech pulling Main Stack Effluent Sample On-Shift Position: Shift HP Tech #3				X	X	X	X	X	X									
5.	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
6.	Chemistry function/task #1 Obtain Main Stack Effluent sample (30 min.) and analyze for release (30 min.) as directed by EOP-04 On-Shift Position: Shift Chem Tech #1				X	X	X	X	X	X	X	X	X	X	X	X			
7.	Chemistry function/task #2 Obtain Noble Gas Dose Rate and provide to MCR per EOP-04 On-Shift Position: Shift Chem Tech #2				X	X	X	X											
8.	Chemistry function/task #3 Sample and program Turbine WRGM Set points following realignment to recirculation per EOP-04 On-Shift Position: Shift Chem Tech #2								X	X	X	X	X	X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 4**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2.	Approve Offsite Protective Action Recommendations	Shift Manager	NA
3.	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4.	Approve extension to allowable dose limits	Shift Manager	NA
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	EP/Ops Training and EP Drill Program
6.	ERO notification	Security	EP/Ops Training and EP Drill Program
7.	Abbreviated NRC notification for DBT event	NA	NA
8.	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9.	Perform State/local notifications	Auxiliary Operator #4 (CREC)	EP/Ops Training and EP Drill Program
10.	Complete NRC event notification form	Shift Manager	EP/Ops Training and EP Drill Program
11.	Activate ERDS	Shift Technical Advisor	EP/Ops Training and EP Drill Program
12.	Offsite radiological assessment	Unaffected Unit CRS	EP/Ops Training and EP Drill Program
13.	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #5 as req.	EP/Ops Training and EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)[1]	Auxiliary Operator #4 (CREC)	N/A
15.	Personnel accountability	Security	Physical Security Plan

Attachment 2E: Control Rod Drop

1. **Event Summary:**

   A single control rod drops out of the core to the full out rod drive position after becoming unlatched from the control rod drive.

2. **Event Specific Assumptions:**

   - The control rod drop occurs subsequent to the withdrawal of the control rod to the sequence planned position 48.

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - 0E&RC 1006 Routine RCS, RHR Hx sampling
   - 0E&RC-1505 PASS Sampling
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #5: DBA/ISG Event - Control Rod Drop
TABLE 1 – On-shift Positions

ECL: Site Area Emergency

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	BNP 0ERP; Figure 3-1	N/A	T2/L1 T5/L1 T5/L3 T5/L5 T5/L8 T5/L10	No	No
2.	Control Room Supervisor (SRO)	BNP 0ERP; Figure 3-1	N/A	T2/L2	No	No
3.	Shift Technical Advisor	BNP 0ERP; Figure 3-1	N/A	T2/L3 T5/L11	No	No
4.	Reactor Operator #1 (OAC)	BNP 0ERP; Figure 3-1	N/A	T2/L4	No	No
5.	Reactor Operator #2 (BOP)	BNP 0ERP; Figure 3-1	N/A	T2/L5	No	No
6.	Auxiliary Operator #1	BNP 0ERP; Figure 3-1	N/A	T2/L6	No	No
7.	Auxiliary Operator #4 (CREC)	BNP 0ERP; Figure 3-1	N/A	T5/L9 T5/L13 T5/L14	No	No
8.	Auxiliary Operator #5	BNP 0ERP; Figure 3-1	N/A	T5/L13	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
9.	Unaffected U1 CRS	BNP 0ERP; Figure 3-1	N/A	T5/L12	No	No
10.	Health Physics Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L1	No	No
11.	Health Physics Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L4	No	No
12.	Chemistry Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L6	No	No
13.	Chemistry Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L7 T4/L8	No	No
14.	Security	BNP 0ERP; Figure 3-1	NA	T5/L6 T5/L15	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 5**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit Supervisor	Control Room Supervisor (SRO)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
4.	Reactor Operator #1	Reactor Operator #1 (OAC)	Operator Training
5.	Reactor Operator #2	Reactor Operator #2 (BOP)	Operator Training
6.	Auxiliary Operator #1	Auxiliary Operator #1	Operator Training

