PSEG Site
ESP Application
Part 5, Emergency Plan

SECTION 1

INTRODUCTION

1.0 Purpose

This plan has as its fundamental purpose the protection of health and safety of the general public and site personnel from the potential hazards of a radiological emergency.

2.0 Background

This plan is submitted in accordance with the requirements of 10 CFR 50 Appendix E and the objectives of NUREG 0654 (November 1980).

3.0 Scope

This plan identifies the normal and emergency operating organizations, the emergency facilities available, and the overall program for managing and recovering from an emergency situation. The plan shows which federal, state, and local authorities and agencies are available for assistance, and that liaison with such authorities and agencies can be and is established in order to obtain assistance and implement protective actions if necessary. In this manner, the plan reflects the combined efforts and coordination of all responsible organizations, and addresses the general criteria and organization for managing an emergency.

4.0 Planning Basis

In developing this plan, the following reference documents were used as the planning basis:

(1) "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants", NUREG-0654/FEMA, REP.- 1, Rev. l (November 1980); and

(2) "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" NUREG-0396, EPA 510/1-78-016 (December 1978).

The PSEG Site is 15 miles south of the Delaware Memorial Bridge, 18 miles south of Wilmington, Delaware, 30 miles southwest of Philadelphia, Pennsylvania, and 7-1/2 miles southwest of Salem, New Jersey. Figure 1-1 shows the general location of the PSEG Site and the PSEG Site layout is shown in Figure 1-2. The closest primary public road is New Jersey Route 49, and typical access to the site is from Alloway Creek Neck Road.

The overall objective of this plan is to prevent or reduce radiation exposures to the public resulting from an accident at the PSEG Site. The actual or potential exposures considered in the development of this plan are due to the two principal pathways (plume and ingestion). Although the selected planning basis is independent of specific accident sequences, a number of accident descriptions were considered in the development of this plan, including the core melt accident release categories of the Reactor Safety Study (WASH 1400).

The planning basis used two predominant Emergency Planning Zones (EPZs).

(1) Plume exposure pathway EPZ – The plume exposure pathway EPZ is an area surrounding the plant within a radius of approximately 10 miles. The principal exposure sources from this pathway are: (a) whole body external exposure to gamma radiation from the plume and from deposited material; and (b) inhalation exposure from the passing radioactive plume.

(2) Ingestion exposure pathway EPZ – The ingestion exposure pathway EPZ is an area surrounding the plant within a radius of approximately 50 miles. The principal exposure from this pathway is the ingestion of contaminated milk. The planning effort for this pathway involves the identification of potential sources of contaminated milk and associated control points and mechanisms that prevent it from entering the human food chain. Ingestion pathway exposures in general would represent a problem in the days or weeks following an accident, although some early protective actions to minimize subsequent contamination of milk are provided in the state plans. Additionally, the secondary exposure pathway of ingestion of contaminated foods (either human or animal) was considered in the planning effort.

The EPZ Centerpoint is located at Latitude 39° 27’ 50.4” and Longitude 75° 32’ 08.7”. (Exact boundaries are determined in concurrence with state and county authorities). Figure 1-3 provides an illustration of the plume exposure pathway EPZ which includes areas within approximately 10-miles of the PSEG Site in Salem and Cumberland counties in New Jersey and New Castle and Kent counties in Delaware. Figure 1-4 provides an illustration of the ingestion exposure EPZ which consists of an area approximately 50 miles in radius around the PSEG Site and includes portions of New Jersey, Delaware, Maryland and Pennsylvania.

The EPZs are the areas for which planning is performed to assure that prompt effective actions can be taken to protect the public in the event of an accident. The state's response organizations, rather than local, have taken principal responsibility for the planning associated with the ingestion exposure pathway. The principal townships, towns, cities, and ERPA populations within ten miles of the site are listed in Table 1-1.

The following definitions are used in the plan:

(1) **Accident**

An unforeseen and unintentional event that may result in an emergency.

(2) **Action Steps**

Those steps listed in the Emergency Plan Implementing Procedures which are used to provide direction to appropriate individuals to reduce risk to the health and safety of the public, site personnel and emergency workers in the event an emergency occurs.

