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Indian Point Nuclear Energy Center
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Buchanan, NY 10511
Attn: Emergency Planning Department

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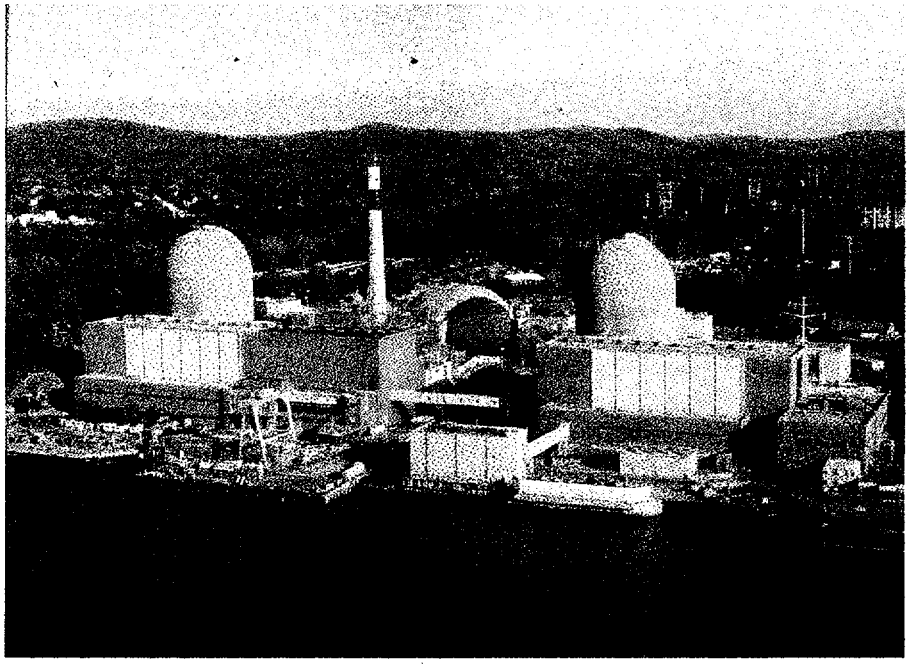
Emergency Plan for Indian Point Unit Nos. 1 & 2



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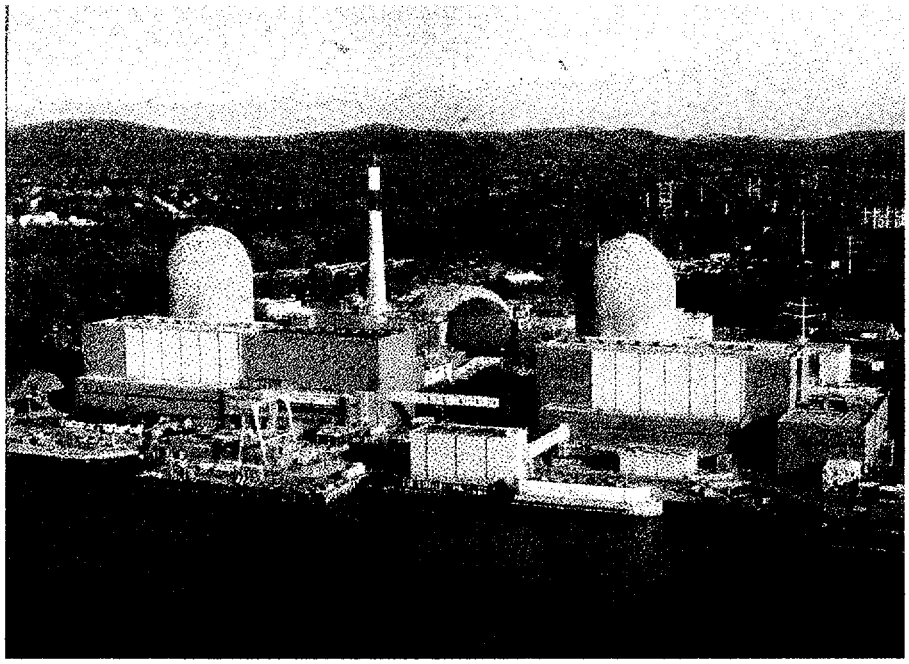
Emergency Plan for Indian Point Unit Nos. 1 & 2



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ENTERGY NUCLEAR NORTHEAST

DOCKET NOS. 50-3, 50-247

EMERGENCY PLAN FOR

INDIAN POINT UNIT NOS. 1 AND 2

Revision 01-02

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SNSC Review: T. Walsh SNSC MTG #2854 Date: 10/17/01

Approved By: [signature] Date: 10/18/01

Effective Date: 10/18/01

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1.0 DEFINITIONS

- **Accountability** - the process used by the Onsite Emergency Organization to identify potentially missing and/or injured personnel during an emergency.

- **Area Radiation Monitors** - fixed radiation detectors placed in strategic locations throughout the Station for the purpose of continuously monitoring area radiation dose rates; an integral part of the Radiation Monitoring System which provides the Control Room with remote monitoring capabilities.

- **Assessment Actions** - those actions taken during or after an accident to obtain and process information that is necessary to make decisions to implement specific emergency measures.

- **Central Information Group** - (CIG) - part of Con Edison System Operations located at the West End Avenue, is manned 24 hours a day and located in New York City.

- **Corrective Actions** - those emergency measures taken to ameliorate or terminate an emergency situation at or near its source.

- **Emergency Action Level (EAL)** - a predetermined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class. (NUMARC/NESP-007)

- **Emergency Coordinator** - a position title in NUREG 0654-Rev 1 corresponding to the Con Edison position of Emergency Director.

- **Emergency Director** - a previously designated and trained individual for directing all licensee activities related to an emergency at the site. The Emergency Director is the interface between the Onsite Emergency Organization and all offsite agencies.

- **Emergency Operations Center** - each of the four (4) counties (Westchester, Rockland, Putnam and Orange) surrounding the site has an Emergency Operations Center from which the County officials evaluate and coordinate all County activities during an emergency.

- **Emergency Operations Facility** - the facility for evaluating and coordinating all of Con Edison activities related to an emergency.

- **Emergency Planning Manager** - individual responsible for reviewing and updating the emergency plan and supporting documents and coordinating all onsite and offsite emergency planning efforts.

- **Emergency Planning Zone (EPZ)** - the area around the Indian Point Site where planning is required for the plume exposure pathway out to approximately 10-miles (10-mile EPZ) and for the ingestion exposure pathway out to approximately 50-miles (50-mile EPZ). The 10-mile EPZ encompasses areas of Westchester, Rockland, Putnam and Orange Counties. The 50-mile EPZ includes the 10-mile EPZ and encompasses areas of Connecticut, New Jersey, Pennsylvania and New York.

- **Emergency Plant Manager** - The individual who has total responsibility and provides overall direction for the emergency actions of the Onsite Emergency Organization and acts as interim Emergency Director until the assigned Emergency Director assumes command.

- **Exclusion Area** - the area surrounding the reactor in which licensee has authority to determine all activities including exclusion or removal of personnel and property from the area. (10 CFR 100)

- **Implementation Procedures** - detail procedures developed for implementing specific tasks or methods.

- **Indian Point Site** - the combined areas immediately surrounding Indian Point Units 1, 2 and 3, which are owned and operated by Entergy Corporation.

- **Memorandum of Understanding** - agreement between Entergy Corporation and other organization defining rules and requirements applicable to such things as fire fighting, medical assistance and other emergency response.

- **New York Emergency Operations Center** - New York State has two (2) Emergency Operations Centers, one in the Southern District Emergency Management Office located in Poughkeepsie, New York, and the other is in the substructure of the Public Security Building, State Office Building Campus, Albany, New York.

- **Nuclear Facility Operator** - The licensee (Entergy Corporation) who operates the nuclear power plants at the Indian Point Site.

- **Offsite** - locations outside of the Indian Point Site boundary.

- **Onsite** - the area within the Indian Point Site boundary.

- **Onsite Emergency Organization** - The Indian Point organization which has the capability to provide initial response to emergency situations.

- **Operations Support Center** - located on the 53' elevation next to the TSC, it houses all Operations, Instrument and Control, Quality Assurance, Maintenance, Chemistry and Health Physics personnel awaiting assignment by the Shift Manager/Emergency Plant Manager. (NUREG0654)

- **Plant Emergency Procedures** - procedures located under separate cover from the Emergency Procedures Document which specify actions required to be performed by control room personnel to mitigate reactor coolant system or process system abnormalities.

- **Process Radiation Monitors** - radiation detectors which continuously monitor operating plant systems or specific effluent release points and provide the Control Room with remote monitoring capabilities and in some cases provide initiation of automatic termination of a specific effluent release.

- **Protective Actions** - those actions taken during or after an emergency for the purpose of reducing or eliminating hazards or preventing or minimizing radiological exposures to persons that would likely occur if the actions were not taken. Protective actions would be warranted provided the reduction in an individual dose expected to be achieved by carrying out the protective actions is not offset by excessive risks to individual safety in taking the protection action.

- **Protective Action Guides** - projected radiological dose or dose commitment values to individuals in the general population that warrant protective actions following a release of radioactive material.

- **Protected Area** - the area enclosed by the security fence immediately surrounding Units 1 and 2 where access is restricted in accordance with the Security Plan.

- **Radiation Area** - any area, accessible to personnel, in which there exists radiation, originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of five millirem, or in any five consecutive days a dose in excess of one hundred millirem. Radiologically Controlled Area - those areas within the plant building or on plant property where access is restricted and monitored for the purpose of radiation protection.

- **Radiological Emergency Communication System (RECS)** - dedicated private line telephone system connecting the licensee with State and County Warning Points and Emergency Operations Centers.

- **Recovery Actions** - those actions taken after the emergency to restore the plant as nearly as possible to its pre-emergency condition.

- **Recovery Center** - the location from which the Recovery Manager will control the overall recovery effort.

- **Recovery Manager** - the individual who reports to the President of the company and who directs the Corporate Response Organization during the recovery stage. He is responsible for the technical direction and control of the integrated recovery effort.

- **Shift Manager** - management person in charge of plant operations during each shift. He initially takes charge of the emergency response effort until arrival of the management persons who will relieve him of the emergency duties of Emergency Plant Manager and Emergency Director.

- **Site Boundary** - that line beyond which the land is neither owned, leased, nor otherwise controlled by either site licensee (Unit 2, Technical Specifications). The site boundary for the purposes of the Emergency Plan, coincides with the "exclusion area" boundary shown in the FSAR. (FSAR, Figure 2.2-2)

- **Station** - the two Entergy Nuclear Generating Units 1 and 2 located on the Indian Point Site.

- **Technical Support Center** - a previously designated and equipped location, onsite, which will be used by technical, engineering and operations personnel in their support of the watch personnel handling the in-plant accident conditions (NUREG-0654)

- **Technical Support Center Manager** - the individual who directs and coordinates the technical support activities.

- **Warning Point** - a location designated by a government agency for the purposes of receiving and promulgating warning information.

- **Watch** - positions covered by plant operating personnel on a 24-hour basis.

2.0 SCOPE AND APPLICABILITY

Entergy Corporation's Emergency Plan for the Indian Point Generating Station Units 1 and 2, is applicable to plant conditions that may cause or may threaten to cause radiological hazards at Units 1 and 2 affecting the health and safety of workers or the public or resulting in damage to property. Unit 1 is defueled and only those areas of Unit 1 that either store or process radioactive materials (the Fuel Handling Building and waste storage/process areas in the Chemical Systems Building and the Integrated Liquid Radwaste Systems Building) were considered in evaluating radiological hazards.

This Emergency Plan is solely dedicated to Units 1 and 2 and includes details of how the company utilizes its resources to assist the plant operating staff during an emergency situation.

Indian Point Site is located on the east bank of the Hudson River about 24 miles north of the New York City boundary line, at Indian Point, Village of Buchanan, in upper Westchester County, New York State. The Station is about 2.5 miles southwest of the City of Peekskill; 8.3 miles south of West Point; 1.5 miles northeast of the Lovett generating station site; 4.6 miles north of the Bowline Point generating station site; and 2.3 miles north of Montrose Point. Figures 2-1 and 2-2 are maps which show the general location of the Site and its environs within a 10-mile and 50-mile radius, respectively. Approximately 1,000 people live within one mile and approximately 70,000 people live within a five-mile radius of the site based on the 1990 population estimates in the New York State Emergency Plan.

The Site is approximately 239 acres and contains three pressurized water reactors. Unit 1 (615 MWt, defueled), Unit 2 (3071 Mwt), and Unit 3 (3071 Mwt)are owned and operated by the Entergy Nuclear. Figure 2-3 is a plot plan for the Site. A separate plan for an emergency at Unit 3 has been prepared.

This Plan describes in a general nature the response of Entergy personnel at the Indian Point Site during emergencies. It identifies an Emergency Organization, describes facilities and equipment, assigns responsibilities and authorities and identifies procedures for responding to all emergencies from minor injury to personnel to conditions having offsite radiological consequences. The procedures for implementing this Plan are presented in the Emergency Plan Implementing Procedures. These implementation procedures identify the elements of the Emergency Organization and the interface with

supporting offsite organizations. A listing of procedure subject matter is contained in Section 10 Appendix C. Copies of the Emergency Plan Implementing Procedures are maintained in the Unit 2 Control Room, Technical Support Center, Emergency Operations Facility and alternate Emergency Operations Facility.

Plant operating, radiological control and security procedures were considered in the development of this Plan. Reference to these procedures is made where necessary. Plant operating and emergency procedures are available in the Control Room for use by the operating staff. Radiological control procedures are available for use by the Watch Health Physics personnel. Procedures that address Security requirements during emergencies for the security forces are contained in the Security Force Manual.

This Plan includes agreements made with offsite organizations that furnish support during emergencies. Copies of these agreements are contained in Section 10 Appendix A. Specific notification and direction instructions are incorporated into the Emergency Plan Implementing Procedures where necessary.

Elements of the offsite emergency response are specified in the emergency Plans of New York State, Westchester, Rockland, Putnam and Orange counties.