TABLE 3 – Firefighting **Analysis # 5**

Line	Performed By	Task Analysis Controlling Method
1	No actions required for this event	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 5**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1	In-Plant Survey: On-Shift Position: Shift Health Physics Technician #1				X	X	X	X	X	X									
2	On-Site Survey: On-Shift Position: Shift Health Physics Technician	N/A – The performance of an on-site survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. An on-site survey team may be dispatched after activation of the OSC.																	
3	Personnel Monitoring: On-Shift Position: Shift Health Physics Technician	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4	Job Coverage: Chemistry Tech pulling Main Stack Effluent Sample On-Shift Position: Shift Health Physics Technician #2				X	X	X	X	X	X	X	X	X	X	X	X			
5	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
6	Chemistry function/task #1 Obtain Main Stack Effluent sample (30 min.) and analyze for release (30 min.) as directed by EOP-04 On-Shift Position: Shift Chem Technician #1				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	Chemistry function/task #2 Obtain Noble Gas Dose Rate and provide to MCR as directed by EOP-04 On-Shift Position: Shift Chem Technician #2				X	X	X	X	X										
8	Chemistry function/task #3 Program Turbine WRGM Set points following realignment to recirculation as directed by EOP-04 On-Shift Position: Shift Chem Technician #2								X	X	X	X	X	X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 5**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	NA	NA
3	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4	Approve extension to allowable dose limits	NA	NA
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	EP/Ops Training and EP Drill Program
6	ERO notification	Security	Security Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	NA	NA
8	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator 4 (CREC)	EP/Ops Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	EP/Ops Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	EP/Ops Training and EP Drill Program
12	Offsite radiological assessment	Unaffected U1 CRS	EP/Ops Training and EP Drill Program
13	Perform NRC notifications	Auxiliary Operator 4 (CREC) Auxiliary Operator #5 as req.	EP/Ops Training and EP Drill Program
14	Perform other site-specific event notifications	Auxiliary Operator 4 (CREC)	N/A
15	Personnel accountability	Security	Physical Security Plan

Attachment 2F: Station Blackout (SBO)

1. **Event Summary:**

   A Loss of all Off-Site power occurs.

2. **Event Specific Assumptions:**

   - Only EDG #2 starts and synchronizes to 4160 Emergency Bus E2.
   - There was no other plant damage and all equipment operates as designed.

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - AOP-36.2 Station Blackout
   - 1(2)EOP-01-RSP Reactor Scram Procedure
   - 1(2)EOP-01-RVCP Reactor Vessel Control Procedure
   - 1(2)EOP-04 RRCP Radiation Release Control Procedure
   - 0E&RC 1006 Routine RCS, RHR Hx sampling
   - 0E&RC-1706 TB OTV alignment
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #6: DBA/ISG Event # 6 - SBO **ECL: Site Area Emergency**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	0ERP Section 3.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5 T5/L8 T5/L10	No	No
2.	Unit Supervisor #1	0ERP Section 3.1	N/A	T2/L2	No	No
3.	Unit Supervisor #2	0ERP Section 3.1	N/A	T2/L3	No	No
4.	Shift Technical Advisor	0ERP Section 3.1	N/A	T2/L4 T5/L11	No	No
5.	Reactor Operator #1	0ERP Section 3.1	N/A	T2/L5	No	No
6.	Reactor Operator #2	0ERP Section 3.1	N/A	T2/L6	No	No
7.	Reactor Operator #3	0ERP Section 3.1	N/A	T2/L7	No	Yes
8.	Auxiliary Operator #1	0ERP Section 3.1	N/A	T2/L8	No	No
9.	Auxiliary Operator #2	0ERP Section 3.1	N/A	T2/L9	No	No
10.	Auxiliary Operator #3	0ERP Section 3.1	N/A	T2/L10	No	No
11.	Auxiliary Operator #4 (CREC)	0ERP Section 3.1	N/A	T5 /L9 T5/L13 T5/L14	No	No
12.	Auxiliary Operator #5	0ERP Section 3.1	N/A	T2/L11	N/A	N/A
13.	Auxiliary Operator #6	0ERP Section 3.1	N/A	T2/L12	N/A	N/A
14.	Auxiliary Operator #7	0ERP Section 3.1	N/A	T2/L13	N/A	N/A

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
15.	Auxiliary Operator #8	0ERP Section 3.1	N/A	T5/L13	N/A	N/A
16.	HP Technician #1	0ERP Section 3.1	N/A	T4/L1 T4/L5 T4/L6	No	No
17.	HP Technician #2	0ERP Section 3.1	N/A	T4/L2	No	No
18.	HP Technician #3	0ERP Section 3.1	N/A	T4/L4	No	No
19.	Chemistry Technician #1	0ERP Section 3.1	N/A	T4/L8 T4/L9 T4/L12	No	No
20.	Chemistry Technician #2	0ERP Section 3.1	N/A	T4/L10 T4/L11	No	No
21.	Security Officer #1	0SI-05	N/A	T5/L6	No	No
22.	Security Officer #2	0SI-05	N/A	T5/L15	No	No
23.	Security Officer #3	0SI-05	N/A	T5/L16	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 6**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Analysis Controlling Method
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit Supervisor #1	Unit 1 CRS	Operator Training
3.	Unit Supervisor #2	Unit 2 CRS	Operator Training
4.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
5.	Reactor Operator #1	RO1 Unit 1 OAC Operator	Operator Training
6.	Reactor Operator #2	RO2 Unit 1 BOP Operator	Operator Training
7.	Reactor Operator #3	RO3 Unit 2 OAC Operator	Operator Training
8.	Auxiliary Operator #1	RB2 Equip Operator	Operator Training
9.	Auxiliary Operator #2	TB2 Equip Operator	Operator Training
10.	Auxiliary Operator #3	Outside Equip Operator	Operator Training
11.	Auxiliary Operator #5	RB1 Equip Operator	Operator Training
12.	Auxiliary Operator #6	TB1 Equip Operator	Operator Training
13.	Auxiliary Operator #7	WCC Auxiliary Operator	Operator Training