(3) **Affected Station**

Distinguishes the station (PSEG Site, Hope Creek or Salem), which experiences a specific emergency event. The designation of the affected station determines the leadership sequences for the emergency response organization for PSEG.

(4) **Assessment Actions**

Those actions taken during or after an accident to obtain and process information necessary to make decisions to implement specific emergency measures.

(5) **Committed Effective Dose Equivalent (CEDE)**

The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

(6) **Contamination**

The presence of radioactive material in undesirable locations.

(7) **Curie (Ci)**

A unit of radioactivity; 1 Curie is that amount of radioactive material in which 3.7×10^{10} disintegrations occur per second. The millicurie and microcurie are respectively one thousandth and one millionth of a Curie.

(8) **Deep Dose Equivalent (DDE)**

Applies to external whole body exposure. It is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm^2).

(9) **Decontamination**

The removal of radioactive contaminants from surfaces or equipment, by cleaning or washing with water or a decontamination solution, if required.

(10) **Drill**

The supervised instruction period aimed at testing, developing and maintaining skills in a particular operation of emergency preparedness. A drill is often a component of an exercise.

(11) **Emergency**

That situation or condition which may lead to undue risk to the health and safety of the public or to site personnel. The emergency action levels that are used to identify these emergencies are described in the Event Classification Guide (as discussed in Section 5 of this plan).

(12) **Emergency Action Levels (EAL)**

Pre-designated parameters of radiological dose rates, specific contamination levels of airborne, waterborne, or surface-deposited concentrations of radioactive materials, or specific instruments/parameters (including their rates of change) that may be used as thresholds for initiating a particular level of emergency, a notification procedure, or a particular protective action.

(13) **Emergency Coordinator (EC)**

That person who has the authority and responsibility to immediately and unilaterally initiate any emergency action including the decision to notify and provide protective action recommendations to authorities responsible for implementing offsite emergency measures.

(14) **Emergency News Center/Joint Information Center (ENC/JIC)**

A facility operated by PSEG for the purpose of disseminating accurate information to the news media.

(15) **Emergency Operations Center (EOC)**

A state or local government's command and communication center which is activated to evaluate the radiological emergency and coordinate the protective actions that may need to be implemented.

(16) **Emergency Operations Facility (EOF)**

A facility operated by PSEG for the coordination of decisions affecting accident mitigation and public safety. The EOF is described in Section 9.0 of this plan.

(17) **Emergency Plan Implementing Procedures**

Specific procedures defining in detail the actions to be taken in the event of an accident by the emergency response organization. The procedures are separate from, but may incorporate and refer to, normal plant operating procedures and instructions.

(18) **Emergency Response Planning Area (ERPA)**

A subdivision of the plume exposure emergency planning zone (10 mile).

(19) **Exercise**

An exercise is an event that tests the integrated capability and a major portion of the basic elements existing within emergency plans of the principal response organizations.

(20) **Fixed Nuclear Facility (FNF)**

A site where nuclear materials are employed in commercial power generating operations.(This term is used extensively in the offsite emergency plans.)

(21) **Mitigating Actions**

Those emergency measures taken to reduce the consequences of or terminate an emergency situation in order to prevent an uncontrolled release of radioactive material or to reduce the magnitude of a release, e.g., shutting down equipment, fire fighting, repair and damage control.

(22) **Offsite**

That area outside of the Protected Area.

(23) **Onsite**

That area inside the Protected Area.

(24) **Operations Support Center (OSC)**

An onsite emergency response facility which functions to coordinate the corrective and protective action activities of site personnel outside of the Control Room. These activities include repairs, fire fighting, damage control, search and rescue, medical response, bomb searches, and local plant system lineup changes.

(25) **Owner Controlled Area (OCA)**

This refers to that area within the PSEG property line.

(26) **Population at Risk**

Those persons for whom protective actions are being or would be taken.

(27) **Protective Actions**

Those emergency measures taken after a release of radioactive material has occurred, or before a release which is expected to occur which would exceed a Protective Action Guide (PAG), for the purpose of preventing or minimizing radiological exposures to persons and the public.