FIGURE 2-1

0-10 MILE PLUME EXPOSURE PATHWAY EPZ

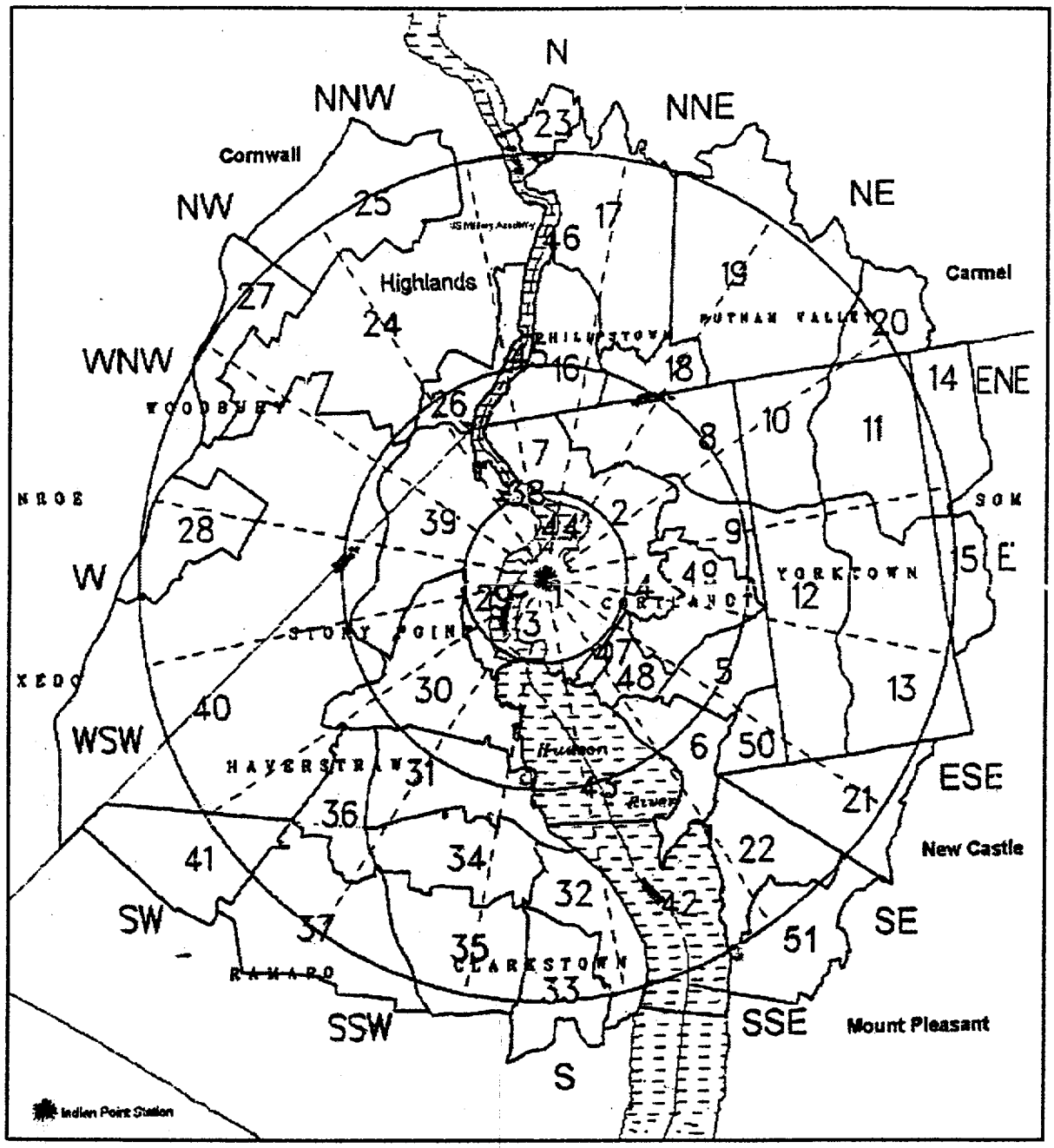


FIGURE 2-2

0-50 MILE INGESTION EXPOSURE PATHWAY EPZ

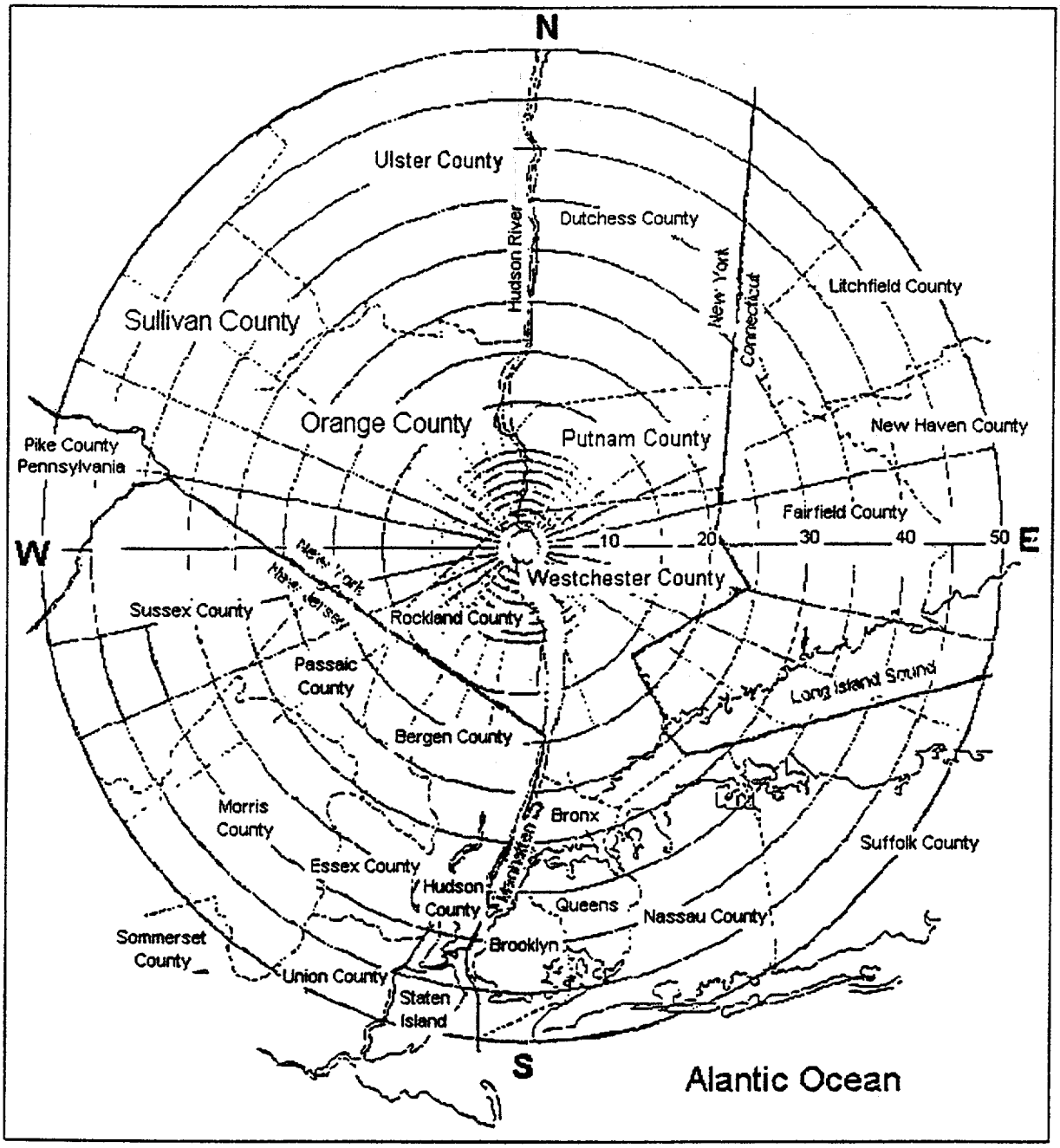
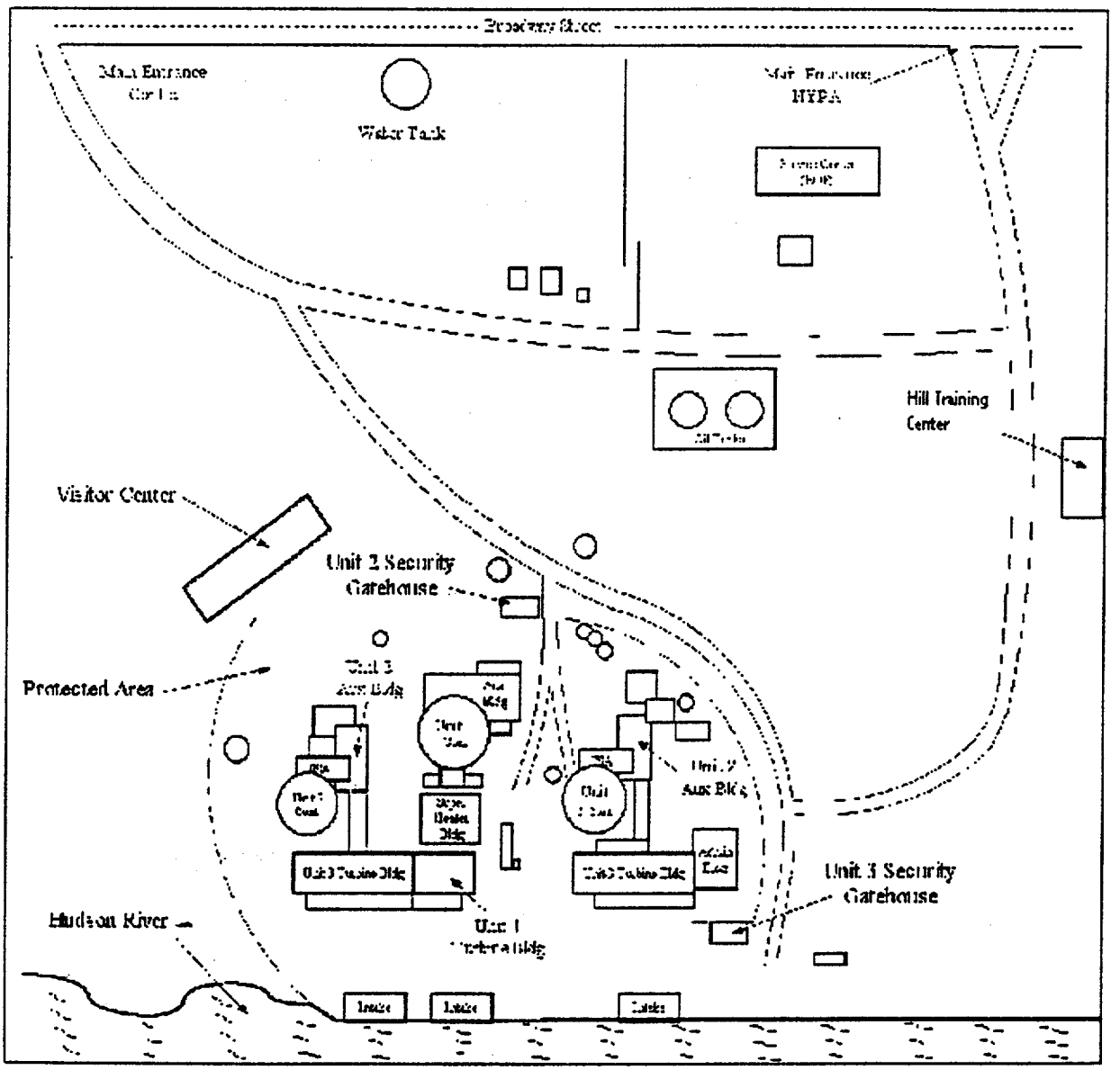


FIGURE 2-3

INDIAN POINT SITE



3.0 SUMMARY OF EMERGENCY PLAN

This Plan was developed to respond and minimize the onsite and offsite impact of an accident at Indian Point Unit 1 and 2. The interrelationship between the Site, Corporate, Federal, State and local government organizations is discussed. Protective measures within the exclusion area (onsite) are the responsibility of Entergy Corporation. Protective measures outside the exclusion area (offsite) are the responsibility of state and local government authorities. The Indian Point Onsite and Offsite Emergency Organization can respond to any incident or accident 24-hours every day. This emergency organization consists of many subgroups. The responsibilities, authorities and interactions between the subgroups are discussed in Section 5.

This Plan incorporates a classification system for emergencies and prescribes the actions which are to be taken to protect the safety of the public, plant personnel and property both onsite and offsite. These actions are contained in the Indian Point Emergency Plan Implementation Procedures. The Plan addresses the responsibilities of personnel and the available resources.

The State and local government responses to plant-related emergencies outside the exclusion area are coordinated between the New York State Emergency Management Office and the County Offices of Emergency Management as described in their respective Emergency Plans.

The response to an emergency occurs in three phases.

The first phase includes immediate operator actions to maintain or bring the plant to a safe shutdown condition, initiate action to protect onsite personnel, classify the emergency and notify plant personnel and the appropriate offsite authorities. This phase is conducted by watch personnel (staffing level I, refer to section 5.1) with the assistance of other in-house personnel (staffing level II, refer to Section 5.2).

The second phase includes planed actions to terminate the incident, monitor both onsite and offsite monitoring areas, assess the extent of any release of radioactivity, and disseminate the assessment (estimated exposure information) to offsite authorities. The second phase is performed under the direction of the Emergency Director (staffing level III). This phase includes augmenting the Onsite Emergency Organization with support from offsite.

The third phase (recovery) begins after the emergency is terminated and includes planned actions for reentry by the workforce to restore the station to normal operation, assist offsite authorities return the public evacuated from around the Site, and to implement post accident environmental sampling as needed. This phase is the responsibility of the Recovery Manager.

4.0 EMERGENCY CONDITIONS

4.1 CLASSIFICATION SYSTEM

This Plan is based on consideration of conceivable consequences of potential situations ranging from incidents where effects on plant and personnel are negligible to highly unlikely releases of radioactivity which could affect members of the public. The emergency classification of these conditions, both radiological and non-radiological, indicates the relative severity for immediate implementation of response actions. The four (4) major classification's increase in overall severity from Notification of Unusual Event to General Emergency. The specific instruments, parameters or equipment statuses which identify the overall severity of the emergency condition and the actions to be taken by the facility staff are identified in the plant emergency procedures. The Emergency Action Levels (EALs) are grouped into nine categories to simplify their presentation and promote a rapid understanding by their users. (See Table 4-1). These categories are:

- CSFST Status
- Reactor Fuel
- Reactor Coolant System
- Containment
- Radioactivity Release/Area Radiation
- Electrical Failures
- Equipment Failures
- Hazards
- Other

Category one through five is primarily symptom based. The symptoms are indicative of actual or potential degradation of either fission product barrier's or personnel safety.

Categories six, seven and eight are event based. Electrical Failures are those events associated with losses of either AC or vital DC electrical power. Equipment Failures are abnormal and emergency events associated with vital plant system failures, while hazards are those non-plant system related events which have affected or may affect plant safety.

Category nine provides the Emergency Director(Shift Manager) the latitude to classify and declare emergencies based on plant symptoms or events which in his judgement warrants classification. This judgement includes evaluation of loss or potential loss of one or more fission product barriers warranting emergency classification consistent with the NUMARC barrier loss criteria.

4.1.1 Notification of Unusual Event

A Notification of Unusual Event classification is used to denote events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs. The purpose of offsite notification is to (1) assure that the first step in any response later found to be necessary has been carried out, (2) bring the operating staff to a state of readiness, and (3) provide systematic handling of unusual events information and decision making. Any radioactive releases to the environment would not cause exposure to the offsite population at levels requiring Environmental Protection Agency (EPA) protective actions to be instituted.

The Shift Manager/Emergency Director would:

1. Promptly inform NRC, State and local offsite authorities and Corporate Management of the nature of the unusual condition as soon as it is discovered

2. Augment on-shift resources as needed

3. Assess and respond

4. Escalate to a more severe class, if appropriate

or

5. Close out with verbal summary of offsite authorities followed by written summary within 24 hours

State and local offsite authorities would:

1. Provide fire or security assistance if requested

2. Escalate to a more severe class, if appropriate

or

3. Standby until a verbal closeout

4.1.2 Alert

An Alert classification indicates events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

The purpose of the Alert is to (1) assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required, and (2) provide the offsite authorities with current information. Where radiological releases to the environment have occurred, it is expected that the site boundary doses will be equal to or exceed 10 mRem Total Effective Dose Equivalent (TEDE) and 10 mRem/hr External Exposure Rate.

The Shift Manager/Emergency Director would:

1. Promptly inform NRC, State and local authorities and Corporate Management of Alert status and reason for Alert as soon as discovered

2. Augment resources by activating the Technical Support Center (TSC), Operations Support Center (OSC) and Emergency Operations Facility (EOF)

3. Assess and respond

4. Dispatch onsite monitoring teams and establish associated communications

5. Provide periodic plant status updates to offsite authorities (approximately every 30 minutes)

6. Provide periodic meteorological assessment to offsite authorities and, if any releases are occurring, dose estimates for actual release

7. Escalate to a more severe class, if appropriate

or

8. Close out or recommend reduction in emergency class by verbal summary to offiste authorities followed by written summary within eight hours of closeout or class reduction.

State and local offsite authorities would:

1. Provide fire or security assistance if requested

2. Augment resources and bring primary response centers and Emergency Alert System(EAS) to standby status

3. Alert key emergency personnel to standby status including monitoring teams and associated communications

4. Provide confirmatory offsite radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed technical specification limits

5. Escalate to a more severe class, if appropriate

or

6. Maintain Alert status until verbal closeout, escalation, or reduction of emergency class.

4.1.3 Site Area Emergency

A Site Area Emergency indicates events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels except near the site boundary. The purpose of the Site Area Emergency declaration is to (1) assure that response centers are staffed, (2) assure that monitoring teams are dispatched, (3) assure that personnel required for evacuation of near-site areas are at duty stations if the situation becomes more serious, (4) provide current information for and consultation with offsite authorities and public, (5) provide updates for the public through offsite authorities. Where radiological releases to the environment have occurred, it is expected that the site boundary doses will be equal to or exceed 100 mRem Total Effective Dose Equivalent (TEDE), 500 mRem/CDE Thyroid, 100 mRem/hr External Exposure Rate, and 500 mRem/hr Thyroid Exposure Rate for one hour of inhalation.

The Shift Manager/Emergency Director would:

1. Promptly inform NRC, State and local offsite authorities and Corporate Management of Site Area Emergency status and reason for emergency as soon as discovered

2. Augment resources by activating the Technical Support Center (TSC), Operations Support Center (OSC) and Emergency Operations Facility (EOF)

~~3~~. Assess and respond

4. Dispatch onsite and offsite monitoring teams and establish associated communications

5. Provide an individual for plant status updates to offsite authorities and periodic news media briefings (perhaps joint with offsite authorities)

6. Make senior technical and management staff on-site available for consultation with NRC and State on a periodic basis

7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission

8. Provide release and dose projections based on available plant condition information and foreseeable contingencies

9. Escalate to General Emergency class, if appropriate

   or

10. Close out or recommend reduction in emergency class by briefing of offsite authorities at Emergency Operations Facility and by phone followed by written summary within eight hours of close out or class reduction.

State and local offsite authorities would:

1. Provide any assistance requested

2. If sheltering near the site is desirable, activate public notification system

3. Provide public within at least ten miles with periodic updates on emergency status

4. Augment resources by activating near-site EOC and any other primary response centers

5. Dispatch key emergency personnel including monitoring teams and establish associated communications

6. Alert other emergency personnel to standby status (e.g., those in need for evacuation) and dispatch personnel to near site duty stations

7. Provide offsite monitoring results to licensee, DOE and others and jointly assess them

8. Continuously assess information from licensee and offsite monitoring teams with regard to changes to protective action already initiated for public and mobilizing evacuation resources

9. Recommend placing milk animals within 2 miles on stored feed and assess to extend distance

10. Provide media briefings, perhaps with a licensee

11. Escalate to General Emergency class, if appropriate

12. Maintain Site Area Emergency status until closeout, escalation, or reduction of emergency class.

4.1.4 General Emergency

A General Emergency indicates events are in progress or have occurred which involved actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline. The purpose of the General Emergency is to (1) initiate and, predetermined protective actions for the public, (2) provide continuous assessment of information from licensee and offsite organization measurements, (3) initiate additional measures as indicated by actual or potential releases, (4) provide consultation with offsite authorities, and (5) provide updates for the public through offsite authorities. Where radiological releases to the environment have occurred, it is expected that the site boundary doses will be equal too or exceed 1000 mRem Total Effective Dose Equivalent (TEDE) and 5000 mRem/CDE Thyroid, 1000 mRem/hr External Exposure Rate, and 5000 mRem/hr Thyroid Exposure Rate for one hour of inhalation.

The Shift Manager/Emergency Director would:

1. Promptly inform NRC, State and local offsite authorities and Corporate Management of the General Emergency status and reason for emergency as soon as discovered

2. Augment resources by activating the Technical Support Center (TSC), Operations Support Center (OSC) and Emergency Operations Facility (EOF)

3. Assess and respond

4. Dispatch onsite and offsite monitoring teams and associated communications

5. Provide an individual for plant status updates to offsite authorities and periodic news media briefings (perhaps joint with offsite authorities)

6. Make senior technical and management staff on-site available for consultation with NRC and State on a periodic basis

7. Provide meteorological and dose estimates to offsite authorities for actual releases via a dedicated individual or automated data transmission

8. Provide release and dose projections based on available plant condition information and foreseeable contingencies

9. Close out or recommend reduction of emergency class by briefing of offsite authorities at Emergency Operations Facility and by phone followed by written summary within eight hours of closeout or class reduction.

State and local offsite authorities would:

1. Provide any assistance requested

2. Activate immediate public notification of emergency status and provide public periodic updates

3. Recommend, as a minimum, evacuation for 2 mile radius and 2-5 miles downwind and assess need to extend distances; consider advisability of evacuation (projected time available vs. estimated evacuation times).

4. Augment resources by activating near-site EOC and any other primary response centers

5. Dispatch key emergency personnel including monitoring teams and establish associated communications

6. Dispatch other emergency personnel to duty stations within 5 mile radius and alert all others to standby status

7. Provide offsite monitoring results to licensee, DOE and others and jointly assess them

8. Continuously assess information from licensee and offsite monitoring teams with regard to changes to protective actions

9. Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance

10. Provide news media briefings, perhaps with a licensee

11. Maintain General Emergency status until closeout or reduction of emergency class.

4.2 SPECTRUM OF POSTULATED ACCIDENTS

The postulated accidents analyzed in Section 14 of the Unit 2 Final Facility Description and Safety Analysis Report and the example initiating conditions found in Appendix 1 to NUREG 0654-REV 1 have been reviewed to determine an emergency classification and emergency action level scheme. The NUMARC/NESP-007, "Methodology for development of Emergency Action Levels" has been accepted by the NRC as an alternative to NUREG-0654-REV 1. The results of this are presented in nine categories of EALs which show the parameters for establishing each emergency classification.

The time-distance-dose curves for the most serious design accident, a loss of reactor coolant, are presented in Section 10 Appendix B along with a discussion of their development.

4.3 Review of Emergency Action Levels with Offsite Agencies

In accordance with 10CFR50 Appendix E.IV.B, Entergy conducts annual reviews of the emergency action level scheme with State and local planning agencies.

Table 4-1 Emergency Action Levels

CATEGORY 1.0 CSFST STATUS				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
1.1 Subcriticality	**1.1.3 (1, 2)** RED path in F-0.1, Subcriticality **AND** Actual or imminent entry into either: RED Path in F-0.2, Core Cooling **OR** Red Path in F-0.3, Heat Sink	**1.1.2 (1, 2)** RED path in F-0.1 Subcriticality **AND** Emergency boration is required	**1.1.1 (1, 2)** Any Failure of an automatic trip signal to reduce power range < 5% **AND** Manual trip is successful	
1.2 Core Cooling	**1.2.2 (1, 2)** RED path in F-0.2, Core Cooling **AND** Functional restoration actions taken and procedures not effective within **15 minutes**.	**1.2.1 (1, 2)** ORANGE or RED path in F-0.2, Core Cooling		
1.3 Heat Sink		**1.3.1 (1, 2)** RED path in F-0.3, HEAT SINK **AND** Heat sink is required		
1.4 Integrity			**1.4.1 (1, 2)** RED Path on F-0.4, Integrity	

Table 4-1 Emergency Action Levels

CATEGORY 1.0 CSFST STATUS				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
1.5 Containment	**1.5.1 (1, 2)** RED Path F-0.5, Containment resulting from loss of coolant.			