TABLE 3 – Firefighting **Analysis # 6**

Line	Performed By	Task Analysis Controlling Method
1	No actions required for this event	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 6**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey: Perform RB surveys. On-Shift Position: Shift Health Physics Technician #1. Would also perform survey areas covered in line 5 and 6.		X	X	X														
2.	On-Site Survey: Perform Field Surveys for unmonitored release. On-Shift Position: Shift Health Physics Technician #2				X	X	X	X	X	X									
3.	Personnel Monitoring: On-Shift Position: Shift Health Physics Technician	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4.	Job Coverage: Chemistry Tech pulling Main Stack Effluent Sample On-Shift Position: Shift Health Physics Technician #3.				X	X	X	X	X	X									
5.	Job Coverage: Operations verify RB Ventilation dampers closed. On-Shift Position: Shift Health Physics Technician #1 performed concurrent with line 1										X	X	X	X					
6.	Job Coverage: Operations defeat HPCI/RCIC auto swap (open breakers in RB). On-Shift Position: Shift Health Physics Technician #1 concurrent with line 1					X	X	X	X										
7.	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
8.	Chemistry function/task #1 Initiate Alternate Sampling for loss of power to station Radiation Monitors On-Shift Position: Shift Chem Technician #1		X	X	X	X	X	X											
9.	Chemistry function/task #2 Obtain Noble Gas Dose Rate and provide to MCR as directed by EOP-04 On-Shift Position: Shift Chem Technician #1								X	X	X	X							

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
10.	Chemistry function/task #3 Obtain Main Stack Effluent sample (30 min.) as directed by EOP-04 On-Shift Position: Shift Chem Technician #2		X	X	X	X	X	X											
11.	Chemistry function/task #4 Analyze Main Stack Effluent sample (30 min.) as directed by EOP-04 On-Shift Position: Shift Chem Technician #2								X	X	X	X	X	X					
12.	Chemistry function/task #5 Program Turbine WRGM Set points following realignment to recirculation as directed by EOP-04 On-Shift Position: Shift Chem Technician #1												X	X	X	X	X	X	

TABLE 5 – Emergency Plan Implementation **Analysis # 6**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	Operations Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	Operations Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	Operations Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	Operations Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	Operations Training and EP Drill Program
6	ERO notification	Security Officer #1	Operations Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	N/A	N/A
8	Complete State/local notification form	Shift Manager	Operations Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	Operations Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	Operations Training and EP Drill Program
12	Offsite radiological assessment	N/A	N/A
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #8	Operations Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4 (CREC)	N/A
15	Personnel accountability	Security Officer #2	Security Training and EP Drill Program
16	Access Control to ERO and TSC	Security Officer #3	Security Training and EP Drill Program

Attachment 2G: Steam System Piping Failure

1. **Event Summary:**

   Unit 2 "A" Main Steam Line ruptures in Turbine Building in area outside MSL Tunnel but upstream of steam bypass header.

2. **Event Specific Assumptions:**

   - Group 1 isolation on High Steam Flow or High Turbine Building Temperature
   - Rx scam initiated by MSIV limit switch position – All control rods insert successfully

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - 1(2)EOP-01-RSP Reactor Scram Procedure
   - 1(2)EOP-01-RVCP Reactor Vessel Control Procedure
   - 0EOP-04 RRCP Radiation Release Control Procedure
   - 0E&RC 1006 Routine RCS, RHR Hx sampling
   - 0E&RC-1505 PASS Sampling
   - 0E&RC-1706 TB OTV Alignment
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #7: DBA/ISG Event #7 - Steam System Piping Failure **ECL: General Emergency (Radiological Consequence)**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	BNP 0ERP; Figure 3-1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5 T5/L8 T5/L10	No	No
2.	Control Room Supervisor (SRO)	BNP 0ERP; Figure 3-1	N/A	T2/L2	No	No
3.	Unaffected Unit Control Room Supervisor (SRO)	BNP 0ERP; Figure 3-1	N/A	T5/L12	No	No
4.	Shift Technical Advisor	BNP 0ERP; Figure 3-1	N/A	T2/L3 T5/L11	No	No
5.	Reactor Operator #1 (OAC)	BNP 0ERP; Figure 3-1	N/A	T2/L4	No	No
6.	Reactor Operator #2 (BOP)	BNP 0ERP; Figure 3-1	N/A	T2/L5 T5/L5	No	No
7.	Auxiliary Operator #2	BNP 0ERP; Figure 3-1	N/A	T2/L6	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
8.	Auxiliary Operator #4 (CREC)	BNP 0ERP; Figure 3-1	N/A	T5/L9 T5/L13 T5/L14	No	No
9.	Auxiliary Operator #5	BNP 0ERP; Figure 3-1	N/A	T5/L13	No	No
10.	Health Physics Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L1	No	No
11.	Health Physics Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L2	No	No
12.	Health Physics Technician #3	BNP 0ERP; Figure 3-1	N/A	T4/L4	No	No
13.	Chemistry Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L6	No	No
14.	Chemistry Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L7 T4/L8	No	No
15.	Security	BNP 0ERP; Figure 3-1	N/A	T5/L6 T5/L15	No	No