(28) **Protective Action Guides (PAG)**

Projected radiological dose or dose commitment values to individuals in the general population which would warrant protective action following a release of radioactive material. Protective actions would be warranted only when the reduction in individual dose expected to be received is not offset by excessive risks to individual safety should the protective action be taken. The PAG does not include the dose that has

unavoidably occurred prior to the assessment (under no circumstances will a PAG dose be considered an acceptable dose).

(29) **Protected Area (PA)**

That area within the boundaries of the Security fence.

(30) **Rad**

Acronym for radiation absorbed dose, basic unit of absorbed dose of radiation. Technically, a dose of one rad means the absorption of 100 ergs of radiation energy per gram of absorbing material (refer to SI units).

(31) **Radiation (as referred to in this plan)**

Any or all of the following: a form of energy which includes gamma rays, x-rays, neutrons, high-speed electrons, positrons, and other atomic particles which occur from radioactive decay or nuclear fission.

(32) **Radiation Accident**

Any unexpected event, occurrence or circumstance involving an actual or potential radiation exposure or radioactive contamination in excess of federal regulations and/or the facility technical specifications.

(33) **Radiological Control Area (RCA)**

That portion of the plant where exposure to nuclear radiation, radioactive material or radioactive contamination is a concern.

(34) **Recovery Actions**

Those actions taken after the emergency to restore the plant as nearly as possible to its pre-emergency condition.

(35) **Release of Radioactive Material**

Plant effluent greater than tech spec limits.

(36) **Rem**

Acronym for Roentgen Equivalent Man, a measure of the dose equivalence of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of one roentgen of X - rays or gamma radiation (refer to SI units).

(37) **Roentgen**

A unit of radioactive exposure; the amount of X-radiation or gamma radiation that will provide one electrostatic unit of charge (positive or negative) in one cubic centimeter of

dry air at standard pressure and temperature conditions (2.58×10^4 coulombs per Kilogram of air).

(38) **Sector**

$22\frac{1}{2}^0$ division of the Emergency Planning Zones (EPZs). The sector (N) is bisected by a line from the PSEG Site directly north.

(39) **Station**

Term used to refer to a licensed nuclear facility that may contain multiple reactors – PSEG Site, Salem and Hope Creek.

(40) **Technical Support Center (TSC)**

This emergency response facility provides a location outside of the Control Room area, where technical support of operations, accident assessment, and initial augmentation of emergency plan implementation may be conducted.

(41) **Total Effective Dose Equivalent (TEDE)**

Term used in conjunction with 10CFR20 and EPA 400 summarizing total dose to the individual which includes exposure from all sources both internal and external to the body.

(42) **Unit**

Term used to refer to a separate reactor in a multi-reactor station – Salem Unit 1, Salem Unit 2.

5.0 State Government Emergency Planning for Contiguous Jurisdictions

5.1 Principal Government Jurisdiction in the EPZs

The States of Delaware and New Jersey are the principal offsite authorities for emergency planning and response for both EPZs. This plan outlines the activities of the states and their response capabilities and includes the agreement between PSEG and the states but does not include the states' plans. A list of all supporting emergency plans is provided as Table 1-2.

5.2 Secondary Government Jurisdictions in the EPZs

The secondary jurisdictions in the EPZs include the affected counties within New Jersey and Delaware and the contiguous States of Pennsylvania and Maryland. These governmental entities have agreements with the States of New Jersey *or* Delaware. The arrangements are outlined in this plan but are not included as part of this plan since they are a part of the appropriate state's plan.

6.0 Integrated Guidance and Criteria

NRC and FEMA have consolidated the guidance intended for use by the licensees, state and local governments in NUREG-0654 FEMA-REP-1, Rev. 1. Should an accident occur, the public can be best protected when the response by all parties is fully integrated. Each party involved must have a clear understanding of what the overall level of preparedness must be and what role it will play in the event of an accident. This understanding can be best achieved if there is an integrated development and evaluation of plans. There must also be an acceptance by the parties and a clear recognition of the responsibility they share for safeguarding public health and safety. This plan has been developed to meet these goals.

Although NUREG-0654 indicates that the criteria are applicable to one or more specific organizations, the intention throughout NUREG-0654 is to provide for an adequate state of emergency preparedness around the facility. To meet this intent this plan has been developed to complement the emergency plans of the States of New Jersey and Delaware.