CATEGORY 2.0 REACTOR FUEL				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
2.1 Coolant Activity		**2.1.3 (1,2)** Coolant activity > **300 µCi/cc** I-131 equivalent and any of the following: • RED path on F-0.4, Integrity • Primary system leakage exceeding capacity (> 75 gpm) of single charging pump • RCS subcooling < SI initiation setpoint due to RCS leakage • Rise in R-41 offscale or R-42 >0.17 µCi/cc due to RCS leakage	**2.1.2 (1,2)** Coolant Activity > **300 µCi/cc** I-131 equivalent	**2.1.1 (1,2,3,4,5)** Coolant sample activity: ≥ **60/(E bar) µCi/cc**
2.2 Containment Radiation	**2.2.3 (1,2)** Containment Radiation monitor R-25 or R-26 > **68 R/HR**	**2.2.2 (1,2)** Containment Radiation monitor R-25 or R-26 > **17 R/HR**	**2.2.1 (1,2)** Rise in R-41 offscale or R-42 > **0.17µCi/cc** due to RCS leakage	

Table 4-1 Emergency Action Levels

CATEGORY 2.0 REACTOR FUEL				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
2.3 Refueling Accidents or Other Radiation Monitors			**2.3.2 (1,2,3,4,5)** Confirmed sustained alarm on ANY of the following radiation monitors resulting from fuel damage caused by an uncontrolled fuel handling process: • R-2/R-7 Vapor Containment Area Monitors • R-5 Fuel Storage Building Area Monitor • R-25 or 26 Vapor Containment High Radiation Area Monitors **2.3.3 (1,2,3,4,5)** Report of visual observation of irradiated fuel uncovered	**2.3.1 (1,2,3,4,5)** Spent fuel pool(reactor cavity during refueling) water level cannot be restored and maintained above Technical Specification minimum water level

Table 4-1 Emergency Action Levels

CATEGORY 3.0 REACTOR COOLANT SYSTEM				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
3.1 RCS Leakage		**3.1.3 (1,2,3,4)** RVLIS cannot be maintained > **39%** with no RCP's running **OR** With the reactor vessel head removed, it is reported that water level in the reactor vessel is dropping in an uncontrolled manner and core uncovery is likely	**3.1.2 (1,2)** Primary system leakage exceeding capacity **(> 75 gpm)** of single charging pump	**3.1.1 (1,2)** Unidentified or pressure boundary leakage > **10 gpm** **OR** Identified leakage > **25 gpm**
3.2 Primary to Secondary Leakage		**3.2.2 (1,2)** Unisolable release of secondary side to atmosphere from the affected steam generator(s) with primary to secondary leakage exceeding capacity (> **75 gpm**) of a single charging pump **3.2.3 (1,2)** Unisolable release of secondary side to atmosphere from the affected steam generator(s) with primary to secondary leakage > **0.3 gpm** in any steam generator **AND** Coolant activity > **300 µCi/cc** of I-131 equivalent		**3.2.1 (1,2)** Unisolable release of secondary side to atmosphere from the affected steam generator(s) with primary to secondary leakage > **0.3 gpm** in any Steam Generator
3.3 RCS Subcooling			**3.3.1 (1,2)** RCS subcooling <SI initiation setpoint due to RCS leakage	

Table 4-1 Emergency Action Levels

CATEGORY 4.0 CONTAINMENT				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
4.1 Containment Integrity Status	**4.1.4 (1,2)** Confirmed **Phase "B"** isolation signal following confirmed LOCA with less than minimum containment cooling safeguards equipment operating, Table 4.3 **AND** Any indicators of fuel clad loss, Table 4.1 **4.1.5 (1,2)** **EITHER:** • Rapid uncontrolled decrease in containment pressure following initial increase due to RCS failure **OR** • Loss of primary coolant inside containment with containment pressure or sump level response not consistent with LOCA conditions **AND** Any indications of fuel clad damage, Table 4.2	**4.1.2 (1,2)** Rapid uncontrolled decrease in containment pressure following initial increase due to RCS failure **OR** Loss of primary coolant inside containment with containment pressure or sump level response not consistent with LOCA conditions		**4.1.1 (1,2)** Both doors open on a VC airlock for **> 4 hrs**. **OR** Inability to close containment pressure relief or purge valves which results in a radiological release pathway to the environment for **> 4 hrs**. **OR** Any **Phase "A"** or **Phase "B"** or containment ventilation isolation valve(s) not closed when required which results in a radiological release pathway to the environment

Table 4-1 Emergency Action Levels

CATEGORY 4.0 CONTAINMENT				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
4.1 Containment Integrity Status (continued)	**4.1.6 (1,2)** **EITHER:** • Any **Phase "A"** or **Phase "B"** or CVI valve(s) not closed when required following confirmed LOCA **OR** • Inability to isolate any primary system discharging outside containment **AND** Radiological release to the environment exists as a result **AND** Any indicators of fuel clad damage, Table 4.2	**4.1.3 (1,2)** **EITHER:** • Any **Phase "A"** or **Phase "B"** or CVI valve(s) not closed when required following confirmed LOCA **OR** • Inability to isolate any primary system discharging outside containment **AND** Radiological release to the environment exists as a result		
4.2 SG Tube Rupture w/Secondary Release	**4.2.2 (1,2)** Unisolable faulted (outside VC) ruptured steam generator **AND** Any indicators of fuel clad damage, Table 4.2	**4.2.1 (1,2)** Unisolable faulted (outside VC) ruptured steam generator		
4.3 Combustible Gas Concentrations	**4.3.1 (1,2)** $\geq$ 4% Hydrogen concentration in containment			

Table 4-1 Emergency Action Levels

CATEGORY 5.0 RADIOACTIVITY RELEASE				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
5.1 Effluent Monitors	**5.1.4 (1,2,3,4,5)** A valid reading on any monitors Table 5.1 column "GE" for **> 15 minutes** unless dose assessment can confirm releases are below Table 5.2 column "GE" within this time period.	**5.1.3 (1,2,3,4,5)** A valid reading on any monitors Table 5.1 column "SAE" for **> 15 minutes** unless dose assessment can confirm releases are below Table 5.2 column "SAE" within this time period.	**5.1.2(1,2,3,4,5)** A valid reading on any monitors Table 5.1 column "Alert for **> 15 minutes** unless dose assessment can confirm releases are below Table 5.2 column "Alert" within this time period.	**5.1.1(1,2,3,4,5)** A valid reading on any monitors Table 5.1 column "NUE" for **> 60 minutes** unless sample analysis can confirm release rates **< 2 x technical specifications** within this time period.
5.2 Dose Projections -Environ. Measure.- Release Rates	**5.2.5 (1,2,3,4,5)** Dose projections or field surveys resulting from an actual imminent release which indicate doses/dose rates > Table 5.2 column"GE" at the site boundary or beyond.	**5.2.4 (1,2,3,4,5)** Dose projections or field surveys resulting from an actual imminent release which indicate doses/dose rates > Table 5.2 column "SAE" at the site boundary or beyond.	**5.2.2 (1,2,3,4,5)** Confirmed sample analysis for gaseous or liquid release rates > **200 x technical specifications** limits for **> 15 minutes** **5.2.3 (1,2,3,4,5)** Dose projections or field surveys resulting from an actual imminent which indicate doses/dose rates > Table 5.2 column "Alert" at the site boundary or beyond.	**5.2.1 (1,2,3,4,5)** Confirmed sample analysis for gaseous or liquid release rates **> 2 x technical specifications** limits for **> 60 minutes.**

Table 4-1 Emergency Action Levels

CATEGORY 5.0 RADIOACTIVITY RELEASE				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
5.3 Area Radiation Levels			**5.3.2 (1,2,3,4,5)** Sustained area radiation levels > **15 mRem/hr** in **EITHER:** • Control Room **OR** • Central Alarm Station and Secondary Alarm Station **5.3.3 (1,2,3,4,5)** Sustained abnormal area radiation levels > **8 R/hr** within any areas, Table 5.3 **AND** Access is required for safe operation or shutdown	**5.3.1(1,2,3,4,5)** Any sustained direct ARM readings **> 100 x alarm or** offscale high resulting from an uncontrolled process

Table 4-1 Emergency Action Levels

CATEGORY 6.0 ELECTRICAL FAILURES				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
6.1 Loss of AC Power Sources	**6.1.5 (1,2)** Loss of all emergency AC power **AND EITHER:** Power restoration to required core cooling systems is not likely in ≤ **1 hr.** **OR** Actual or imminent entry into ORANGE or RED path on F-0.2, "Core Cooling"	**6.1.4 (1,2)** Loss of AC power to all 480 volt busses (5A,2A/3A,6A) for > **15 minutes.** **AND** Inability to power required core cooling systems with alternate power sources for > **15 minutes.**	**6.1.2 (3,4,5)** Loss of AC power to all 480 volt busses(5A,2A/3A,6A) for > **15 minutes.** **AND** Inability to power required core cooling/ spent fuel cooling systems with alternate power sources for > 15 minutes. **6.1.3 (1,2)** AC power capability to 480 volt busses (5A,2A/3A,6A) reduced to only one of the following sources for > **15 minutes**: • 480V EDG 21 • 480V EDG 22 • 480V EDG 23 • Unit Auxiliary Transformer* • Station Auxiliary Transformer* • 13.8KV Gas Turbine Auto Transformer *With 86P or 86BU tripped, all offsite power supplies must be considered one power supply	**6.1.1** (1,2,3,4,5) Unplanned loss of offsite power to all 480V busses (5A,2A/3A,6A) for > 15 minutes.

Table 4-1 Emergency Action Levels

CATEGORY 6.0 ELECTRICAL FAILURES				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
6.2 Loss of DC Power Sources		**6.2.2 (1,2)** **Loss of bus voltage (<105 vdc) for > 15 minutes on all of the DC busses.**		**6.2.1 (3,4)** **Unplanned loss of bus voltage (<105 vdc) for > 15 minutes on any DC bus resulting in the loss of decay heat removal capability.**

CATEGORY 7.0 EQUIPMENT FAILURES				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
7.1 Technical Specifications /Requirements				**7.1.1 (1,2)** Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.

Table 4-1 Emergency Action Levels

CATEGORY 7.0 EQUIPMENT FAILURES				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
7.2 System Failures or Control Room Evacuation		**7.2.5 (1,2,3,4,5)** Control Room Evacuation **AND** Plant control cannot be established per AOI27.1.9, "Control Room Inaccessibility/ Safe Shutdown" in **15 minutes**	**7.2.2 (1,2)** Turbine failure generated missiles which causes or potentially causes any required safety related system or structure to become inoperable. **7.2.3 (1,2,3,4,5)** Entry into AOI-27.1.9, Control Room Inaccessibility/ Safe Shutdown Control" **7.2.4 (3,4)** Reactor coolant temperature cannot be maintained < **200 °F**	**7.2.1 (1,2)** Report of main turbine failure requiring turbine trip resulting in: Damage to turbine generator seals causing release of lubricating oil or hydrogen **OR** Casing penetration

Table 4-1 Emergency Action Levels

CATEGORY 7.0 EQUIPMENT FAILURES				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
7.3 Loss of Indications/ Alarms/ Communication Capability		**7.3.4 (1,2)** Loss of most (approx. 75%) safety system annunciators or indications on Control Room Panels **AND** Loss of ability to monitor critical safety function status **AND** A significant plant transient in progress	**7.3.3 (1,2)** Unplanned loss of most (approx. 75%) safety system annunciators or indications on Control Room Panels for > **15 minutes** **AND** Increased surveillance is required for safe plant operation **AND EITHER:** A significant plant transient in progress **OR** Proteus and SAS are unavailable	**7.3.1 (1,2)** Unplanned loss of most (approx. 75%) safety system annunciators or indications on Control Room Panels for > **15 minutes** **AND** Increased surveillance is required for safe plant operation **7.3.2 (1,2,3,4,5)** Loss of all communications capability affecting the ability to EITHER: Perform routine operations **OR** Notify offsite agencies or personnel

Table 4-1 Emergency Action Levels

CATEGORY 8.0 HAZARDS				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
8.1 Security Threats	**8.1.4 (1,2,3,4,5)** Security Event which results in: Loss of plant control from the Control Room **AND** Loss of remote shutdown capability	**8.1.3 (1,2,3,4,5)** Intrusion into a plant security vital area by an adversary **OR** Any security event which represents actual or likely failures of plant systems needed to protect the public.	**8.1.2 (1,2,3,4,5)** Intrusion into plant Protected Area by an adversary **OR** Any security event which represents an actual substantial degradation of the level of safety of the plant.	**8.1.1 (1,2,3,4,5)** Bomb Device or other indication of attempted sabotage discovered within plant Protected Area but outside Plant Vital Areas, Table 8.2 **OR** Any security event which represents a potential degradation in the level of safety of the plant
8.2 Fire or Explosion			**8.2.3 (1,2,3,4,5)** Fire or explosion in any plant area, Table 8.2, which causes or potentially causes any required safety related system or structure to become inoperable	**8.2.1 (1,2,3,4,5)** Confirmed fire in or contiguous to any plant area, Table 8.2 not extinguished in ≤ **15 minutes** of Control Room notification. **8.2.2 (1,2,3,4,5)** Report by plant personnel of an explosion within Protected Area boundary which impacts plant safety related systems or structures.

Table 4-1 Emergency Action Levels

CATEGORY 8.0 HAZARDS				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
8.3 Man-Made Events			**8.3.3 (1,2,3,4,5)** Vehicle crash or projectile impact which causes or potentially causes any required safety related system or structure to become inoperable, Table 8.2 **8.3.4 (1,2,3,4,5)** Report or detection of toxic or flammable gases within a plant area, Table 8.2, in concentrations that will be life threatening to plant personnel or preclude access to equipment (even when using personal protective equipment) needed for safe plant operation	**8.3.1 (1,2,3,4,5)** Vehicle crash into or projectile which impacts plant safety related structures or systems within Protected Area boundary **8.3.2 (1,2,3,4,5)** Report or detection of toxic or flammable gases that could enter or have entered within the Protected Area boundary in amounts that could affect the health of plant personnel or safe plant operation **OR** Report by local, county or state officials, or Unit 3, for potential evacuation of site personnel based on offsite event

Table 4-1 Emergency Action Levels

CATEGORY 8.0 HAZARDS				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
8.4 Natural Events	!		**8.4.4 (1,2,3,4,5)** Earthquake felt in- plant based upon consensus of Control Room Operators on duty **AND** Notification from Unit 3 that an earthquake of a magnitude **≥ 0.15g** horizontal or **≥ 0.10g** vertical has occurred. **8.4.5 (1.2.3.4.5)** Sustained winds **> 100 mph** **OR** Tornado strikes a plant vital area, Table 8.2 **8.4.6 (1,2,3,4,5)** Assessment by the Control Room personnel that a natural event has occurred which causes or potentially causes any required safety system or structure to become inoperable, Table 8.2 **8.4.7 (1,2,3,4,5)** River level **≥ 15' (OSML)** **OR** Low service water bay level resulting in a loss of service water flow	**8.4.1 (1,2,3,4,5)** Earthquake felt in plant based upon a consensus of Control Room Operators on duty **AND** Notification received from Unit 3 that an earthquake has been detected on their instrumentation. **8.4.2 (1,2,3,4,5)** Report by plant personnel of tornado within plant Protected Area boundary **8.4.3 (1,2,3,4,5)** River level **≥ 14.5' (OMSL)** **OR** Service water bay level **< -4.5' (OMSL)**

Table 4-1 Emergency Action Levels

CATEGORY 9.0 OTHER				
Category	**General**	**Site Area**	**Alert**	**Unusual Event**
9.1 Other	**9.1.7 (1,2,3,4,5)** As determined by the Shift Manager or Emergency Director, events are in progress which indicate actual, or imminent core damage and the potential for a large release of radioactive material in excess of EPA PAGs outside the site boundary. **9.1.8 (1,2)** Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to a loss of any two fission product barriers and loss or potential loss of the third, Attachment A.	**9.1.5 (1,2,3,4,5)** As determined by the Shift Manager or Emergency Director, events are in progress which indicate actual or likely failures of plant systems needed to protect the public. Any releases are not expected to result in exposures which exceed EPA PAGs. **9.1.6 (1,2)** Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to EITHER: Loss or potential loss of both fuel clad and RCS barrier, Attachment A. **OR** Loss or potential loss of either fuel clad or RCS barrier in conjunction with a loss of containment, Attachment A.	**9.1.3 (1,2,3,4,5)** Any event, as determined by the Shift Manager or Emergency Director, that could cause or has caused actual substantial degradation of the level of safety of the plant. **9.1.4 (1,2)** Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to a loss or potential loss of either fuel clad or RCS barrier, Attachment A.	**9.1.1 (1,2,3,4,5)** Any event, as determined by the Shift Manager or Emergency Director, that could lead to or has led to a potential degradation of the level of safety of the plant. **9.1.2 (1,2)** Any event, as determined by the Shift Manager Emergency Director, that could lead to or has led to a loss or potential loss of containment, Attachment A.

Refer to IP-1024 for referenced tables and Attachment A "Fission Product Barrier Loss & Potential Loss Indicators."

5.0 ORGANIZATIONAL CONTROL OF EMERGENCIES

Using the normal shift operating organization as a base, this section of the Plan describes the Emergency Response Organization that may be activated onsite and augmented with Entergy personnel and offsite forces when necessary. Authorities and responsibilities of key individuals and groups are delineated. The communication links for notifying, alerting and mobilizing emergency personnel are identified.

5.1 NORMAL PLANT ORGANIZATION

The normal watch organization for the Station (Figure 5-1) functions twenty four (24) hours per day, seven (7) days per week and consists of the following qualified individuals:

One (1) Shift Manager, who holds a Senior Reactor Operator's license and is in charge of operating personnel during his/her shift and is responsible for assuring that all operations are conducted in accordance with approved procedures and the limitations set forth in Unit Technical Specifications;

One (1) Control Room Supervisor, who holds a Senior Reactor Operator's license and is responsible for safe operation of the unit within the requirements of the Technical Specifications.

Two (2) Control Room Operators, who both hold a Reactor Operator's license, are responsible for manipulating controls in the Control Room including taking the immediate operator action required as stipulated by written procedures necessary to maintain or bring the plant to a safe condition during abnormal and/or emergency conditions;

One (1) Watch Engineer who performs two main functions in an advisory capacity to the Shift Manager;

- Accident Assessment
- Operational review from a safety perspective;

Two (2) Nuclear Plant Operators who perform plant operations and monitoring under the direction of the Control Room

Supervisor. One Nuclear Plant Operator is assigned to the conventional, the other to the nuclear portion of the plant. Two (2) additional Nuclear Plant Operators function as rovers;

Two (2) Health Physics Technicians (one from Unit 3) and one (1) Chemistry Technician perform radiation monitoring; surveillance, decontamination, water chemistry or counting as necessary;

One (1) Field Support Supervisor who reports to the Shift Manager and supervises (1) Nuclear Plant Operator normally assigned to Unit 1.

The watch organization is augmented during normal working hours Monday through Friday by the Indian Point Management and Operations Staff which is organized to lend expertise to the watch force. Figure 5-2, shows the normal station organization functional areas and reporting chains.

The Shift Manager and the Control Room Supervisor have the responsibility and authority to declare an emergency, initiate the appropriate immediate action in accordance with written procedures, mitigate the consequences of the emergency, activate the Onsite Emergency Organization and notify offsite support and government agencies.

5.2 ONSITE EMERGENCY RESPONSE ORGANIZATION

The Onsite Emergency Response Organization is established to assure that a sufficient number of appropriately qualified personnel are available each day, 24 hours a day to deal with any situation. This organization consists of three (3) staffing levels.

During an event or emergency at Indian Point Unit 2, the first phase of the response is conducted by normal watch personnel onsite (Staffing level I).

Staffing level II requires activation of the minimum Onsite Emergency Response Organization which includes an augmented normal watch. The Onsite Emergency Response Organization is capable of performing those near-term activities necessary to (1) maintain and/or regain control of the plant and mitigate the consequences of the emergency, (2) conduct accident assessment and analysis to determine the full scope and

impact of the situation, and (3) establish and maintain communications with authorities responsible for implementing offsite emergency measures.

Staffing level III occurs at the declaration of a Site Area Emergency and gives the Emergency Director full access to the resources of the Company. The Emergency Operations Facility, Technical Support Center and Operational Support Center are fully staffed. The Corporate Response Center is activated at Corporate Headquarters.

Table 5-1 presents, in tabular form, the minimum staffing requirements of NUREG-0654 on-shift personnel and the additional personnel required within 60 minutes of declaring a Site Area Emergency. The Watch Force, identified as Staffing Level I and depicted in Figure 5-1 satisfies the NUREG-0654 requirements for on-shift personnel.

Personnel required to augment the Watch Force within 60 minutes of the declaration of an emergency, plus the Watch Force, are identified as Staffing Level II. These personnel are immediately available during normal working hours or are contacted by a page "beeper" system during non-working hours. The pager system is backed up with an automated telephone notification system. The additional personnel that may be contacted to supplement the minimum staffing requirements depicted in Figure 5-1 are listed in the Emergency Telephone Directory.

Figure 5-3 presents an organizational chart of the Emergency Response Organization, showing the major onsite functional areas and the relationships to offsite groups. Until the arrival of the Emergency Director and the start of the staffing level III organization, overall control of the onsite emergency organization will be exercised by the Emergency Plant Manager.

Figure 5-4 shows the full Emergency Response Organization (staffing Level III). Table 5-2 provides descriptions of the roles and responsibilities for each of the positions identified in Figure 5-4.

5.2.1 Direction and Coordination

The Shift Manager (or the Control Room Supervisor in the event that the Shift Manager is unavailable) has the authority to declare an emergency and immediately takes charge of the emergency response effort. In the event of an Alert, Site Area or General Emergency, he/she activates the Onsite Emergency Response Organization and functions as the Emergency Director directing the emergency response until the arrival of management personnel who relieve him/her of the duties of Emergency Plant Manager and Emergency Director.