TABLE 2 Plant Operations & Safe Shutdown **Analysis # 7**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit 2 Supervisor	Control Room Supervisor 2 (SRO)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
4.	Reactor Operator #1	Reactor Operator #1 (OAC)	Operator Training
5.	Reactor Operator #2	Reactor Operator #2 (BOP)	Operator Training
6.	Auxiliary Operator #2	Auxiliary Operator #2 (U2 Turbine)	Operator Training

TABLE 3 – Firefighting **Analysis # 7**

Line	Performed By	Task Analysis Controlling Method
1	No actions required for this event	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 7**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey: Perform TB surveys as allowed by SIC. On-Shift Position: Shift Health Physics Technician #1				X	X	X	X	X	X	X	X	X	X	X	X			
2.	On-Site Survey: Perform Field Surveys for unmonitored Turbine Bldg. release. On-Shift Position: Shift Health Physics Technician #2				X	X	X	X	X	X	X	X	X	X	X	X			
3.	Personnel Monitoring: On-Shift Position: Shift Health Physics Technician	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4.	Job Coverage: Chemistry Tech pulling Turbine Bldg. Effluent Sample On-Shift Position: Shift HP Technician #3				X	X	X	X	X	X	X	X	X	X	X	X			
5.	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
6.	Chemistry function/task #1 Obtain Turbine Stack Effluent sample (30 min.) and analyze for release (30 min.) as directed by 0EOP-04. On-Shift Position: Shift Chem Tech #1				X	X	X	X	X	X	X	X	X	X	X	X			
7.	Chemistry function/task #2 Obtain Noble Gas Dose Rate and provide to MCR as directed by 0EOP-04. On-Shift Position: Shift Chem Tech #2				X	X	X	X	X										
8	Chemistry function/task #3 Perform E&RC-1706 Sampling of Once-Thru Ventilation as directed by EOP-04. On-Shift Position: Shift Chem Tech #2									X	X	X	X	X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 7**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	EP/Ops Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	EP/Ops Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	EP/Ops Training and EP Drill Program
6	ERO notification	Security Officer	EP/Ops Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	NA	NA
8	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	EP/Ops Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	EP/Ops Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	EP/Ops Training and EP Drill Program
12	Offsite radiological assessment	Unaffected Unit CRS	EP/Ops Training and EP Drill Program
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #5 as req.	EP/Ops Training and EP Drill Program
14	Perform other site-specific event notifications	Auxiliary Operator #4 (CREC)	EP/Ops Training and EP Drill Program
15	Personnel accountability	Security	Physical Security Plan

Attachment 2H: Large Break Loss of Coolant Accident (LOCA)

1. **Event Summary:**

   A complete circumferential break of one of the recirculation loop pipelines occurs. This accident has been established as the design basis LOCA.

2. **Event Specific Assumptions:**

   - The reactor is operating at a condition at the time the recirculation pipe breaks
   - A complete loss of normal AC power occurs simultaneously with the pipe break.
   - The recirculation loop pipeline is considered to sever instantly.

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - AOP-36.1 Loss of Any 4160v Buses or 480v E-Buses
   - 1(2)EOP-01-RSP Reactor Scram Procedure
   - 1(2)EOP-01-RVCP Reactor Vessel Control Procedure
   - 0EOP-04 RRCP Radiation Release Control Procedure
   - 0E&RC 1006 Routine RCS, RHR Hx sampling
   - 0E&RC-1505 PASS Sampling
   - 0E&RC-1706 TB OTV Alignment
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System
   - OPS-NGGC-1000 Fleet Conduct of Operations
   - Physical Security Plan
   - 0ERP Radiological Emergency Response Plan

Analysis #8: DBA/ISG Event #8 - Large Break LOCA **ECL: Site Area escalates to General Emergency**
TABLE 1 – On-shift Positions