7.0 Technical Assistance

The planning for response to the offsite consequences of an accident at the PSEG Site and implementation of protective actions resulting from that accident are the responsibility of the States. This plan provides for cooperation with and assistance to the States of New Jersey and Delaware.

8.0 Emergency Response Organization (ERO)

PSEG has established an organization to respond to emergencies at the PSEG Site. This organization consists of PSEG response personnel. These response organizations and their method of notification, resources, initiation and limitations are detailed in the appropriate sections of this plan.

9.0 Form and Content of Plans

This plan has been written following the outline of NUREG-0654 (November 1980) to minimize the need for cross referencing and to aid the review process.

10.0 Emergency Plan Implementing Procedures

Emergency plan implementing procedures provide directions for implementation of the Emergency Plan. Each Table of Contents to the procedure volumes is considered the controlled listing of procedures and revisions. Emergency Plan Procedures, including PSEG Site Event Classification and Notification Procedures, are also listed in the Emergency Plan attachment volume.

TABLE 1-1

LIST OF EMERGENCY RESPONSE PLANNING AREAS, TOWNS WITHIN 10 MILES OF THE PSEG SITE, AND ERPA POPULATIONS [1]

DELAWARE TOWNS	DISTANCE FROM SITE (miles)	NEW JERSEY TOWNS	DISTANCE FROM SITE (miles)
Bay View Beach	3.4 (WNW)	LAC Township	0.0 (E)
Delaware City	7.5 (WNW)	Quinton Township	8.5 (NE)
Middletown	9.5 (W)	Salem	8.0 (NNE)
Odessa	6.2 (W)		
Port Penn	4.2 (NNW)		
St. Georges	9.5 (WSW)		
Townsend	9.5 (WSW)		
Woodland Beach	9.7 (SSE)		

DELAWARE

ERPA	POPULATION
A	5343
B	11,202
C	16,496
D (River)	0
DE TOTAL	33,041

NEW JERSEY

ERPA	POPULATION
1	862
2	3067
3	6595
4	242
5	437
6	491
7	299
8 (River)	0
NJ TOTAL	11,993

DELAWARE & NEW JERSEY TOTAL	45,034

1 – 2009 Population data based on ETE Report (Attachment 11)

TABLE 1-2
OFFSITE EMERGENCY PLANS SUPPORTING PSEG EMERGENCY PLAN

Plan	Responsible Agency
Plume Exposure Pathway	
New Jersey Radiological Emergency Response Plan	Office of Emergency Management, New Jersey State Police
Salem County Radiological Emergency Response Plan	Salem County Office of Emergency Management
Elsinboro Township Radiological Emergency Response Plan	Elsinboro Township Office of Emergency Management
Lower Alloways Creek Township Radiological Emergency Response Plan	Lower Alloways Creek Office of Emergency Management
Mannington Township Radiological Emergency Response Plan	Mannington Township Office of Emergency Management
Pennsville Township Radiological Emergency Response Plan	Pennsville Township Office of Emergency Management
Quinton Township Radiological Response Plan	Quinton Township Office of Emergency Management
Salem City Radiological Emergency Response Plan	Salem City Office of Emergency Management
Cumberland County Radiological Emergency Response Plan	Cumberland County Office of Emergency Management
Greenwich Township Radiological Emergency Response Plan	Greenwich Township Office of Emergency Management

TABLE 1-2 (cont)
OFFSITE EMERGENCY PLANS SUPPORTING PSEG EMERGENCY PLAN

Plan	Responsible Agency
Plume Exposure Pathway	
Stow Creek Township Radiological - Emergency Response Plan	Stow Creek Township Office of Emergency Management
Delaware Radiological Plan	Delaware Emergency Management Agency
New Castle County Radiological Emergency Plan	New Castle County Department of Public Safety
Kent County Radiological Emergency Plan	Kent County Emergency Planning and Operations
Ingestion Pathway	
Maryland Disaster Assistance Plan, Annex O, Radiological Emergency Response Plan	Maryland Civil Defense & Disaster Preparedness Agency
Pennsylvania Disaster Operations Plan, Annex E, Fixed Nuclear Facility Incidents	Pennsylvania Emergency Management Agency