The Emergency Plant Manager takes charge of the overall emergency response, thus freeing the Shift Manager to direct his/her attention towards the mitigation of the accident using the emergency operating procedures. Until the arrival of the Emergency Director, overall control of the Onsite Emergency Organization will be exercised by the Emergency Plant Manager.

The following positions have responsibilities for command and control of the Emergency Response Organization:

5.2.1.1 Emergency Director

The Emergency Director is responsible for directing and coordinating the integrated emergency response effort of all Company activities during the emergency including those which originate from Corporate Headquarters. Personnel trained in accordance with this plan and qualified as Emergency Directors are designated in the Emergency Telephone Directory. The Emergency Director is stationed in the Emergency Operations Facility during Alert, Site Area and General Emergencies and is the interface between the onsite and offsite authorities. He/she has the responsibility and authority to provide protective action recommendations to the authorities responsible for implementing offsite emergency measures.

The Shift Manager (or Control Room Supervisor if the Shift Manager is not present) becomes the Emergency Director upon declaration of an emergency. The Emergency Plant Manager will assume the role of

Emergency Director upon his/her arrival at the Central Control Room until a Emergency Director is ready to assume the position at the Emergency Operations Facility. Specific responsibilities of the Emergency Director include:

- Declare the emergency and upgrade/downgrade conditions as warranted and initiates recovery phase when appropriate, this responsibility can not be delegated;
- Review and approve initial notifications to the State and local authorities, this responsibility can not be delegated;
- Recommend protective actions to offsite authorities, this responsibility can not be delegated;
- Authorizing Entergy personnel outside the Protected Area Fence to exceed normal radiation exposure limits, this responsibility can not be delegated;
- Establish communications with the Technical Support Center and obtain information on the diagnosis and prognosis of the accident condition;
- Review all radiological, meteorological and operational data and update the offsite authorities and the Joint News Center;
- Receive designated responding representatives from offsite emergency agencies and assist in their information and communication needs;
- Arrange for and dispatch any special assistance or service requested (e.g., radiological measurement or protection equipment, onsite medical treatment);
- Coordinate offsite radiological evaluation with the State, Counties and U.S. Department of Energy.
- Relate all of these actions to the remainder of the emergency response organizations.

The Emergency Director is assisted in these activities by personnel in the Emergency Operations Facility and in the field. Although the Emergency Director may delegate most of these responsibilities, he/she may not delegate the responsibility for the decision to notify and recommend protective actions.

5.2.1.2 Emergency Plant Manager

The Emergency Plant Manager directs and coordinates the operational aspects of the In-Plant Emergency Organization. He/she assures proper coordination and direction of the efforts of each element of the In-Plant Emergency Organization in returning the plant to and maintaining it in a safe and stable condition.

The Emergency Plant Manager is normally located in the Technical Support Center, he/she may go to the Central Control Room to receive briefings from the Shift Manager and review plant data. Specific responsibilities of the Emergency Plant Manager include:

- Initially relieving the Shift Manager of the Emergency Director responsibilities and continue to act as Emergency Director until an Emergency Director is ready to assume the position in the Emergency Operations Facility.

- Directing actions to mitigate the accident. Directing the in-plant radiological monitoring.

- Authorizing Entergy personnel within the Protected Area to exceed normal radiation exposure limits, this responsibility can not be delegated;

- Authorizing the mobilization of search and rescue teams.

- Directing re-assembly within the protected area fence.

- Assuring that all emergency personnel within the protected area fence take adequate protective measures.

5.2.1.3 Emergency Operations Facility Manager

The Emergency Operations Facility Manager is located in the Emergency Operations Facility and reports to the Emergency Director. He/she directs and coordinates the activities of the Emergency Operations Facility. He/she assures proper staffing and operations of the Emergency Operations Facility to assist the Emergency Director in completion of his/her responsibilities. Specific responsibilities of the Emergency Operations Facility Manager include:

- Direct and coordinate the activities of the Emergency Operations Facility;
- Assist the Emergency Director with interactions with offsite authorities.

5.2.1.4 Offsite Radiological Assessment Director

The Offsite Radiological Assessment Director reports directly to the Emergency Operations Facility Manager. Specific Responsibilities of the Offsite Radiological Assessment Director include:

- Directing and coordinating the activities of the offsite and onsite (outside the protected area fence) radiological monitoring teams;
- Interpreting radiological and meteorological data and updating the Emergency Director with the result in the terms of both real-time measurements and projected radiological exposures;
- Providing radiological evaluation and protection at the Emergency Operations Facility;
- Having estimates of offsite population dose performed;
- Initiating post-accident environmental surveys.

5.2.1.5 Technical Support Center Manager

The Technical Support Center Manager is responsible for directing coordination of the Technical Support Center as the central facility for the accumulation and re-transmittal of plant parameters. The Technical Support Center Manager is stationed in the Technical Support Center and reports to the Emergency Plant Manager.

Specific responsibilities of the Technical Support Center Manager and Staff include:

- Analyzing and developing plans and procedures in direct support of Plant Operations personnel;
- Analyzing and resolving core physics, thermodynamic, hydraulic, mechanical, electrical and instrument problems.
- Designing and coordinating short term modification to plant systems.
- Keeping the Emergency Plant Manager appraised of plant conditions.
- Interfacing with NRC personnel in the Technical Support Center.

5.2.1.6 Operations Support Center Manager

The Operations Support Center Manager is responsible for directing coordination of the Operations Support Center as the central facility for the planning and dispatch of operations and repair teams into the plant. The Operations Support Center Manager is stationed in the Technical Support Center, next to the Operations Support Center and reports to the Emergency Plant Manager.

Specific responsibilities of the Operations Support Center Manager and Staff include:

- Maintaining continuous accountability of all personnel within the Protected Area when it is called for.
- Planning and/or coordination of field activities, such as search and rescue, investigations, equipment operation, surveys or repairs
- Developing relief staffing rosters to ensure 24 hour manning of Emergency Response Facilities.

5.2.2 Plant Staff Emergency Assignments

In addition to the direction and coordination of the emergency response effort just discussed, other major functional areas of responsibility are identified as necessary to deal with emergency situations. Assignments made for these functional areas are discussed below. The interfaces between these functional areas is shown in Figure 5-4.

5.2.2.1 Plant Operations and Assessment of Operational Aspects

While overall direction of in-plant activities is the responsibility of the Emergency Plant Manager, responsibility for plant systems operations remains with the Control Room Operators and the Nuclear Plant Operators under the direction of the Shift Manager and Control Room Supervisor.

5.2.2.2 Notification/Communication

The Control Room communication links with offsite authorities are manned each day 24-hours a day by Control Room personnel. The initial notification of offsite authorities and emergency response organization personnel is initiated by the Shift Manager and the Control Room Communicator. Communications with offsite authorities are maintained from the Control Room until the Emergency Director takes over the responsibility at the Emergency Operations Facility. A "Communicator" is designated at the Emergency Operations Facility to establish/maintain communication links.

5.2.2.3 In-Plant Radiological Accident Assessment

In-plant radiological monitoring and chemical/ radiochemical analysis is provided by the Watch Health Physics Technician and Chemistry Technician, respectively, under the direction of the Shift Manager and by other responding personnel under the direction of the Emergency Plant Manager.

5.2.2.4 Offsite Radiological Accident Assessment

The expertise for evaluating the radiological consequence of the accident is provided by the Dose Assessment Health Physicist and the Survey Team Health Physicist who function directly under authority of the Offsite Radiological Assessment Director. These individuals assure that sufficient monitoring activities are instituted, evaluate and assess the results, and apprise the Offsite Radiological Assessment Director of all activities, results and recommendations. Until the EOF is activated, the Shift Manager shall be responsible for the performance of offsite radiological accident assessments. Onsite, out-of-plant radiological monitoring will be provided for by responding Radiation Protection Personnel. Offsite monitoring is performed by Radiation Protection and other qualified personnel from Indian Point.

5.2.2.5 Plant System Engineering

The Watch Engineer supplies plant technical assistance to the Shift Manager during the initial stages of an emergency. Personnel who assemble in the Technical Support Center include selected members of the plant staff who are knowledgeable in one or more specific disciplines or functional areas at Indian Point. These individuals perform operational accident assessment activities in support of the watch personnel handling the in-plant accident conditions.

5.2.2.6 Repair and Corrective Actions

The Shift Manager and Nuclear Plant Operators perform emergency repairs if necessary, within the first 60

minutes. Other Station maintenance personnel are not immediately available.

Maintenance mechanics and operations personnel (NPO) who respond to the Operations Support Center perform repair and corrective actions directed by the Operations Support Center Manager.

5.2.2.7 Protective Actions (In-Plant)

The Watch Health Physics Technician is normally responsible for radiation protection in-plant. The Field Support Supervisor and the Unit No. 2 Watch Health Physics Technician are immediately available for radiation protection under the direction of the Shift Manager during the first 60 minutes. Later, Health Physics personnel under the direction of the Operations Support Center Manager are responsible for radiation protection.

5.2.2.8 Firefighting

Fire fighting is the responsibility of the Fire Brigade as defined in the Indian Point Station Fire Protection Program Plan. The Fire Brigade consists of at least five members who are trained in fire fighting techniques and are on duty 24 hours a day. A local fire department may be called if necessary.

5.2.2.9 Rescue Operations and First Aid

Search and rescue jurisdiction during an emergency is divided between the in-plant area (inside the protected area fence), which is handled by the Shift Manager or Emergency Plant Manager, and the rest of the onsite area which is handled by the Emergency Director. Search and rescue operations would initially be directed during the first 60 minutes by the Shift Manager using available personnel onsite.

There is at least one individual on duty 24 hours a day (exclusive of the Shift Manager) who is trained in first-aid techniques. Additional medical support can be called as necessary.

5.2.2.10 Site Access Control and Accountability

Plant security and site access control are the responsibility of the Security Supervisor and the Security Force, with backup assistance available from the Buchanan Police Department and other police departments in Westchester County as the situation demands, in accordance with a County Mutual Assistance Plan and the New York State police.

Initial personnel accountability during an Alert, Site Area Emergency or a General Emergency is the responsibility of the Shift Manager and Shift Security Supervisor. Procedures in the Emergency Plan Implementing Procedures are used to account for all personnel within the Protected Area. If necessary, Security Personnel will be dispatched to warn employees, visitors, contractors and construction personnel who may be within the exclusion area but outside the Protected Area.

Continuous accountability will be maintained during events classified as a Site Area or General Emergency. The Emergency Plant Manager may suspend accountability requirements at the Alert level.

5.2.3 Information Dissemination

To assure that only factual and consistent information is released statements concerning the emergency are the responsibility of the Media Relations Department. A Media Relations Duty Officer is on call 24 hours a day and is responsible for interfacing with the news media for release of any public statements concerning Notification of Unusual Events. For events classified at an Alert or higher, a Joint News Center Director responds to the pre-designated Joint News Center.

The Joint News Center Director will be responsible for providing accurate and timely information to the public through the news media and coordinating with Federal, State and local public information officials to assure timely exchange and release of information. Both the Media Relations Duty Officer and the Joint News Center Director have access to all necessary information, either directly available to them or available through

the Emergency Plant Manager/Emergency Director. An Information Liaison at the Emergency Operation Facility reports to the plant with the initial augmentation of the watch force to facilitate information flow between the plant personnel and the Media Relations Duty Officer and/or the Joint News Center Director.

5.3 AUGMENTATION OF EMERGENCY ORGANIZATION

This section describes the offsite support available from three (3) sources: Corporate Headquarters, local services, and private sector organizations. The need for this augmentation will be evaluated by the Emergency Plant Manager, Technical Support Center Manager and the Emergency Director. The names and phone numbers of the offsite support contacts are listed in the Emergency Telephone Directory which is maintained in the Unit 2 Control Room, Technical Support Center and in the Emergency Operations Facility. Figure 5-3 illustrates the interface between the Onsite Emergency Organization and the offsite support groups.

5.3.1 Corporate Support

Company personnel augment the onsite staff in the performance of certain functions required to cope with an emergency. The corporate support is integrated into the Emergency Response Organization at Staffing Level III (refer to figure 5-4). With the activation of Staffing Level III, Entergy is capable of continuous (24 hour) operations for a protracted period. The Emergency Director will assure the continuity of resources(technical, administrative and logistics) to support the emergency response.

5.3.2 Local Services Support

The availability of local services support to assist the emergency forces has been ascertained and agreement letters from each organization in this section have been solicited. These letters are contained in Section 10, Appendix A.

5.3.2.1 Ambulance Service

Twenty-four (24) hour ambulance service is provided by the Verplanck Fire Department Ambulance with mutual aid backup from other ambulance services such as the Cortlandt Volunteer Ambulance Corps. and the Peekskill Volunteer Ambulance Corps. The Emergency Plan Implementing Procedures contain procedures which cover the call for assistance and the handling of the ambulance service personnel. Radio communications exists between the ambulance and local hospitals and the site can communicate with the ambulance through this link.

5.3.2.2 Medical

Local physicians, under contract to the Entergy Medical Department, are available. The Emergency Plan Implementing Procedures cover the request for medical assistance and the handling of patients. In the event that a patient should receive a massive radiation exposure, an expert medical consultant on the management of radiation injuries would be available. A written agreement is contained in Section 10, Appendix A.

5.3.2.3 Hospital

The Hudson Valley Hospital Center at Peekskill/Cortlandt has agreed to accept patients from the Indian Point Site who have been injured, contaminated or irradiated. This is a modern hospital with facilities such as an emergency room, a laboratory, a radiology department and a nuclear medicine department.

The Phelps Memorial Hospital Center, Tarrytown, New York has agreed to serve as the backup hospital. A written agreement is contained in Section 10, Appendix A.

5.3.2.4 Police

When notified that assistance is required, the Village of Buchanan Police Department will respond immediately. Timely reinforcement can be provided by adjacent police departments to include, eventually, all police departments in Westchester County as the situation demands in accordance with a County Mutual Assistance Plan, and the New York State Police. The handling of security matters for the Indian Point site is covered in the Security Plan.

5.3.4 Private Sector Organizations

5.3.4.1 Laboratory Services

The availability of laboratory/analytical services has been ascertained and an agreement letter is contained in Section 10, Appendix A.

5.3.4.2 Additional Technical Assistance

If the need for additional technical assistance is identified, this may be obtained by the Technical Support Center Manager and the Emergency Director. Assistance of this type would include that from the NSSS Supplier (Westinghouse), architect engineer and consultants. A copy of the letter of agreement with Westinghouse is contained in Section 10, Appendix A. The Institute for Nuclear Power Operations (INPO) may be called upon, by the Emergency Director, to act as the agent to arrange for and coordinate emergency support using the information in the INPO Emergency Resources Manual. The manual contains information on;

- Equipment that is available from other utilities
- Equipment that can be supplied by vendors
- Service Companies and available personnel
- A/E & NSSS Contacts
- Technical experts and their specialties
- Telephone directory for other utilities

5.4 COORDINATION WITH PARTICIPATING GOVERNMENT AGENCIES

In the event of an emergency, as defined in Section 4.1, various Federal, State, and County organizations must be notified. This section identifies the principal State agency and other government agencies having planning and/or action responsibilities for emergencies, in the Westchester, Orange, Putnam and Rockland County areas of New York State.

5.4.1 New York State

The agency responsible for emergency planning is the State Emergency Management Office. The Chairman of the Disaster Preparedness Commission will assume the direction and coordination of the State response activities. The specific tasks and responsibilities assigned to various departments and agencies of the State are delineated in New York State's Radiological Emergency Preparedness Plan. Notification to the State of emergency conditions would be as indicated in Section 6.1.

5.4.2 U.S. Department of Energy

The U.S. Department of Energy operates a Radiological Assistance Plan from its regional office at Brookhaven, Long Island. The Radiological Assistance Plan, which specializes in radiation safety and medicine, will provide assistance to the Nuclear Facility Operator, the State or the county request. This assistance, which includes monitoring of the environment surrounding the site, is available twenty-four (24) hours a day by calling the contact phone number listed in the Emergency Telephone Directory. The expected time of arrival is approximately 3 hours. The Emergency Director is authorized to request this assistance in the event it is necessary. Westchester County Airport, located approximately 30 minutes by automobile from the site, can supply facilities for air transportation. An agreement letter which addresses this assistance can be found in Section 10, Appendix A.

5.4.3 U.S. Coast Guard

During a radiation incident which could have offsite radiological consequences, the U.S. Coast Guard will

assist by maintaining traffic control on the Hudson River. Coast Guard assistance is requested by and coordinated through New York State, the appropriate county, or FEMA.

5.4.4 County Offices of Disaster and Emergency Services/Civil Defense

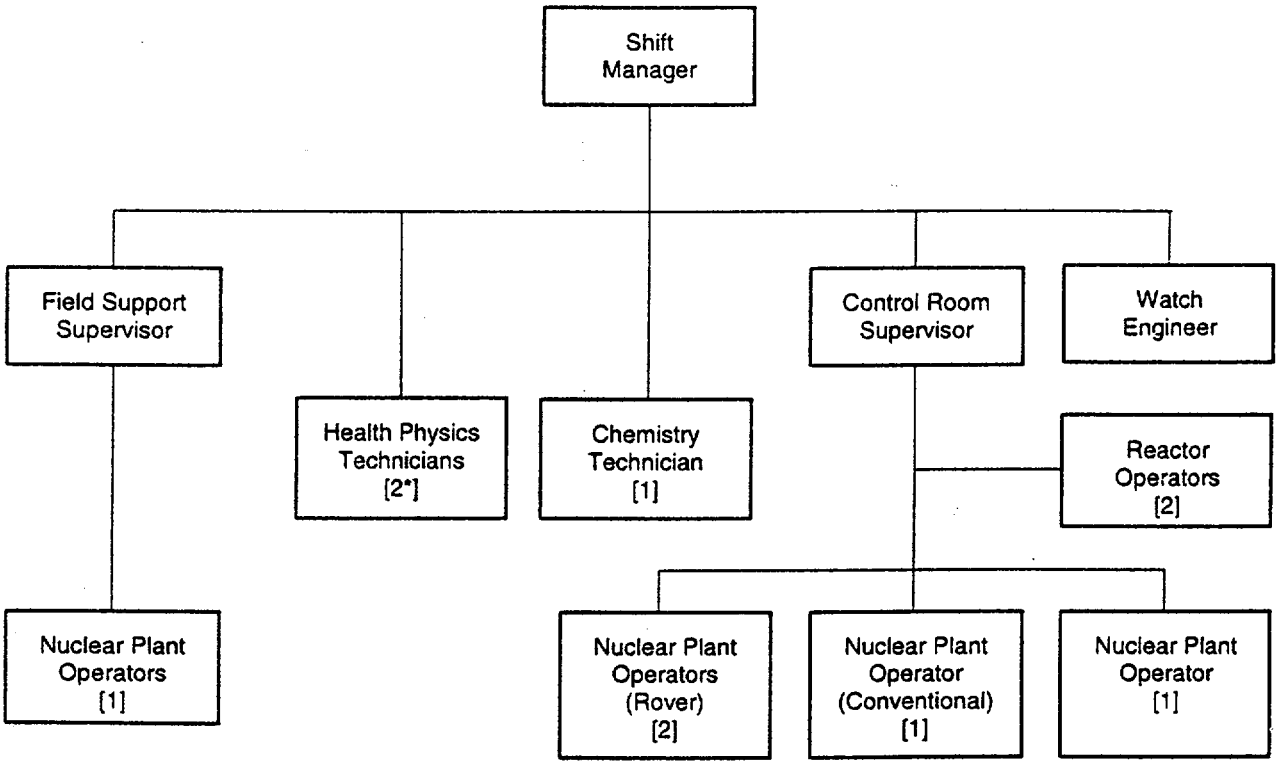
The four(4) counties which are involved in emergency response activities at the Indian Point Site include Westchester, Rockland, Orange and Putnam. Westchester, the County in which the Indian Point is located; Rockland County on west side of the Hudson River across from Indian Point; and Orange and Putnam Counties the closest boundaries of which are approximately four (4) miles from Indian Point. Each county has an Office of Disaster and Emergency Services or Civil Defense. The Director of each of these offices, or their designee, will act as the County Emergency Operations Director in the County Emergency Operations Center and direct and coordinate the County's response, under the authority of the Chief Executive of the County, for natural and man-made disasters. Notifications to the Counties of an Unusual Event, Alert, Site Area or General Emergency at Indian Point would be as described in Section 6.1.