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	0ERP Section 3.1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5 T5/L8 T5/L10	No	No
2.	Unit 2 CRS	0ERP Section 3.1	N/A	T2/L2	No	No
3.	Shift Technical Advisor	0ERP Section 3.1	N/A	T2/L3 T5/L11	No	No
4.	Reactor Operator #1	0ERP Section 3.1	N/A	T2/L4	No	No
5.	Reactor Operator #2	0ERP Section 3.1	N/A	T2/L5	No	No
6.	Unaffected Unit (1) CRS	0ERP Section 3.1	N/A	T5/L12	No	No
7.	Auxiliary Operator #1	0ERP Section 3.1	N/A	T2 / L6	No	No
8.	Auxiliary Operator #2	0ERP Section 3.1	N/A	T2 / L7	No	No
9.	Auxiliary Operator #3	0ERP Section 3.1	N/A	T2/L8	No	No
10.	Auxiliary Operator #4 (CREC)	0ERP Section 3.1	N/A	T5/L9 T5/L13 T5/L14	No	No
11.	Auxiliary Operator #5	0ERP Section 3.1	N/A	T2/L9	No	No
12.	Auxiliary Operator #6	0ERP Section 3.1	N/A	T2/L10	No	No
13.	Auxiliary Operator #7	0ERP Section 3.1	N/A	T2/L11	No	No
14.	Auxiliary Operator #8	0ERP Section 3.1	N/A	T5/L13	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
15.	HP Technician #1	0ERP Section 3.1	N/A	T4/L1 T4/L5	No	No
16.	HP Technician #2	0ERP Section 3.1	N/A	T4/L4	No	No
17.	HP Technician #3	0ERP Section 3.1	N/A	T4/L6	No	No
18.	Chemistry Technician #1	0ERP Section 3.1	N/A	T4/L8	No	No
19.	Chemistry Technician #2	0ERP Section 3.1	N/A	T4/L9 T4/L10	No	No
20.	Security Officer #1	0SI-05	N/A	T5 / L6	No	No
21.	Security Officer #2	0SI-05	N/A	T5/L15	No	No
22.	Security Officer #3	0SI-05	N/A	T5/L16	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 8**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Analysis Controlling Method
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit Supervisor #2	Unit 2 CRS	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
4.	Reactor Operator #1	Unit 2 OAC	Operator Training
5.	Reactor Operator #2	Unit 2 BOP	Operator Training
6.	Auxiliary Operator #1	RB Auxiliary Operator	Operator Training
7.	Auxiliary Operator #2	TB Auxiliary Operator	Operator Training
8.	Auxiliary Operator #3	OS Auxiliary Operator	Operator Training
9.	Auxiliary Operator #5	Equipment Operator #5	Operator Training
10.	Auxiliary Operator #6	Equipment Operator #6	Operator Training
11.	Auxiliary Operator #7	Equipment Operator #7	Operator Training

TABLE 3 – Firefighting **Analysis # 8**

Line	Performed By	Task Analysis Controlling Method
1	No actions required for this event	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 8**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey: Perform RB surveys as allowed by SIC. On-Shift Position: Shift Health Physics Technician #1								X	X	X	X	X	X					
2.	On-Site Survey: Perform Field Surveys for unmonitored release. On-Shift Position: Shift Health Physics Technician	N/A – The performance of an on-site survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. An on-site survey team may be dispatched after activation of the OSC.																	
3.	Personnel Monitoring: On-Shift Position: Shift Health Physics Technician	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4.	Job Coverage: Chemistry Tech pulling Main Stack Effluent Sample On-Shift Position: Shift HP Technician #2.				X	X	X	X	X	X									
5.	Job Coverage: Ops close MS-3 per SEP-11. On-Shift Position: Shift HP Technician #1				X	X	X	X											
6.	Job Coverage: Operations maximize CRD injection in U2 RB per SEP-09. On-Shift Position: Shift HP Technician #3				X	X	X	X	X	X									
7.	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
8.	Chemistry function/task #1 Obtain Main Stack Eff. sample (30 min.) and analyze for release (30 min.) per EOP-04. On-Shift Position: Shift Chem Technician #1				X	X	X	X	X	X	X	X	X	X	X	X			
9.	Chemistry function/task #2 Obtain Noble Gas Dose Rate and provide to MCR as directed by EOP-04. On-Shift Position: Shift Chem Technician #2				X	X	X	X	X										
10.	Chemistry function/task #3 Sample TB effluent and program Turbine WRGM Set points following realignment to recirculation as directed by EOP-04. On-Shift Position: Shift Chem Technician #2									X	X	X	X	X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 8**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	Operations Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	Operations Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	Operations Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	Operations Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	Operations Training and EP Drill Program
6	ERO notification	Security Officer #1	Security Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	N/A	N/A
8	Complete State/local notification form	Shift Manager	Operations Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	Operations Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	Operations Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	Operations Training and EP Drill Program
12	Offsite radiological assessment	Unaffected Unit (1) CRS	Operations Training and EP Drill Program
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) Auxiliary Operator #8	Operations Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4(CREC)	Operations Training and EP Drill Program
15	Personnel accountability	Security Officer #2	Security Training and EP Drill Program
16	Access Control to ERO and TSC	Security Officer #3	Security Training and EP Drill Program

Attachment 2I: SAMG Response Actions

1. **Event Summary:**

   As a continuation of Event #8, Large Break LOCA, this analysis assumes Control Room Operators were unable to restore and maintain Reactor Water level above -57.5 inches as an entry into the SAMG procedures.