FIGURE 1-1
GENERAL LOCATION OF THE PSEG SITE AND SURROUNDING AREA

FIGURE 1-2
PSEG SITE LAYOUT

FIGURE 1-3
10-MILE EMERGENCY PLANNING ZONE
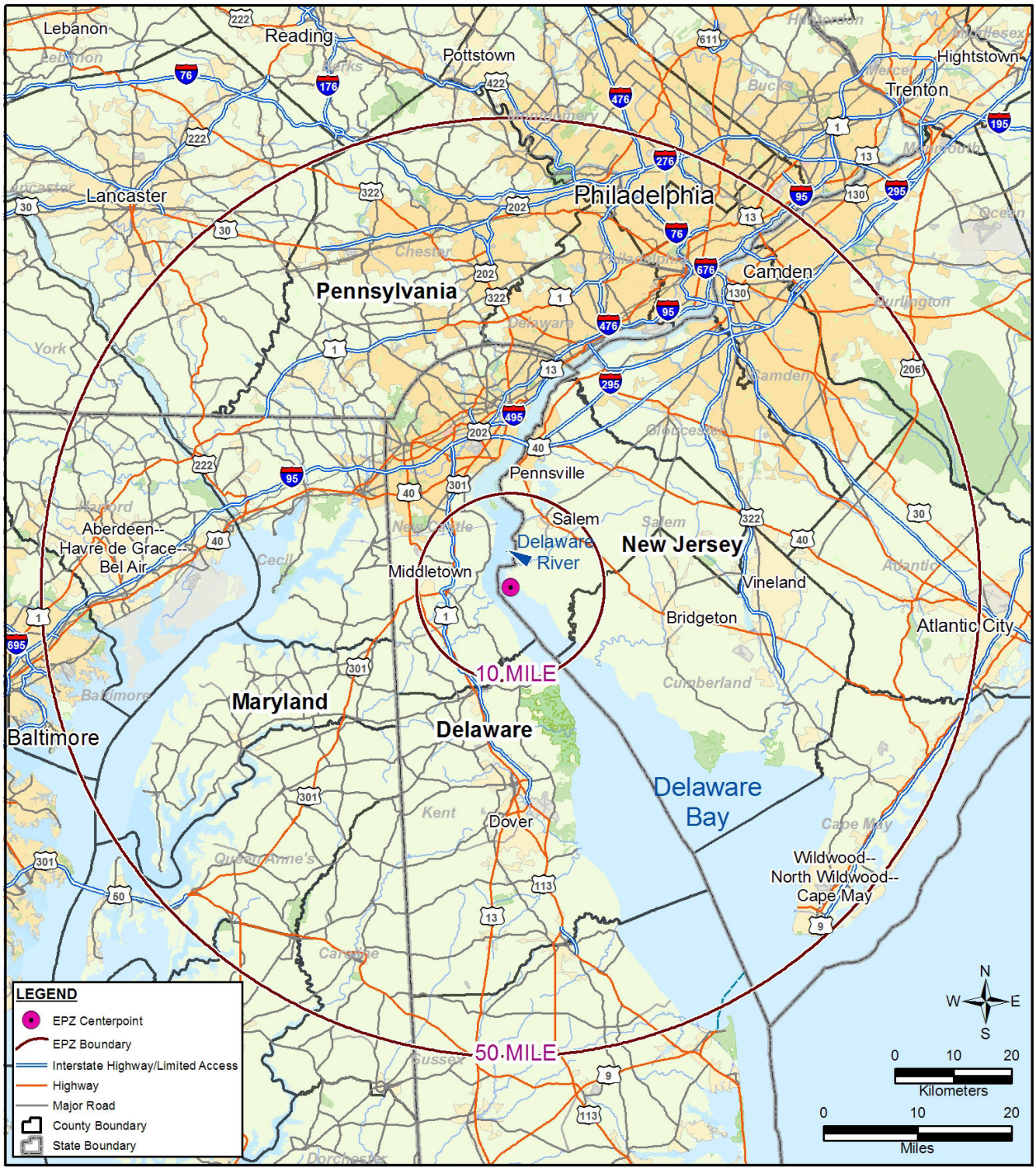
FIGURE 1-4
50-MILE EMERGENCY PLANNING ZONE