5.4.5 New York State Emergency Management Office, Southern District

During an emergency, New York State can utilize the facilities at the Emergency Management Office, Southern District which has an 8,700 square foot underground EOC equipped with statewide communications capability.

Figure 5-1

Normal Watch Organization



* One Health Physics Technician is onshift at Indian Point 3 and is available to respond to an emergency at Indian Point 2.

Figure 5-2

Normal Station Organization Functional Areas

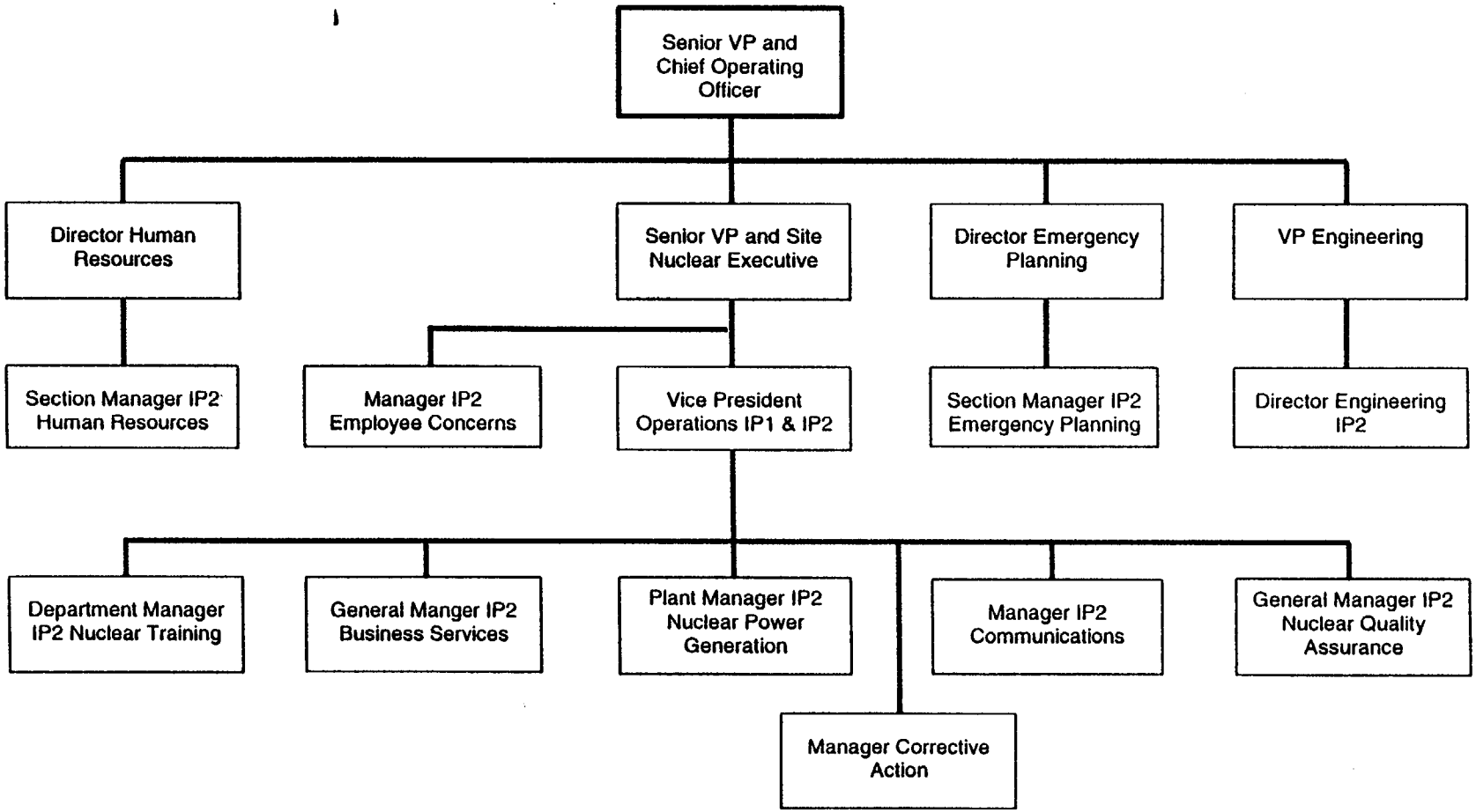


Figure 5-3

Onsite-Offsite Organization Interfaces

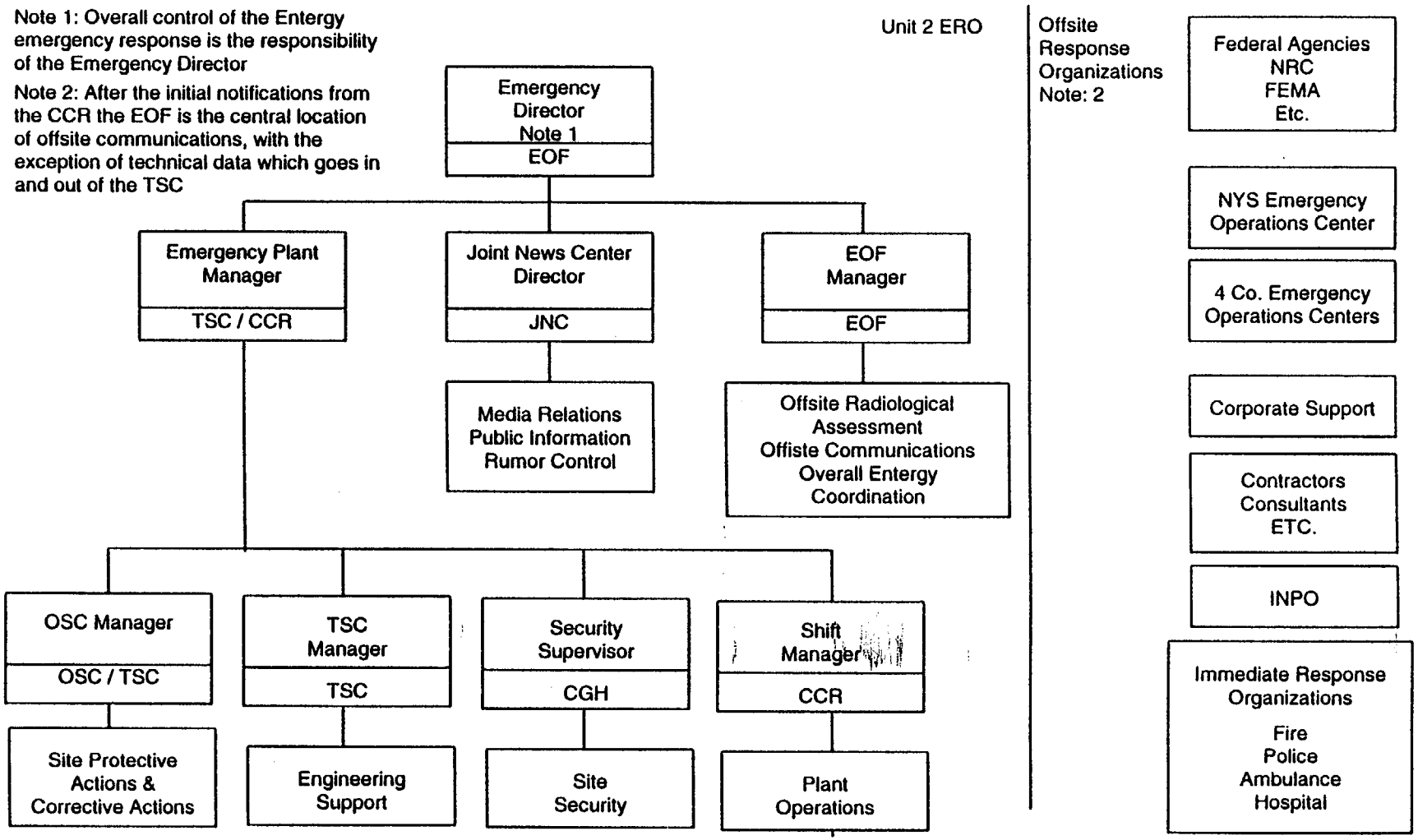
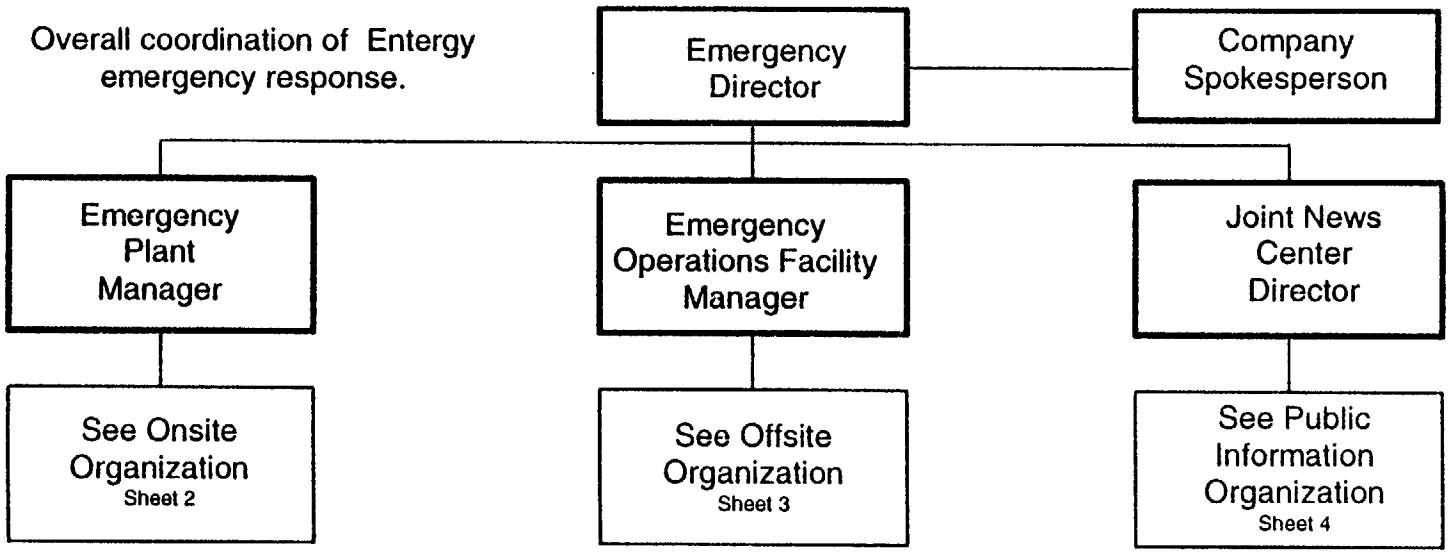


Figure 5-4 (Sheet 1 of 4)

Indian Point Unit 2 Emergency Response Organization



- Coordination of Entergy onsite response
- Plant Operations
- Engineering Assessment
- Corrective Actions
- Onsite Radiological Assessment
- Safety of onsite Entergy Emergency Responders

- Coordination of Entergy offsite response
- Notifications and communications with State and Local authorities.
- Offsite Radiological Assessment
- Safety of offsite Entergy Emergency Responders

- Overall coordination of Entergy Public Information Response
- Coordinate public information with the State and Local Response Organizations
- Interface with the Media
- Rumor Control

Figure 5-4 (Sheet 2 of 4)

Indian Point Unit 2 Emergency Response Organization

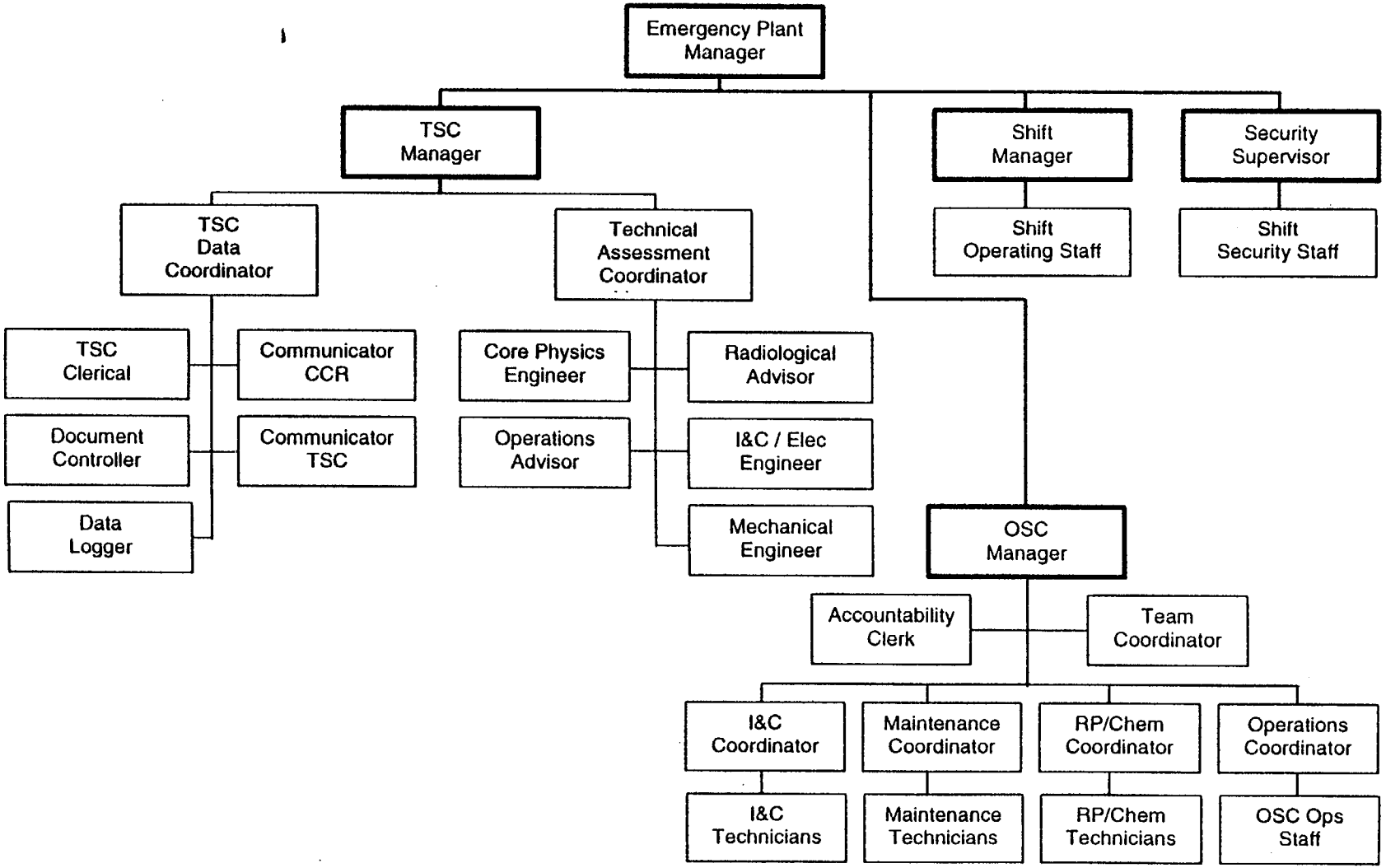


Figure 5-4 (Sheet 3 of 4)

Indian Point Unit 2 Emergency Response Organization

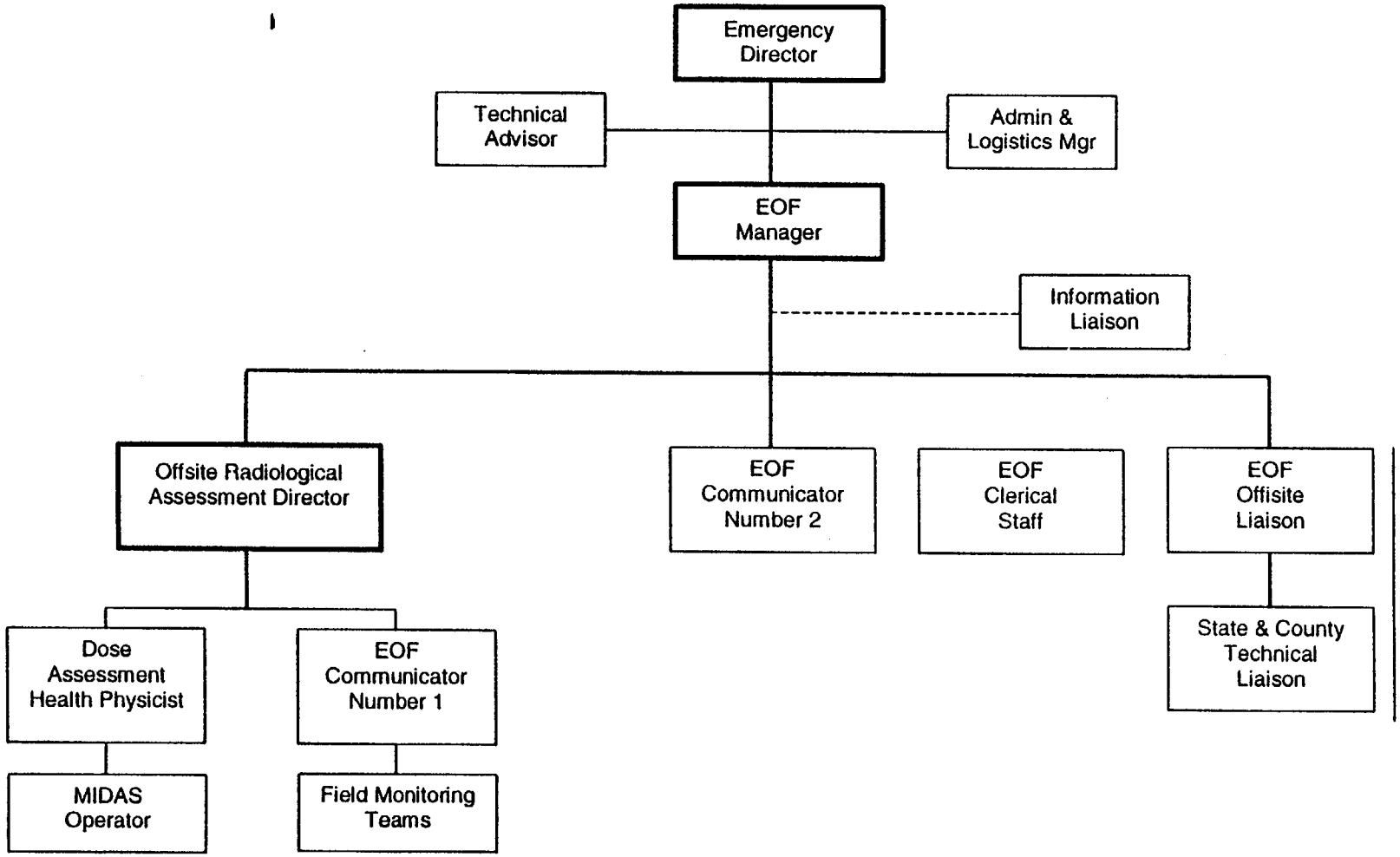


Figure 5-4 (Sheet 4 of 4)