2. **Event Specific Assumptions:**

   - There was no other plant damage and all equipment operates as designed.

3. **Procedures Reviewed for Accident Response Include:**

   - 0PEP-2.1 Initial Emergency Actions
   - 0PEP-2.1.1 Emergency Control, UE, Alert, SAE, GE
   - 0PEP-2.6.21 Emergency Communicator
   - 0PEP-2.6.28 Protective Action Recommendations
   - 0PEP-3.8.2 Personnel Accountability and Evacuation
   - 1(2)EOP-01-RSP Reactor Scram Procedure
   - 1(2)EOP-01-RVCP Reactor Vessel Control Procedure
   - 0EOP-04 RRCP Radiation Release Control Procedure
   - 0SAMG-01 RPV Level Control
   - 0SAMG-02 Containment and Radioactivity Release Control
   - 0EDMG-04 Depressurization of the Reactor Vessel and Injection using the Emergency Diesel Makeup Pump (EDMP)
   - 0EDMG-08 Emergency Diesel Makeup Pump (EDMP) Setup and Operation
   - 0E&RC-1006 Routine RCS, RHR Hx sampling
   - 0E&RC-2020 Setpoint Determinations for Gaseous Radiation Monitors
   - 0E&RC-1505 PASS Sampling
   - 0E&RC-1706 TB OTV Alignment
   - EMG-NGGC-0005 Activation of the Emergency Response Organization Notification System

- OPS-NGGC-1000 Fleet Conduct of Operations
- Physical Security Plan
- 0ERP Radiological Emergency Response Plan

Analysis #9: DBA/ISG Event # 9 - SAMG **ECL: General Emergency**
TABLE 1 – *On-shift Positions*

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
1.	Shift Manager	BNP 0ERP; Figure 3-1	N/A	T2/L1 T5/L1 T5/L2 T5/L3 T5/L4 T5/L5 T5/L8 T5/L10	No	No
2.	Control Room Supervisor (SRO)	BNP 0ERP; Figure 3-1	N/A	T2/L2	No	No
3.	Shift Technical Advisor	BNP 0ERP; Figure 3-1	NA	T2/L3 T5/L11	No	No
4.	Unaffected Unit (1) CRS	BNP 0ERP; Figure 3-1	N/A	T5/L12	No	No
5.	U2 Reactor Operator #1 (OAC)	BNP 0ERP; Figure 3-1	N/A	T2/L4	No	No
6.	U2 Reactor Operator #2 (BOP)	BNP 0ERP; Figure 3-1	N/A	T2/L5	No	No
7.	Auxiliary Operator#1 (Reactor)	BNP 0ERP; Figure 3-1	N/A	T2/L6	No	No
8.	Auxiliary Operator#2 (Turbine)	BNP 0ERP; Figure 3-1	N/A	T2/L7	No	No
9.	Auxiliary Operator#3 (Outside)	BNP 0ERP; Figure 3-1	N/A	T2/L8	No	No

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table#/Line#	Unanalyzed Task?	TMS Required?
10.	Auxiliary Operator #4 (CREC)	BNP 0ERP; Figure 3-1	N/A	T5/L9 T5/L13 T5/L14	No	No
11.	Auxiliary Operator #5	BNP 0ERP; Figure 3-1	N/A	T5/L13	No	No
12.	Health Physics Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L1 T4/L5	No	No
13.	Health Physics Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L4	No	No
14.	Health Physics Technician #3	BNP 0ERP; Figure 3-1	N/A	T4/L6	No	No
15.	Chemistry Technician #1	BNP 0ERP; Figure 3-1	N/A	T4/L8 T4/L9	No	No
16.	Chemistry Technician #2	BNP 0ERP; Figure 3-1	N/A	T4/L10 T4/L11 T4/L12	No	No
17.	Mechanical Maintenance Technician #1	BNP 0ERP; Figure 3-1	N/A	T2/L9	No	No
18.	Security	BNP 0ERP; Figure 3-1	N/A	T5/L6 T5/L15	No	No

Table 2 Plant Operations & Safe Shutdown **Analysis # 9**
BNP Nuclear Plant Two Units - One Control Room
Minimum Operations Crew Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
1.	Shift Manager	Shift Manager	Operator Training
2.	Unit 2 Supervisor	Control Room Supervisor (SRO)	Operator Training
3.	Shift Technical Advisor	Shift Technical Advisor	Operator Training
4.	Reactor Operator #1	U2 Reactor Operator #1 (OAC)	Operator Training
5.	Reactor Operator #2	U2 Reactor Operator #2 (BOP)	Operator Training
6.	Auxiliary Operator #1	Auxiliary Operator#1 (Reactor)	Operator Training
7.	Auxiliary Operator #2	Auxiliary Operator#2 (Turbine)	Operator Training
8.	Auxiliary Operator #3	Auxiliary Operator#3 (Outside)	Operator Training

Other (non-Operations) Personnel Necessary to Implement
AOPs and EOPs, or SAMGs if applicable

Line	Generic Title/Role	On-Shift Position	Task Performance Validation
9.	Mechanical Maintenance	Mechanical Maintenance Technician #1	Mechanical Maintenance Technical Training

TABLE 3 – Firefighting **Analysis # 9**

Line	Performed By	Task Analysis Controlling Method
1	*No actions required for this event*	NA

TABLE 4 – Radiation Protection & Chemistry **Analysis # 9**

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
		0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
1.	In-Plant Survey: Perform RB surveys as allowed by SIC. On-Shift Position: Shift Health Physics Technician #1										X	X	X	X	X	X			
2.	On-Site Survey: On-Shift Position:	N/A – The performance of an on-site survey is not necessary for initial implementation of the Emergency Plan, and not required by any procedure. An on-site survey team may be dispatched after activation of the OSC.																	
3.	Personnel Monitoring: On-Shift Position:	N/A – Personnel can out-process from the Radiologically Controlled Area (RCA) using portal and small article monitors. On-shift personnel do not require monitoring support in order to perform in-plant EOP/shutdown actions. If necessary, site evacuees would be monitored at the Remote Monitoring Area after arrival of augmented ERO personnel.																	
4.	Job Coverage: Chemistry Tech pulling Main Stack Effluent Sample On-Shift Position: Shift HP Technician #2.				X	X	X	X	X	X									
5.	Job Coverage: Chemistry Tech Pulling Primary Containment sample. On-Shift Position: Shift HP Technician #1				X	X	X	X	X	X									
6.	Job Coverage: OPS Support for EDMG-004 and EDMG-008 drafting water from Discharge Canal. On-Shift Position: Shift HP Technician #3				X	X	X	X	X	X									
7.	Offsite Radiological Assessment On-Shift Position: Chemistry Tech	Performed by Unaffected Unit CRS – Ref. Table 5																	
8.	Chemistry function/task #1 – Sample Primary Containment for venting within release limits per E&RC 2020& 1505 On-Shift Position: Shift Chem Tech #1			X	X	X	X	X	X										
9.	Chemistry function/task #2 – Analyze and Primary Containment atmospheric sample for venting. On-Shift Position: Shift Chem Tech #1									X	X	X	X	X	X	X	X	X	X

Line	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)																	
10.	Chemistry function/task #3 – Determine Noble Gas Instantaneous Release Rate for Gaseous Radiation Monitors directed by SAMG-02. On-Shift Position: Shift Chem Tech #2			X	X	X	X												
11.	Chemistry function/task #4 Obtain Main Stack Effluent sample (30 min.) On-Shift Position: Shift Chem Tech #2							X	X	X	X	X	X						
12.	Chemistry function/task #5 Analyze Main Stack Effluent sample (30 min.) On-Shift Position: Shift Chem Tech #2													X	X	X	X	X	X

TABLE 5 – Emergency Plan Implementation **Analysis # 9**

Line	Function/Task	On-Shift Position	Task Analysis Controlling Method
1	Declare the Emergency Classification Level (ECL)	Shift Manager	EP/Ops Training and EP Drill Program
2	Approve Offsite Protective Action Recommendations	Shift Manager	EP/Ops Training and EP Drill Program
3	Approve content of State/local notifications	Shift Manager	EP/Ops Training and EP Drill Program
4	Approve extension to allowable dose limits	Shift Manager	EP/Ops Training and EP Drill Program
5	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Shift Manager	EP/Ops Training and EP Drill Program
6	ERO notification	Security	Security Training and EP Drill Program
7	Abbreviated NRC notification for DBT event	NA	NA
8	Complete State/local notification form	Shift Manager	EP/Ops Training and EP Drill Program
9	Perform State/local notifications	Auxiliary Operator #4 (CREC)	EP/Ops Training and EP Drill Program
10	Complete NRC event notification form	Shift Manager	EP/Ops Training and EP Drill Program
11	Activate ERDS	Shift Technical Advisor	EP/Ops Training and EP Drill Program
12	Offsite radiological assessment	Unaffected Unit CRS	EP Training and EP Drill Program
13	Perform NRC notifications	Auxiliary Operator #4 (CREC) & Auxiliary Operator #5	EP/Ops Training and EP Drill Program
14	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	Auxiliary Operator #4 (CREC)	N/A
15	Personnel accountability	Security	Physical Security Plan