Indian Point Unit 2 Emergency Response Organization

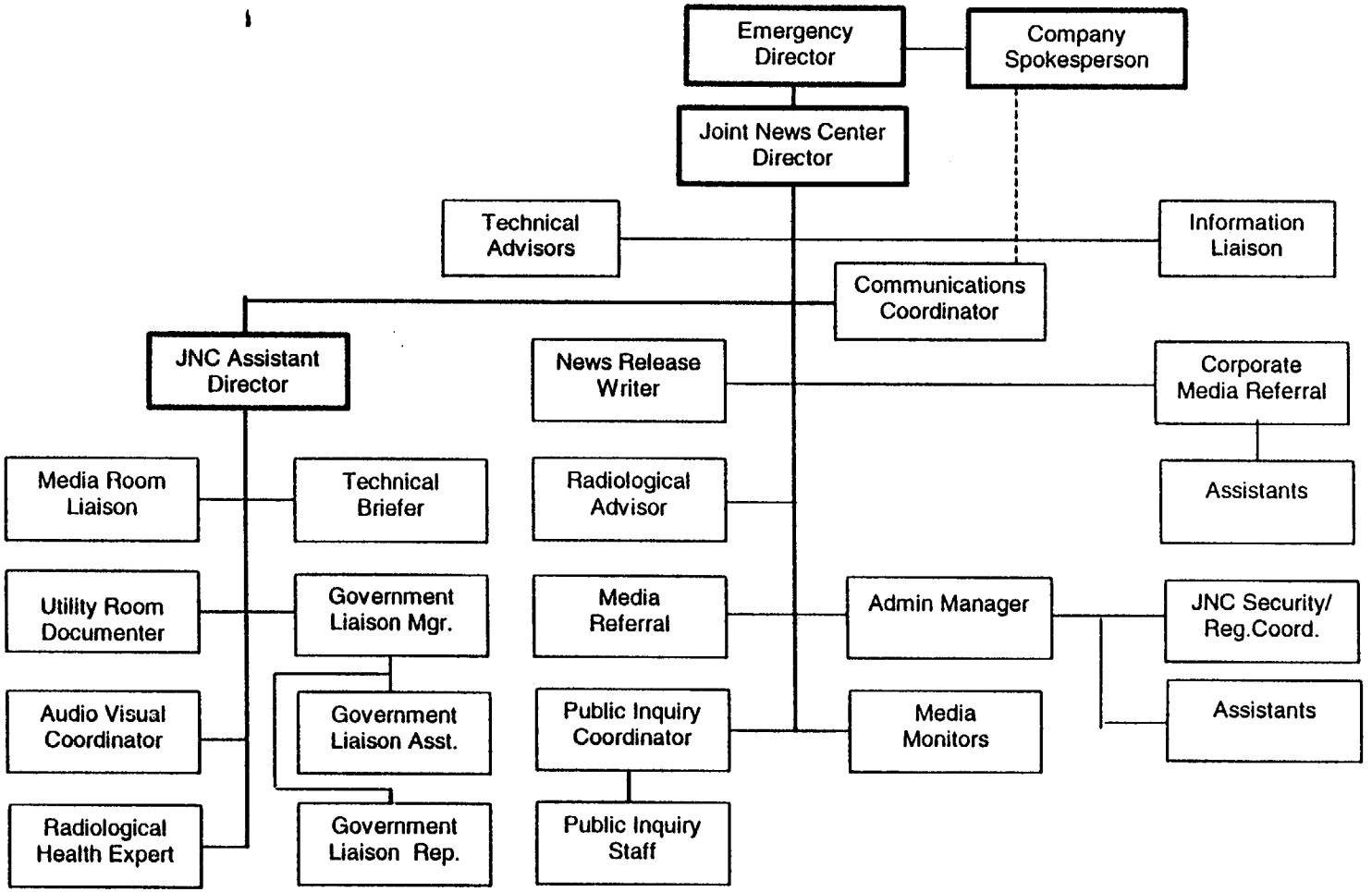


Table 5-1 (3 Sheets)

On-shift Staffing and Augmentation

Major Functional Area	Location	Major Tasks	Position Title or Expertise	On Shift	Available Within 60 Minutes
Plant Operations & Assessment of Operational Aspects	CCR		Shift Manager Control Room Supervisor Reactor Oper. Nuclear Plant Oper.	1 1 2 2	-- -- -- --
Emergency Direction & Control (Emergency Director***)	CCR	Overall direction & control	Shift Manager or Control Room Supervisor	1**	--
Notification/ Communication	CCR TSC EOF	Notify licensee, State, local & Federal Personnel & maintain communication	Communicator	1****	2
Radiological Accident Assessment	CCR/EOF	Emergency Operations Facility (EOF) Director	Emergency Plant Manager/ Emergency Director	—	1
	EOF	Offsite Dose Assessment	ORAD	—	1
		Offsite Surveys Onsite Surveys (out-of-plant) In-plant Surveys Chemistry/Radio-chemistry	Offsite Monitors Onsite Monitors Health Physics Technician Chemistry Technician	— — 1 1	4 2 2 1

Major Functional Area	Location	Major Tasks	Position Title or Expertise	On Shift	Available Within 60 Minutes
Plant System Engineering and support of Operational Assessment	CCR/TSC	Technical Support, operational accident assessment	Watch Engineer	1	
			Core/Thermal Hydraulics Engineer	—	1
			Electrical Engineer	—	1
			Mechanical Engineer	—	1
Repair and Corrective Actions	OSC	Repair and Corrective Actions	Mechanical Maintenance Technician	1**	2
			Electrical Maintenance Technician	—	2
			Instrument & Control Technician)	—	1
Protective Actions (In-Plant)		Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue, first-aid & firefighting monitoring c. Personnel monitoring d. Dosimetry	Health Physics Technician	2**	4

Major Functional Area	Location	Major Tasks	Position Title or Expertise	On Shift	Available Within 60 Minutes
Fire fighting		—	—	Fire Brigade per T.S.	Local Support
Rescue Operations and First-Aid		—	—	2**	Local Support
Site Access Control		Security, Personnel			All per Security Plan
Personnel Accountability		OSC Manager / Team Coordinator			1**
				TOTAL 10	TOTAL 26

** May be provided by shift personnel assigned other functions

*** Overall direction of emergency response to be assumed by the on-call Emergency Director. Direct operation of plant systems remains with the Shift Manager

**** Performed by Facility Support NPO or Security

Table 5-2 (7 Sheets)

Indian Point Unit 2 Emergency Response Organization Roles & Responsibilities

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
Emergency Director	1	Refer to Section 5.2.1.1
Company Spokesperson	1	Updates media on plant conditions during briefings; approves news releases.
Emergency Plant Manager	1	Refer to Section 5.2.1.2
EOF Manager	1	Refer to Section 5.2.1.3
Joint News Center Director	1	Responsible for overall direction of JNC; supervises information flow in JNC; coordinates briefings with State, counties and Company Spokesperson and presides over media briefings.
TSC Manager	2	Refer to Section 5.2.1.5
Technical Assessment Coordinator	2	Directs the activities of the technical assessment team; assists the TSC Manager in planning and performing engineering assessments of plant conditions and actions to be taken to mitigate plant damage.
Core Physics Engineer	2	Monitors and assesses plant conditions for any indications of core damage; assists operations personnel in tracking core reactivity; assesses status of fission product barrier integrity.

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
Operations Advisor	2	Monitors fission product barrier integrity and plant status, provides recommendations for emergency classification changes based on EALs; clarifies plant parameter information for the technical assessment team; works with other members of the TSC staff to provide support to the CCR to mitigate the effects of the event.
Radiological Advisor	2	Monitors plant radiological conditions and any release or potential release of radioactive materials; provides radiological status updates to TSC personnel; assists the Radiation Protection Coordinator in the development of emergency radiation work permits; assesses plant radiological parameters and informs other staff of the significance; provides input regarding decisions on emergency exposure authorization and issuance of KI.
I&C/Electrical Engineer	2	Assists in clarifying I&C/electrical information to members of the technical assessment team; provides support to the CCR to mitigate the effects of the event; assists OSC Maintenance and I&C Coordinators in preparing repair teams for dispatch into the plant.
Mechanical Engineer	2	Assists in clarifying mechanical information to members of the technical assessment team; provides support to the CCR to mitigate the effects of the event; assists OSC Maintenance Coordinator in preparing repair teams for dispatch into the plant.
TSC Data Coordinator	2	Activates computerized information systems in the TSC/OSC Complex; ensures necessary drawings and procedures are available; assists the TSC staff in obtaining plant data from various sources.
TSC Clerical	2	Provides clerical support to the TSC staff

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
TSC Communicator	2	Establishes an open line of communications between the TSC and the CCR and EOF; monitors communications from the CCR keeping aware of CCR personnel actions and procedures being implemented.
CCR Communicator	2	Establishes an open line of communications between the CCR and the TSC and EOF; monitors communications from the TSC keeping aware of TSC personnel actions and procedures being implemented.
Document Controller	2	Provides document control support for the TSC/OSC Complex.
Data Logger	2	Updates plant data for display in the TSC/OSC Complex.
Shift Manager	2	Refer to Section 5.2.1
Shift Operating Staff	2	Refer to Section 5.2.2.1
OSC Manager	2	Refer to Section 5.2.1.6
Radiation Protection Coordinator	2	Coordinates radiological controls within the Protected Area during emergencies.
I&C Coordinator	2	Directs I&C operations during emergency, including planning jobs and preparing repair teams for dispatch.
Maintenance Coordinator	2	Directs Maintenance (mechanical and electrical) operations during emergency, including planning jobs and preparing repair teams for dispatch.

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
Operations Coordinator	2	Directs NPO operations during emergency and coordinates these activities with the CCR.
Team Coordinator	2	Tracks team activities outside the OSC
Accountability Clerk	2	Coordinates initial and ongoing accountability, arranges for second shift ERO, assist Team Coordinator in tracking teams.
Technicians	2	Provide support for Health Physics, Chemistry, I&C, Electrical and Mechanical operations in the plant during emergencies.
Security Supervisor	2	Refer to Section 5.2.2.10
Shift Security Staff	2	Per Security Plan
Emergency Director Technical Advisor	3	Obtains and monitors plant data and advises the Emergency Director regarding plant condition changes, observable trends in plant data, major operator actions being undertaken and any condition which may effect emergency classification; maintains plant status chronology, assists ED in interpreting data, assists in the conduct of briefings.
Administrative & Logistics Manager	3	Provides interface with corporate organization for logistical support.
Information Liaison	3	Facilitates the timely and accurate flow of information from the EOF to the JNC; provides interface between the IP2 Emergency Response organization and Media Relations; obtains clearance of news releases from Emergency director.

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
Offsite Radiological Assessment Director	3	Refer to Section 5.2.1.4
Dose Assessment HP	3	Evaluates plant radiological data; conducts dose projections; assists the ORAD in directing onsite and offsite field monitoring teams; evaluates offsite survey data.
MIDAS Operator	3	Obtains and maintains status of meteorological information; obtains offsite radiological data from fixed radiation monitoring systems; performs dose assessments as directed.
EOF Communicator #1	3	Transmits directions to offsite monitoring teams; receives and records onsite and offsite monitoring team data.
Field Monitoring Teams	3	Perform onsite and offsite radiological monitoring; report monitoring results to the EOF.
EOF Communicator #2	3	Performs required notifications to offsite authorities including the NYS Radiological Emergency Data Form Parts I and II.
EOF Offsite Liaison	3	Coordinated Information flow to and from liaisons located at the State and County EOCs. Provides contact for offsite representatives responding to the Emergency Operations Facility (EOF)
State & County Technical EOC Liaison	3	Provides clarification regarding plant information and notifications received by the State & County EOC.
EOF Clerical Staff	3	Provides clerical support to the EOF staff

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
JNC Technical Advisors	4	Monitors information from the EOF/CCR to the JNC; advises utility workroom personnel and Company Spokesperson on plant conditions and technical matters.
JNC Director	4	Supervises and directs those operations of the JNC that involve the flow of information from the plant to the News Media and Public
JNC Assistant Director	4	Supervises operations in the utility work room; coordinates personnel workshifts and overall non-news events at the JNC; acts as JNC director in the Director's absence.
Media Room Liaison	4	Monitors news briefings; notes unanswered questions from briefings; responds to logistical/administrative questions of reporters; announces upcoming briefings; provides administrative support.
Technical Briefer	4	Supplies technical information on plant operations between briefings; follows Company Spokesperson's statements for technical accuracy.
Utility Room Documenter	4	Establishes and maintains folders to hold pertinent documents.
Government Liaison	4	Interfaces with State and county Public Information Officers at the JNC; ensures news releases are distributed to Corporate Media Referral, ensures status boards are maintained, signs off on EAS messages and initials State and county news releases.
Audio Visual Coordinator	4	Sets up and manages recording of news broadcasts; directs videotaping of all news briefings.
Media Monitors	4	Monitors radio and television broadcasts in accordance with specified procedures.

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
News Release Writer	4	Drafts news releases and briefing notes.
Radiological Advisor	4	Clarifies radiological information for utility workroom personnel and Company Spokesperson.
Media Referral	4	Distributes news releases to media organizations unable to come to the JNC.
Public Inquiry Coordinator	4	Fulfills the rumor control function as defined in specified procedures.
Radiological Health Expert	4	Supplies information on radiation exposure and its potential health effects to media.
Corporate Media Referral	4	Distributes news releases to media organizations unable to come to the JNC.
Admin Manager	4	Opens the JNC; oversees setup and activation of the JNC; oversees overall facility operations.
JNC Security/ Registration Coordinators	4	Registers and badges all personnel entering the JNC.
Assistants	4	Provide clerical support as required.
Communications Coordinator	4	Facilitates coordination of information and communications within and out of the Utility Workroom.
Government Liaison Representative	4	Places initial notifications to pre-defined individuals regarding the event underway and the pending release of information to the media and public.

Emergency Title	Figure 5-4 Sheet No.	Roles/Responsibilities
Public Inquiry Staff	4	Provide incoming callers (the public) with clarification of information that may conflict with official announcements.

6.0 EMERGENCY MEASURES

Emergency measures begin with the activation of an emergency class and its associated emergency organization. Additional measures are organized into assessment actions, corrective actions, and aid to affected persons, where applicable to each emergency class.

6.1 ACTIVATION OF EMERGENCY ORGANIZATION

The emergency conditions classified in Section 4 involve the alerting or activation of progressive segments of the total emergency organization. This section describes the communication steps taken to alert and activate authorities for each class of emergency.

6.1.1 Notification of Unusual Event

A Notification of Unusual Event is declared by the Shift Manager if any one of the conditions listed in the EAL Table (Section 4) is met.

Depending on the particular circumstances of the situation, the Control Room Operator under the Shift Manager's direction alerts the affected plant personnel and Unit 3 Control Room personnel and gives instructions regarding the event, using the public address system, the telephone or by messenger. Distinctive sounding signals are used to announce fire alarms or air raid alerts.

Immediate Notification of an Unusual Event is made by the Shift Manager or his designee to the New York State, Westchester, Rockland, Putnam and Orange County and Peekskill Warning Points using the Radiological Emergency Communications System (RECS) phone (primary method) or the Local Government Radio (LGR) (backup method). The New York State Warning Point relays the information to the New York State Department of Health.

The Nuclear Regulatory Commission's Operations Center is notified using the Emergency Notification System (ENS) phone.

6.1.1 Notification of Unusual Event (cont.)

Entergy Corporate Headquarters is notified by phone. Key individuals would notify via pager to provide support as needed.

The telephone numbers of the State and County Warning Points are contained in the Emergency Telephone Directory.

Confirmation calls from the New York State Emergency Management Office and the Four County Emergency Management Offices are not required unless notification is made via the normal telephone system when used as a backup.

Closeout is accomplished by a verbal summary to offsite authorities followed by a written summary within 24 hours.

6.1.2 Alert

An Alert is declared by the Shift Manager in the event any one of the Alert conditions listed in the EAL Table (Section 4)is met.

Immediate corrective actions, using plant emergency procedures, may be taken by the Control Room Operator to place the plant in a safe condition if the automatic protective systems have not already done it.

Notification of site personnel is accomplished by the Control Room Operator/Communicator initiating the site assembly alarm which is a rapid pulsing sound of at least 30 seconds duration. In addition, the Unit 2 Control Room Operator/Communicator also contacts the Unit 3 Control Room personnel.

In the case of fire, additional notification in the form of a distinctive 30 second duration sirens is also provided.

The Shift Manager may request, by phone, outside assistance from local support services as necessary.

6.1.2 **Alert (cont.)**

The activation of the Emergency Operations Facility, Technical Support Center, and Operations Support Center is initiated by the Shift Manager. During normal working hours the necessary personnel are available in the plant and are contacted by the Public Address System, the plant telephone or messenger. During off-hours individuals can be contacted at their homes by telephone or page "beeper" system. Telephone numbers are in the Emergency Telephone Directory available in the Control Room.

Immediate notification of an Alert is made by the Shift Manager or his designee to the New York State, Westchester, Rockland, Putnam and Orange County and Peekskill Warning Points using the Radiological Emergency Communications System (RECS) phone (primary method) or the Local Government Radio (LGR) (backup system).

The Nuclear Regulatory Commission's Operations Center is notified by the Shift Manager or his designee using the Emergency Notification System (ENS) to the NRC Operations Centers in Bethesda, Maryland.

Entergy Corporate Headquarters is notified by phone. Key individuals would notify via pager to provide support as needed.

Confirmation calls from the New York State Emergency Management Office and the Four County Emergency Management Offices is not required unless the notification was made via the normal telephone system when used as a backup. The telephone numbers of the State and County Warning Points are contained in the Emergency Telephone Directory.

If there is a radiological release above Technical Specification limits involved with the event, the Shift Manager or his designee will provide to the offsite authorities information on the release.

Closeout or reduction in emergency class is accomplished by a verbal summary to offsite authorities followed by a written summary within eight hours.

6.1.3 Site Area Emergency

A Site Area Emergency is declared by the Shift Manager if any one of the Site Area Emergency conditions listed in the EAL Table (Section 4) are met.

Notification of site personnel is accomplished by the Control Room Operator initiating the Site Assembly Alarm which is a rapid pulsing sound of at least 30 seconds duration. In addition Unit 3 Control Room Personnel are contacted by the Unit 2 Control Room Operator.

The activation of emergency personnel to staff the Emergency Operations Facility, Technical Support Center, and Operational Support Center is initiated by the Shift Manager. The minimum organization is described in Section 5. During normal working hours the necessary personnel are contacted in their assembly areas via public address system, plant telephone, or messenger. During off-hours individuals can be contacted at their homes by automatic telephone or page "beeper" system. Telephone numbers of Emergency Personnel are in the Emergency Telephone Directory available in the Control Room.

Entergy Corporate Headquarters is notified by phone. Key individuals would notify via pager to provide support as needed.

Immediate notification of a Site Area Emergency is made by the Shift Manager or his designee to the New York State, Westchester, Rockland, Putnam, and Orange County and Peekskill Warning Points using the State/County Radiological Emergency Communications System phone (primary method) or the State Emergency Management Warning Point relays the information to the New York State Emergency Management Office.

The Nuclear Regulatory Commission's Operations Center is notified by the Shift Manager or his designee using the Emergency Notification System (ENS) to the NRC Operations Centers in Bethesda, Maryland.

6.1.3 Site Area Emergency (cont.)

Confirmation calls from the New York State Emergency Management Office and the Four County Offices of Disaster and Emergency Services/Civil Defense are not required unless the notification was made via the normal telephone system when used as backup. The telephone numbers of the State and County Warning Points are contained in the Emergency Telephone Directory.

After arrival of personnel to staff the Emergency Operations Facility and the Technical Support Center, dedicated individuals would be assigned to provide plant status and meteorological and dose estimates for actual and projected releases.

If there is a radiological release above Technical Specification Limits involved with the event, the Shift Manager/Emergency Director or his designee shall provide to the offsite authorities information on the release.

Close out reduction in emergency class is accomplished by the briefing of offsite authorities at the Emergency Operations Facility and by phone, followed by a written summary within eight hours.

6.1.4 General Emergency

A General Emergency is declared if any one of the General emergency conditions listed in the EAL Table (Section 4) is met.

The activation of the emergency organization, the notification of offsite authorities, Unit 3 Control Room personnel, Corporate Headquarters and the closeout or reduction in emergency classification is the same as described in Section 6.1.3 for a Site Area Emergency.

6.2 ASSESSMENT ACTIONS

Effective coordination and directions of all elements of the emergency organization require continuing assessment throughout an emergency situation. In the case of a Notification of Unusual Event, the assessment and coordination of efforts is handled through the Control Room. During Alert, Site Area and General Emergencies the Technical Support Center and the Emergency Operations Facility are activated. Technical Support Center personnel assist the watch personnel in the assessment of the accident and recommend appropriate steps to mitigate the accident. The Emergency Operations Facility personnel continue the evaluation of offsite consequences started by the Shift Manager. Contact with the offsite agencies is maintained by the Control Room and then by the Emergency Operations Facility when activated.

The Emergency Director sends one of his staff to be an advisor to the New York State Emergency Operations Center (i.e., building No. 22, State Campus, Albany, New York) and to perform liaison duties during Site Area and General Emergencies.