REVISION SUMMARY

Revision 82 consists of the following changes:

- Section 2.1, General Classification System, page 2-1, first paragraph, 2nd sentence, changed the word "instructions" to "procedures." PRR 572687
- Figure 2.0-1, Response Sequence to Off-Normal Conditions, page 2-6, was updated to provide more detail and include Security Threat. PRR 572687
- Section 3.1, Normal Operating Organization, page 3-3, third paragraph, first sentence, changed "Senior Control Operators" to Senior Reactor Operators." PRR 572687
- Section 3.2, On-Shift Emergency Organization, page 3-4, third paragraph, first sentence, was revised from "As an aid toward assuring that critical emergency actions are given proper attention, the plant's emergency procedures provide for emergency response personnel established to carry out specific types of functions such as accident assessment and off-site notification" to "As an aid toward assuring that critical emergency actions are given proper attention, the plant's emergency procedures provide for emergency response personnel to carry out specific types of functions such as accident assessment and off-site notification."
- Section 3.2.2, Plant Operators, page 3-7 second paragraph, first sentence, changed the word "instructions" to "procedures." PRR 572687
- Section 3.3, Technical Support Center:
  - Page 3-7 first paragraph, last sentence; changed "Control Room Operators" to "Reactor Operators." PRR 572687
  - Page 3-8, last sentence added "and provide support per 0PEP-02.6.30, Activation and Operation of the Alternate Emergency Facility, until safe access to the site is assured."
- Section 3.3.1, Plant Operations Director, page 3-8, first and second sentence changed "Control Operators" to "Reactor Operators." PRR 572687
- Section 3.4.6, Fire Brigade, page 3-13, second paragraph, first sentence, deleted "Fire Brigade Advisor." The Fire Brigade Advisor is not a member of the Fire Brigade, they advise the Fire Brigade. They are a member of the Operations Staff. Change made for clarification. PRR 572687
- Section 5.2, Technical Support Center, page 5-2, changed "Control Operators" to "Reactor Operators." PRR 572687
- Section 8.0, References, page 8-3, added Item 30, Letter from Conrad S. Burnside (Federal Emergency Management Agency) to Carolina Power & Light Company regarding provisions for Emergency Plan Backup Alert and Notification, dated November 28, 2012. (Serial Number, FED 12-0001.)
- Appendix B, Agreements, page B-18, updated INPO letter of agreement, dated October 30, 2012.

- The changes below were made to address the BNP Staffing Analysis: PRR 527296
  - Added Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012, to Table of Contents and to body of the 0ERP.
  - Figure 3.1-1, Brunswick Shift Organization, page 3-27, revised to reflect new on-shift staffing.
  - Section 3.1, Normal Operating Organization, page 3-3, third paragraph, was revised from "Each operating shift will normally consist of a Control Room Site Emergency Coordinator normally filled by the Shift Manager or other qualified Control Room personnel, two Senior Control Operators, three Control Operators, nine Auxiliary Operators, three Health Physics Technicians, one Chemistry Technician, two Mechanical Maintenance Technicians, three I&C/Electrical Maintenance Technicians, and one Shift Technical Advisor (STA). Deviation from the normal shift complement is allowed as long as the minimum shift complement, as described in Technical Specification 5.2.2 and UFSAR Table 13-1, is maintained and appropriate action is taken (see Figure 3.1-1)" to "Each operating shift will normally consist of a Control Room Site Emergency Coordinator normally filled by the Shift Manager or other qualified Control Room personnel, two Senior Reactor Operators, four Reactor Operators, nine Auxiliary Operators, three Health Physics Technicians, two Chemistry Technicians, two Mechanical Maintenance Technicians, three I&C/Electrical Maintenance Technicians, and one Shift Technical Advisor (STA). See Figure 3.1-1, Brunswick Shift Organization. Shift crew composition may be less than the minimum requirements for a period of time not to exceed two (2) hours in order to accommodate unexpected absence of on-duty shift crew members provided immediate action is taken to restore the shift crew composition to within the requirements specified as referenced in UFSAR Table 13-1. Document any deviation from Figure 3.1-1 in the corrective action program."
  - Section 3.2, On-Shift Emergency Organization, page 3-4
    - First paragraph, first sentence, added "see Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012."
    - Second paragraph, deleted 3rd sentence "Depending on weather conditions, 30-45 minutes should provide enough time to make the appropriate staff available to augment the on-site organization" and added two new sentences "A Staffing Analysis was completed in December, 2012 which validated adequate on-shift staffing is available for worst case scenarios postulated at Brunswick Nuclear Plant. See Attachment 1, Brunswick Nuclear Plant On-Shift Staffing Analysis Summary December, 2012 for details of on-shift staffing 24/7."
  - Section 8.0, References, page 8-3, added Item 29, On-Shift Staffing Analysis for Brunswick Nuclear Plant, December, 2012. (PRR 00527296)