This section describes for each the emergency classification defined in Section 4 of this Plan those actions taken during or after an accident to obtain and process information that is necessary to make decisions to implement specific emergency measures. Section 10, Appendix C, lists the subject matter covered by implementation procedures designed to guide the actions of the personnel.

6.2.1 Notification of Unusual Event

The existence of conditions which would be classified under this heading is brought to the attention of Control Room Operators by (a) meteorological reports, (b) indications and alarms in the Control Room monitoring plant parameters, (c) indications from fire, seismic or security detection systems, or (d) observations by plant personnel.

6.2.1 Notification of Unusual Event (cont.)

Depending upon the particular circumstances of the event, the Shift Manager takes one or more of the following actions to assess the severity of the situation: request clarification and periodic update of meteorological information received from offsite source; monitor Control Room indications more closely; request the plant security force to investigate the matter further and report their findings; dispatch member(s) of the watch force to personally inspect areas of the plant; request assistance from the plant operations staff and/or Engineering Departments in evaluating data; and make personal observations (e.g. assessing the intensity and extent of fire). With regard to accidental releases of radioactivity within plant buildings, the Shift Manager would evaluate the alarm received with respect to other radiation monitors and process instrumentation readouts in the Control Room. Health Physics personnel would be sent into the affected plant area to make observations and evaluate radiation levels.

6.2.2 Alert

For emergency situations which are classified as Alerts, the Shift Manager/Emergency Director evaluates information available in the Control Room regarding radiation monitor readings, nuclear and process instrumentation readings, containment integrity and status of safeguards equipment.

The Shift Manager, acting as the Emergency Director at the start of the emergency, and the Emergency Director after taking over control at the Emergency Operation Facility, will continually assess the relative condition of the three fission product barriers and radiological conditions onsite and offsite.

6.2.3 Site Area Emergency

For emergency situations which are classified as Site Area Emergencies, the Shift Manager/Emergency Director evaluates information available in the Control Room regarding radiation monitor readings, nuclear and process instrumentation readings, containment integrity and the status of safeguards equipment.

An immediate assessment of the projected exposure to the offsite populace is made by using the Meteorological Information Dose Assessment System (MIDAS - see Appendix F) or by using an Implementation Procedure which includes determining a source term (curies), release rate (curies per second), radioactive airborne concentrations (microcuries per cubic centimeter) in the environment and projected exposure (Rem) to the whole body and thyroid of individuals exposed to the plume. The specifics of these are as follows:

- The source term is determined from the R-25 and R-26 accident monitor instruments, indicating radioactivity in the containment building released from the reactor core.

- The release rate is determined from the Plant Vent Monitor (R-44, 27), Air Ejector Monitor (R-45) or the Main Steam Line Monitors (R-28, 29, 30, and 31). Should the plant vent monitors read off-scale or be inoperable, a remote monitor, gamma field indicating instrument has been installed to read contact field measurements on the plant vent and a procedure is available to convert the mR/hr reading to an equivalent radioactive concentration for noble gases and radioiodine. The procedure requires a field survey to be performed by a Health Physics Technician after reading the remote monitor.

6.2.3 **Site Area Emergency (cont.)**

- The radioactive airborne concentrations in the environment are determined first by calculation and then by actual measurement. The calculations are done, using MIDAS automatically or by hand, using the Implementation Procedures.

  1. The calculation is performed using an equation that utilizes the release rate, dilution factor and wind speed. The dilution factor is obtained from a table in the implementation procedure for the meteorological data display on the control room flight panel.

  2. Measurements are made by offsite monitoring teams who go to selected points and perform field surveys and air sampling. The air samples are counted and the activity calculated.

- The projected thyroid exposures are obtained from calculations that convert radioactive concentrations to mRem/hour and measurements taken in the field. Whole body exposures are as indicated by the field surveys.

The assessment information is disseminated to the New York State Emergency Management Office and to the Westchester, Rockland, Putnam, and Orange County Offices of Emergency Management.

This assessment is updated based on air sampling and field surveys performed by offsite monitoring teams using radio and cell phone equipped, vehicles under the direction of the Emergency Director. The area within a 10-mile EPZ is divided into 16 equal 22½° sectors. In each sector there are three thermoluminescent dosimeters at approximately 1, 5 and 10 miles from the site.

A number of strategically located continuous air sampling sites may also be used to evaluate the exposure for the population at large.

Updated information is transmitted by the Emergency Director to the New York State Emergency Management Office and the Westchester, Rockland, Putnam and Orange County Offices of Emergency Management.

6.2.3 Site Area Emergency (cont.)

Radioactive contamination assessment is performed after a release is terminated. The ongoing Indian Point Radiological Environmental Monitoring Program described in Section 4.2.1 of the Unit 2 Environmental Technical Specifications is utilized to determined the extent of contamination.

Total population dose is calculated by radiological assessment personnel in accordance with an implementation procedure. The calculation utilizes established demographic information in combination with the thermoluminescent dosimeter dose distributions to obtain total population exposure within the ten-mile EPZ.

6.2.4 General Emergency

The assessment actions for a General Emergency (loss of any two barriers with loss or potential loss of a third) are the same as those described in Section 6.2.3 for a Site Area Emergency.

6.3 CORRECTIVE ACTIONS

In some emergency situations, actions can be taken to correct or mitigate the situation at or near the source of the problem. Such actions supplement design features and are both a backup and an extension of automatically initiated actions. This section identifies those actions that can and would be implemented when necessary.

The Shift Manager and the Control Room Operators are licensed by the Nuclear Regulatory Commission to operate the Unit 2 plant systems. Besides their knowledge of plant systems, plant emergency procedures which cover responses to a wide range of system malfunctions are available in the Control Room. Operators are familiar with these procedures through ongoing training, part of which is on a plant-specific simulator.

6.3.1 Plant System Operation

The Shift Manager and the Control Room Operators, utilizing these procedures, perform the necessary actions to mitigate the accident and place the plant in a safe condition.

6.3.2 Fire Control

Fire control is initiated by the Field Support Supervisor. Fire fighting equipment is used by the Fire Brigade to extinguish the fire. If the Field Support Supervisor requires additional assistance, it is requested from the local fire department. Periodic fire drills are conducted to keep firefighting proficiency high. Local fire department personnel participate in an annual fire drill and are instructed in the radiological aspects of fire fighting in radiation areas.

6.3.3 Repair

The Shift Manager and the Nuclear Plant Operators are trained in the operation of all system components and in many cases have the knowledge to repair these components. In emergency conditions they would be the first to handle repairs with the station maintenance force on immediate call to augment the repair force. Entergy maintains spare parts and a tool room at Indian Point to support normal maintenance.

6.3.4 Damage Control

Damage control operation is handled by the Shift Manager and Nuclear Plant Operators with the station maintenance force on immediate call to assist. Depending on the area or equipment damaged, the watch force would perform necessary actions (system shutdown, auxiliary system intervention) to isolate the damage and reduce the possibility of the condition escalating in severity. If necessary the reactor would be tripped and the plant put into a cold shutdown. Entergy maintains spare parts and a tool room at Indian Point to support normal maintenance.

6.4 PROTECTIVE ACTIONS

Protective actions for all personnel (company employees, visitors and contractors) at the Indian Point Site are the responsibility of the Shift Manager, Emergency Plant Manager and the Emergency Director. Offsite protective actions are initiated by local authorities and may be either sheltering or evacuation.

6.4.1 Plant Site

Onsite personnel are notified of an emergency by means of the public address system, route alerting and the use of distinct audio signals for fire, containment evacuation and site assembly. When the Site Assembly Alarm is sounded all personnel within the Protected Area assemble at predetermined initial assembly areas.

Depending upon the emergency classification and plant conditions there would be movement, assembly and evacuation of personnel. For Notification of Unusual Events, personnel may be instructed to evacuate certain areas of the plant. For Alerts, personnel may be directed to leave certain areas of the site if conditions require, such as a radioactive release, fire, toxic gas release etc. For Site Area and General Emergencies, personnel assemble at the initial assembly areas and all non-essential personnel may be evacuated from the site.

Assembly areas and evacuation routes are specified in the Implementing Procedures. Depending on meteorological conditions, the Shift Manager/Emergency Director decides whether to evacuate and the appropriate evacuation routes. Inclement weather, high traffic density and specific radiological or toxic conditions are considered in making the decision. The evacuation is under the direction of the Shift Manager/Emergency Director. Evacuees walk from the initial assembly areas to the reassembly area (Indian Point Service Center). Evacuees continue from site reassembly area using their own cars when practical or other transportation such as busses. The Admin and Logistics Manager is tasked with making arrangements for additional transportations as necessary.

6.4.1 Plant Site (cont.)

Implementing procedures provide instructions to account for all personnel including employees having emergency assignments, visitors, contractors and construction personnel. Initial Accountability will be completed within approximately 30 minutes of sounding the Site Assembly Alarm at the Site Area or General Emergency Classification (or when called for by the Shift Manager or Emergency Plant Manager). The accountability process accounts for everyone within the Protected Area or identifies unaccounted for personnel. Individuals not accounted for will be located by Operations, OSC Personnel, Security or Search and Rescue Teams.

Radiological monitoring of personnel, their possessions and their automobiles would be performed by Health Physics personnel using instrumentation specifically assigned for this purpose.

External radioiodine skin decontamination is performed using reduction materials and following plant radiation protection procedures. Extra clothing is available.

Public access to the site is controlled by the Indian Point Security Force following emergency and security plan procedures.

6.4.2 Offsite Areas

Local and State agencies are responsible for implementing offsite protective actions. These actions are included in the County and the State Emergency Plans. The Indian Point Emergency Director is responsible for recommending offsite protective actions to the offsite authorities.

- Offsite protective actions will be recommended for a General Emergency. The Alert Notification System described in Section 6.6 is activated to alert the public.

6.4.2 Offsite Areas (cont)

- The recommended protective actions are based on the EPA Manual of Protective Action Guides and Protective Actions for Nuclear incidents, (Revised May 1992) and 10 CFR 50. Dose rates, evacuation times and weather conditions are considered. The decision to implement the recommendations is made by State and local officials following their emergency plans and the Laws of New York State.

Evacuation time estimates developed by an outside consultant are appended to this plan in Appendix G. Appendix G contains details on population distribution in the Emergency Response Planning Areas.

6.4.3 Use of Onsite Protective Equipment and Supplies

Special equipment and supplies are available for onsite personnel to minimize their exposure to airborne contaminants. Refer to Section 10 Appendix D for the equipment and its location.

For the most part, the protection provided to non-watch nonessential personnel in areas onsite is the eventual removal to offsite locations; therefore, respiratory equipment and protective clothing are not necessary. Potassium iodide may be administered as a thyroid block for radioiodine. In areas that are highly contaminated or have high airborne radioiodine and other particulate concentrations, protective clothing (coveralls, shoecovers, gloves and hats) is worn. Respiratory protection equipment is used to reduce or protect the emergency worker from a significant thyroid exposure from radiodine (25 Rem or more). Potassium iodide may be used when the individual's thyroid dose (CDE) is expected to exceed 25 Rem.

The Shift Manager/Emergency Director decides on the use of potassium iodide. Potassium iodide is stored in the Emergency Operations Facility, the Unit 1-2 Control Room and the Command Guard House. Respiratory equipment and protective clothing stored at the Emergency Operations Facility, the Unit 1-2 Control Room, the Operational Support Center will be used as directed by the Shift Manager/Emergency Director.

6.4.4 Contamination Control Measures

6.4.4.1 Plant Site

At an Alert, Site Area or General Emergency access to and egress from the site is restricted by the plant Security Force as directed by the Emergency Director. Equipment and personnel that may have been contaminated by a radiological release are checked by Health Physics personnel before leaving the site. The Emergency Plan Implementing Procedures establish levels for decontamination.

No agricultural products or water supplies originate or pass through site. Precautions shall be taken onsite to prevent the contamination of drinking water and food supplies. Radiation Protection Procedures include methods and criteria for returning contaminated areas to normal. The priority of decontamination is decided by the Emergency Plant Manager, Emergency Director and Recovery Manager.

6.4.4.2 Offsite Areas

Local and State agencies are responsible for implementing protective actions offsite.

Protective actions and contamination control measures are contained in the State and County Emergency Plans. Field surveys and air monitors are done during an emergency and environmental sampling of appropriate media is done after the release is terminated. Survey, monitoring and sampling information is passed to the New York State Emergency Management Office.

6.5 AID TO AFFECTED PERSONNEL

6.5.1 Emergency Personnel Exposure

Exposure to emergency personnel will be as low as reasonably achievable.

The Emergency Director and Health Physics supervisory personnel are responsible for exposure control as prescribed in the Emergency Plan Implementing Procedures. Access to areas is controlled and exposure to personnel entering controlled areas is documented. Individual exposures are normally kept below 10 CFR 20 limits for the emergency.

6.5.1 **Emergency Personnel Exposure (cont.)**

Volunteers may receive doses in excess of 10 CFR 20 limits authorized by the Emergency Director or the Emergency Plant Manager as prescribed in the Emergency Plan Implementing Procedures.

The Emergency Director/Emergency Plant Manager may issue potassium iodide at the thyroid dose of 25 Rem CDE.

Doses received by emergency personnel during emergencies are continuously assessed by Health Physics personnel. Dosimeters, and/or themoluminescent dosimeters are distributed to emergency workers and are controlled, read and documented in accordance with the Radiation Protection Procedures and the Emergency Plan Implementing Procedures.

NOTE: Protective measures such as the use of potassium iodide and respiratory protection would be used to reduce or protect the emergency workers from a significant thyroid exposure from radioiodine (25 Rem or more).

6.5.2 **Decontamination and First Aid**

The medical and first aid facilities available onsite for the treatment of injured and/or contaminated personnel are described in Section 7.5. Procedures contained in the Emergency Plan Implementing Procedures specify treatment and decontamination of wounds.

There is at least one individual on every security watch who is trained in first aid techniques. A Health Physics Technician who has received training in decontamination procedures is on duty 24 hours a day.

6.5.3 Medical Transportation

Arrangements have been made for transporting injured, contaminated and irradiated personnel to the hospital via the Verplanck Fire Department Ambulance which provides 24 hour services. Backup ambulance service is available through a mutual aid system. A written agreement is contained in Section 10 Appendix A. The Verplanck Fire Department Ambulance participates at least once per year in the annual medical emergency drill.

6.5.4 Medical Treatment

The Hudson Valley Hospital Center at Peekskill/Cortlandt has agreed to accept injured/contaminated/irradiated patient(s) from the Indian Point Site. The Phelps Memorial Hospital Center, Tarrytown, has agreed to serve as the backup hospital. In addition, a highly qualified and experienced medical doctor has been retained as a consultant to Entergy to supervise special cases of massive whole body exposure or extreme contamination problems. Written agreements for the hospitals and the medical consultant are contained in Section 10 Appendix A. Physicians and nurses at the Hospital participate in and are also given a seminar to acquaint them with the special precautions and techniques required for care of contaminated patients.

6.6 Public Alert and Notification

Entergy has provided and maintains an Alert Notification System (ANS) in the 10-mile radius surrounding the Indian Point Nuclear Plants. The design objective of the ANS is to provide local county governments with the means to alert the general public within EPZ in the event of an emergency at the Indian Point Plants within 15 minutes of the decision to do so. The intended purpose of the alert signal is to instruct the public to refer to public media (radio and television) for more specific information.

6.6 Public Alert and Notification (cont.)

The responsibility for the activation of the ANS resides with the county governments having jurisdiction in the 10-mile EPZ. The alerting devices in each county are controlled by respective county authorities.

The Public Alert Notification System (ANS) is composed mainly of sirens and is augmented with individual alerting devices for special facilities.

The high sirens employed in the ANS are electro-mechanical with rated output of 119-122 dB © at 100 feet and are initiated from each County EOC via transmitted radio signals.

The system design consists of 154 sirens with a distribution as follows:

- Westchester - 77
- Rockland - 51
- Orange - 16
- Putnam - 10

Periodic testing and maintenance of the ANS is performed in accordance with approved procedures. Periodic testing includes:

- Bi-weekly silent test - intended to check encoder equipment, radio transmitter/repeater and siren receiver and encoder.
- Quarterly growl test - intended to test the siren sub-system from receiver antenna to siren motor (satisfies the requirement of the bi-weekly silent test).
- Annual activation test - test the actuation and operation of the siren system (satisfies the requirements of the bi-weekly silent test if the cancel signal is initiated following the activation).

7.0 EMERGENCY FACILITIES AND EQUIPMENT

This section of the plan identifies, describes and gives the location of facilities and equipment used or maintained by Entergy to respond to emergencies at Indian Point.

7.1 EMERGENCY RESPONSE FACILITIES

The emergency response activities of the Indian Point Emergency Plan are distributed among the functions of seven (7) emergency response facilities (ERF)s:

- Central Control Room (CCR)
- Emergency Operations Facility (EOF)
- Alternate Emergency Operating Facility (AEOF)
- Technical Support Center (TSC)
- Operations Support Center (OSC)
- Joint News Center (JNC)

Each facility has procedures, staff, accommodations, equipment, services and supplies for implementing its function. Figure 7-1 shows the location of the Emergency Response Centers.

7.1.1 Central Control Room (CCR)

The CCR in the Unit 2 Control Building, 53' elevation contains the necessary instrumentation for operating the plant under normal and accident conditions. The CCR Watch personnel make the initial declaration and classification of an emergency and performs activities of other facilities until those facilities are activated and operational. Manipulations of the reactor or the plant to mitigate the consequences of an accident and restore safe conditions, however, remain as the primary function of the CCR.

The CCR staff is part of the Watch with two additional positions for assuring plant parameter data is available to the TSC.

7.1.1 Central Control Room (CCR) (cont.)

Overall management of the emergency response lies with the Shift Manager in the CCR until it is accepted by either the Emergency Plant Manager or the Emergency Director. Meteorological, plant parameter, offsite radiation monitor, environmental sample and survey data are available for accident assessment, emergency classification and protective action recommendations. Radio and telephone services are available to alert and notify government authorities of emergencies and recommend protective action.

7.1.2 Emergency Operations Facility (EOF)

The EOF is located at the Buchanan Service Center on Broadway in Buchanan, NY. Functions performed at the EOF include:

1. overall management of the Entergy emergency response;
2. alert and notification of Federal, State and local government authorities of plant events, conditions, emergency action levels, emergency classifications and dose projections;
3. protective action recommendations to State and Local government authorities for the population around the site;
4. coordination with Federal, New York State (NYS) and local government;
5. accident assessment including environment samples, surveys and dose calculations;
6. radiological exposure control for the individuals assigned to the EOF.

The EOF is activated within 60 minutes after a declaration of an Alert, SAE or GE with sufficient staff to perform functions 1 through 4. If the EOF is activated with less than minimum staffing as outlined in Table 5-1, EOF management will assure that minimum staffing is met as required within 60 minutes. Accommodations are available for Federal, State and local government representatives.

7.1.2 Emergency Operations Facility (EOF) (cont.)

The Emergency Director in the EOF is responsible for the overall management of the response. Meteorological, plant parameter, offsite radiation monitor, environmental sample and survey data are available for accident assessment, emergency classification and protective action recommendations. Radio and telephone services are available to alert and notify government authorities of emergencies and recommend protective action.

There are two levels in the EOF. The Emergency Control Center (ECC), MIDAS Area, NRC Room, Electrical Equipment Room and Communications Equipment Room are on the lower level and the Observer's Deck is on the upper level.

Except for the two equipment rooms, air in the remainder of the EOF is kept at a slight pressure and recirculated through HEPA filters to minimize airborne contamination.

7.1.3 Alternate Emergency Operating Facility (AEOF)

The AEOF, located on the 12th floor of the AT&T Building on Hamilton Avenue in White plains NY; is the alternate location for the EOF outside the plume exposure emergency planning zone (EPZ). AEOF and EOF functions are similar. The only radiological exposure control activity to be performed at AEOF is decontaminating individuals evacuated from Indian Point.

Procedures, staff, accommodations, equipment, services and supplies for the AEOF are similar to those for the EOF.

7.1.4 Technical Support Center (TSC)

The TSC located in the Unit 1 Superheater Building, 53' elevation across the hall from the CCR performs the following:

- Overall management by the Emergency Plant Manager of emergency response within the Protected Area.
- Provide technical support to the reactor operating personnel in the Central Control Room.

7.1.4 Technical Support Center (TSC) (cont.)

- Provide information on plant events and conditions, including plant parameter data, to the Emergency Director and emergency response personnel in the EOF.

The TSC is activated within 60 minutes after a declaration of an Alert, SAE or GE with sufficient staff to perform the above functions. If the TSC is activated with less than minimum staffing as outlined in Table 5-1, TSC management will assure that minimum staffing is met as required within 60 minutes.

The TSC Manager directs and coordinates activities in the TSC. Plant parameter data is available for accident assessment including core damage assessment. This data can be forwarded to the EOF or AEOF. Telephone service between locations on and off the site is also available.

Included in the TSC are the Computer Room, NRC Office, Records Management Office and Workspace, Telephone Equipment Room, 53'-62'-72' elevation stairwell and toilets, and former Whole Body Counting Room. The Ventilation System assures that the General Design Center Criterion 19 (GDC) exposures Limits of 5 Rem whole body and 30 Rem thyroid, during the first 30 days of a Design Basis Accident (DBA) can be met.

7.1.5 Operations Support Center (OSC)

The OSC is located in the Unit 1 Superheater Building, 53' elevation across the hall from the CCR, adjacent to the TSC. The OSC is the staging and dispatch area for individuals who may be assigned to first aid, search, survey, rescue, repair and corrective action teams.

The OSC Manager is responsible for managing the activities in the OSC including:

- working with the Emergency Plant Manager in planning field operations to mitigate emergency conditions in the plant;
- accountability of all individuals on the site who are assigned to an Emergency Response Force, the Watch or the Security Force including anyone dispatched from the OSC;

7.1.5 Operations Support Center (OSC) (cont.)

- mobilizing the Material Control Storekeeper and individuals on the emergency roster needed to fill the positions in the OSC,
- radiological exposure control for the individuals within the OSC.

The OSC is activated within 60 minutes after a declaration of an Alert, SAE or GE with sufficient staff to perform the above functions. If the OSC is activated with less than minimum staffing as outlined in Table 5-1, OSC management will assure that minimum staffing is met as required within 60 minutes.

Equipment and supplies for the OSC include protective clothing, dosimetry, sampling and survey equipment to be used by the OSC teams.

The OSC Staff is responsible for Radiological Exposure Controls for the members of the Emergency Response Organization within the Protected Area.

7.1.6 Joint News Center (JNC)

The JNC is located outside the plume exposure emergency planning zone in the former Air National Guard Building at the Westchester County Airport; Interstate I-684, Exit 2; White Plains, NY and provides a place for;

- point of contact between the Entergy corporate spokesperson and the news media
- coordination of public information released to the news media and the public by Entergy, State and Local government including alerts, notifications and protective action recommendations

The JNC has accommodations for Federal, State and Local government representatives as well as representatives of the news media.

Entergy activities at the JNC are managed by the JNC Director and the JNC has equipment to support the activities including telephones, facsimile and photocopiers.

The JNC is activated within 2 hours upon declaration of an Alert, SAE or GE.

7.2 COMMUNICATIONS SYSTEMS

Communications may be established by different means (radio, phone, public address system) within plant buildings, between the Site and local authorities and between the following groups: Control Room personnel, offsite support groups, Emergency Operations Facility personnel, Technical Support Center personnel, Operational Support Center personnel, onsite and offsite monitoring teams, security forces and Corporate Management. Table 7.1 lists the major communications systems available in the Emergency Response Facilities.

7.2.1 Public Address System

The Public Address System is designed for paging within the Unit 1-2 site from the Unit 2 Control Room. Personnel paged have the ability to talk to the Control Room Operator via party line phones that are strategically located within the units. Plant personnel may initiate the communication to the Control Room from outlying party lines. This system is used to call personnel and announce emergencies in the Unit 1-2 buildings. A similar system exists for Unit 3 (ENTERGY) areas.

7.2.2 Telephones

Normal telephone communication service includes Private Branch (PBX) and Commercial and Federal Telephone System (FTS) exchange in the Central Control Room, Emergency Operations Facility, Technical Support Center, Operational Support Center, Joint News Center, Corporate Response Center, and Recovery Center. The

commercial telephone service to Indian Point includes service from both the Peekskill and Croton telephone exchanges.

A microwave system provides alternate telephone communication through a NYC (212 exchange) from the Central Control Room and Emergency Operations Facility. The microwave system is utilized by the Local Government Radio Channel

7.2.2 Telephones (cont.)

The Emergency Notification System (ENS) and the Health Physics Network (HPN) are dial telephone circuits in the Federal Telecommunication System used for the dissemination of operational conditions as well as the initial warning notification from the site to the Nuclear Regulatory Commission. This system has extensions at the Central Control Room, Technical Support Center and the Emergency Operation Facility.

7.2.3 Direct Line Phones

Radiological Emergency Communications System (RECS) and the Emergency Response Facility direct lines.

- Radiological Emergency Communication System (RECS) with phones in the Control Room and the Emergency Operations Facilities is the primary means of simultaneously notifying the City of Peekskill, State, County and Emergency Operations Centers Warning Points of an emergency. This system is staffed twenty-four hour per day in the Control Room and City, County and State Warning Points. State and County Warning Point procedures detail the activation of their respective responses organization. (Figure 7-2)

- Direct line phones connect the Emergency Operations Facility, Joint News Center, Alternate Emergency Operations Facility and the Control Room of Unit 1-2 and Unit 3. Automatic ringing phones connect the Technical Support Center with the Control Room, Emergency Operations Facility and the Alternate Emergency Operations Facility.

7.2.4 Radio Systems

A two channel radio system which operates in the ultra-high frequency range is available for communication between the site and emergency facilities. A channel, designated "Central" channel is provided between the Unit 1-2 Control Room and the System Operator at the New York City Energy Control Center. A second channel, designated "Area" channel is a separate radio system for emergency forces that connects the Emergency Operations Facility, the Unit 3 Control Room, the Unit 1-2 Control Room and the emergency environmental survey vehicles.

A separate security radio system is used by the Security Force connecting the Command Guard House with all guard posts. In addition, the Local Government (LG) radio channel has been installed in the Control Room and Emergency Operations Facilities to be used as backup to the Radiological Emergency Communications System (RECS) phone. Figure 7-3 depicts the LG radio channel.

Backup power generation for the Emergency Response Facilities is provided by either gas or diesel engine driven generators which will automatically supply AC power for the radio system if normal power is interrupted.

7.2.5 Radio Paging System - (Page "Beeper" Service)

A commercial radio paging service is used for recalling personnel that are offsite at the start of an emergency. The paging service is contacted to initiate the page. The paging service then transmits a message to all personnel to whom a pager has been issued. Personnel acknowledge by calling a pre-designated number connected to an answering machine which receives the caller's name and time of the call for accountability purposes.

7.3 ASSESSMENT FACILITIES

Many of the emergency measures described in Section 6 depend on the availability of monitoring instruments and laboratory facilities. This section lists the monitoring systems that are used to initiate emergency measures, as well as those used for continuing assessment.

7.3.1 Onsite Systems and Equipment

7.3.1.1 Seismic Monitoring Equipment

The seismic monitoring equipment at the Indian Point Station is located in the Unit 3 Containment Building. Information from this equipment is transmitted by the Unit 3 Control Room Operator to the Unit 2 Shift Manager. The monitoring system consists of three (3) peak shock records in a tri-axial mount at EL-46'-0" on the base mat; two (2) tri-axial strong motion accelerographs, one at EL-46'-0" on the base mat and one on the Containment Structure Wall at EL-100'-0" directly above the lower unit and three (3) peak recording accelerograph one each on a steam generator, a reactor coolant pump and the pressurizer.

The peak shock recorders readout in the Unit 3 Control Room on a peak shock annunciator when acceleration limits are exceeded. Both strong motion accelerographs record on magnetic tape recorders also located in the Control Room. The accelerographs on the base mat are wired to an alarm panel in the Control Room which produces an audible and a visual signal at an earthquake acceleration greater than 0.01g. The magnetic clips from the peak recording accelerographs must be retrieved from inside containment to be evaluated.

7.3.1.2 Meteorological Monitoring Equipment

A primary 122 meter meteorological tower located on the Indian Point Site provides real-time meteorological parameters as specified in Enclosure 1 to Appendix 2 of NUREG-0654 (January 1980) and USNRC Regulatory Guide 1.23 Revision 1. The three basic functions outlined in Annex 1 to Appendix 2 of NUREG-0654-Rev 1 have been implemented. Electrical service to the tower is backed up with an alternate diesel generator power supply through automatic power transfer switch.

A 33 meter backup tower is located on the site and a 10 meter standby tower is located on the roof of the Indian Point Service Center Building. Real-time wind speed and wind direction data are continuously recorded. An estimator of atmospheric stability (sigma theta) is derived from the wind direction fluctuations. There is an alternate source of power for data collection at both towers available automatically at the loss on normal power.

Real-time atmospheric transport and diffusion calculations are made using the MIDAS operating on a dedicated computer and peripherals. The Class A model can provide relative concentration output within a few minutes. A Class B type model produces refined estimates of transport and diffusion incorporating terrain, time and space variations, and forecasts of meteorological conditions.

Data from the meteorological tower and Class A model can be accessed remotely via telephone communication using a terminal-printer or a personal computer with a modem and is displayed in the control room. All of the data outputs are in the format specified in Enclosure 1 and Appendix 2 of NUREG-0654 (January 1980). Real-time meteorological information can be obtained from the National Weather Services stations and other offsite meteorological facilities identified in Section 7.3.2.

7.3.1.2 Meteorological Monitoring Equipment (cont.)

The telephone communications described in Section 7.2.2 provide access to the meteorological data from the EOF, TSC, CR and offsite NRC center.

Further information on the MIDAS system can be found in Section 10 Appendix F.

7.3.1.3 Radiological Monitors

A Radiological Monitoring System, consisting of fixed process (air, liquid or gas) monitors and area radiation monitors, is installed throughout each Unit with remote readouts and alarm indications in the Control Room. Table 7-2 lists area and process monitor locations.

Laboratory facilities for the radiation protection and chemistry groups include laboratory and calibration rooms for both conventional and radio chemical analyses.

The portable survey instruments, counting equipment and supplies available in emergency lockers are listed in Section 10 Appendix D.

7.3.1.4 Process Instrumentation

Vital parameters (e.g. pressure, flow, temperature, fluid level) are monitored and abnormal conditions immediately brought to the attention of the watch force with either local indication or remote indication in the Control Room.

Process instrumentation inside containment required to operate and provide assessment information after a loss of coolant accident or a steamline break include:

- Pressurizer Pressure channels: PT-455,456, 457,474
- Pressurizer level channels: LT-459,460, 461,462
- High-head flow channels: FT-924,925,926,927
- Accumulator pressure channels:PT-936A,B,C,D; PT-937A,B,C,D

7.3.1.4 Process Instrumentation (cont.)

- Recirculation spray flow channels: FT-945A,B
- Recirculation sump level channels: LT-938,939
- Containment sump level channels: LT-940,941
- Residual heat loop flow channels: FT-640;FT-946A, B,C,D

7.3.1.5 In-plant Iodine Instrumentation

To measure airborne iodine concentrations within Unit 2, Station personnel can perform gamma energy spectrum analyses onsite using equipment located in areas expected to have post accident accessibility. Portable equipment to collect local samples is also available onsite. Procedures provide direction and guidance for sample collection and analysis.

7.3.1.6 Post-accident Sampling

Plant design includes the capability to sample the reactor coolant system, the discharge of the recirculation and residual heat removal pumps, and the post accident containment atmosphere. The post accident sampling capability is in accordance with the criteria of NUREG-0578.

7.3.1.7 Instrumentation for Detecting Inadequate Core Cooling

Instrumentation for detecting inadequate core cooling includes:

- reactor coolant saturation meter
- hot leg wide range temperature
- cold leg wide range temperature
- wide range reactor coolant pressure
- pressurizer level
- reactor vessel level indication system (RVLIS)

7.3.1.7 Instrumentation for Detecting Inadequate Core Cooling (cont.)

The first indication of mass loss from the Reactor Coolant System (RCS) may be a decreasing pressurizer level. Saturation or the degree of subcooling can be determined from the saturation meter or with primary system pressure and temperature from the steam table in the Control Room. Degradation of core cooling is indicated by cold and/or hot leg wide range temperatures which are higher than the saturation temperature.

7.3.1.8 Fire Detection

Heat and smoke detectors are located throughout the plant with alarms annunciated in the Control Room. A detailed description of the fire detection equipment is in the Entergy Indian Point Nuclear Generating Unit No. 2 Fire Protection Program Plan.

7.3.2. Facilities and Equipment for Offsite Monitoring

7.3.2.1 Survey Vehicles

Two survey vehicles, equipped with two-way radios, cell phones, air samplers, sample counters, portable survey meters (including low-level radioiodine detection equipment with a minimum sensitivity of 1 x 10^{-7} µCi/cc), personnel dosimeters and respirators are available for offsite monitoring. Backup vehicles are available from Unit No. 3. Equipment in the survey vehicles is listed in an Emergency Plan Implementation Procedure.

During an emergency the survey vehicles are sent to pre-selected locations within 10 mile radius of the site. Radio communication tests and access checks were performed for each location. Each location is shown on large maps located in the Control Room and Emergency Operations Facility. Laboratory facilities for personnel whole body counting and for environmental sample preparation and counting exist at the site.

7.3.2.2 Radiological Environmental Monitoring Program

Indian Point Radiological Environmental Monitoring Program includes routine direct gamma measurements, particulate and radioiodine air sampling, water sampling, and seasonal aquatic and land vegetation sampling at various locations within a seven and half-mile radius of the plant. The Indian Point Radiological Environmental Monitoring Program is described in Section 4.2.1 of the Indian Point Unit No. 2 Environmental Technical Specifications.

Backup facilities for the environmental sample preparation and counting are available by agreement with an offsite laboratory. A copy of the agreement letter is in Section 10 appendix A.

7.3.2.3 Fixed Field Measurement Sites

Pressurized ionization chambers, one in each of the 16 sectors are located at various distances between the site boundary and 2 miles. The radiation data is collected by the MIDAS computer at the Emergency Operations Facility.

The data is available to the Control Room and may be used to estimate whole body exposure offsite.

7.3.2.4 Offsite Meteorological Information

Offsite meteorological information is available by telephone from the following sources:

National Weather Service (NWS) hourly data from area reporting stations including wind speed, wind direction, cloud cover, precipitation, temperature, dew point and atmospheric pressure.

Atlantic City, New Jersey and Albany, New York NWS stations at upper air sounding.

7.4 PROTECTIVE FACILITIES AND EQUIPMENT

Assembly areas and evacuation routes are specified in the Emergency Plan Implementing Procedures. Assembly areas are located to assure that some are not in the path of the plume. Plant and contractor personnel are assigned assembly areas. Each assembly area has a telephone. The assembly areas within the Protected Area fence are within the range of the plant paging system. Emergency lighting is provided in the buildings within the Protected Area fence. Non-watch, non-emergency personnel will be relocated to less affected areas of the site and eventually evacuated to offsite locations. Depending on existing radiological and meteorological conditions, the Shift Manager/Emergency Director decides when relocation/evacuation is necessary and which route will be used. A procedure for evacuation is contained in the Emergency Plan Implementing Procedures. The use of onsite protective equipment and supplies is described in Section 6.4.2.

7.5 FIRST AID AND MEDICAL FACILITIES

7.5.1 First Aid-Decontamination Room

Medical facilities at Indian Point Station are in a two room First Aid-Decontamination Suite located on the 72 foot elevation of the Unit No. 1 Nuclear Service Building. This suite includes a decontamination room and an examination room with a stainless steel decontamination table, shower facilities, foot sink and hand sink, stainless steel flooring with drains to holdup tank, and first aid and medical supplies for life support and minor surgery.

7.5.2 First Aid Room

A First Aid Room in a non-radiation area is on EL. 15 of the Unit 1 Administration Building. This room contains general first aid equipment, oxygen breathing apparatus and an examination table for non-contaminated patients.

7.5.3 Indian Point Service Center

The Service center is the principal location for the Emergency Operations Facility and is also used to reassemble, monitor and decontaminate personnel evacuated from the plant.

7.6 DAMAGE CONTROL EQUIPMENT AND SUPPLIES

Tools and parts available for normal plant maintenance are also available for damage control operations during emergencies.

Figure 7-1
Location of Emergency Response Facilities

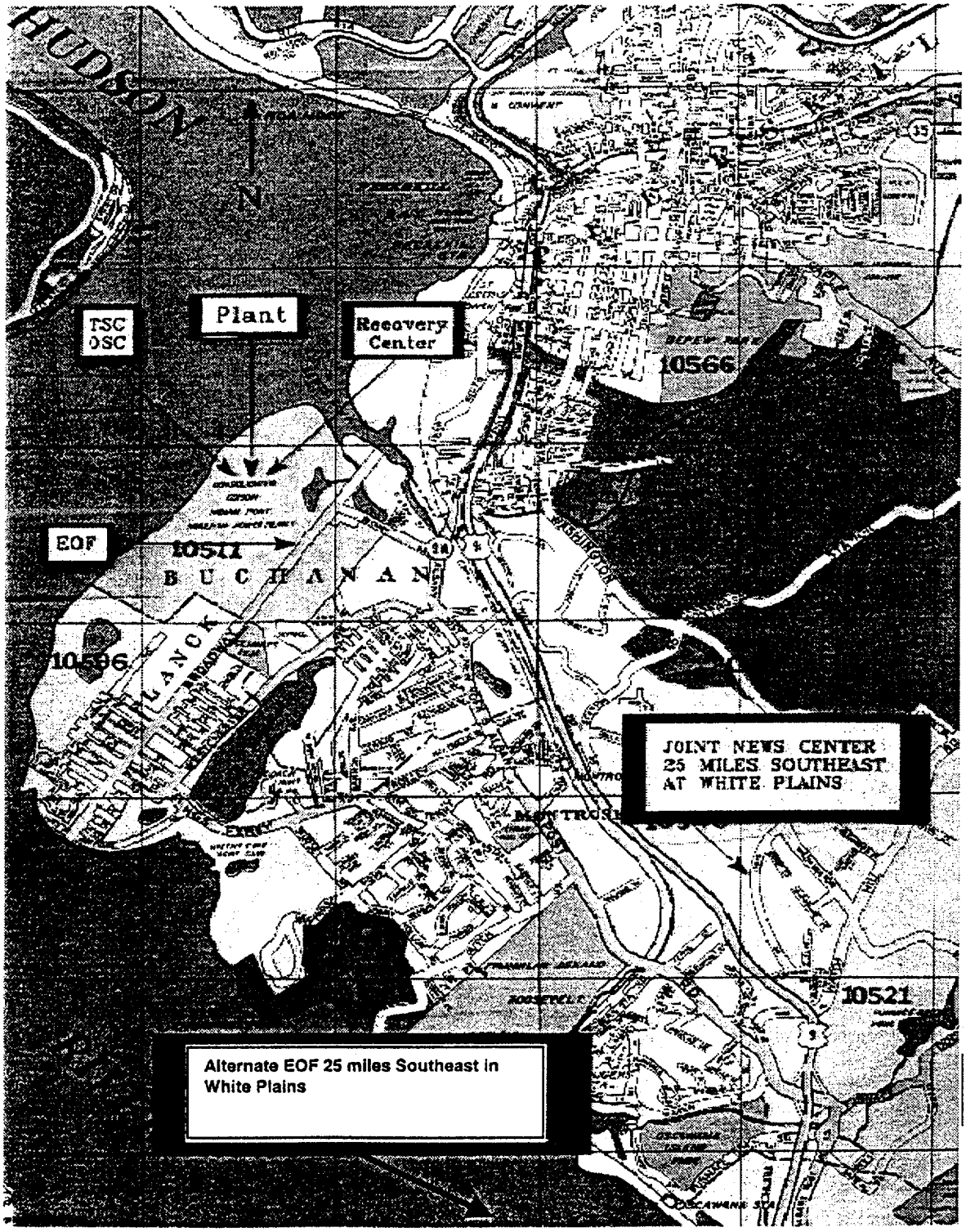


Figure 7-2
Radiological Emergency Communications System (RECS)

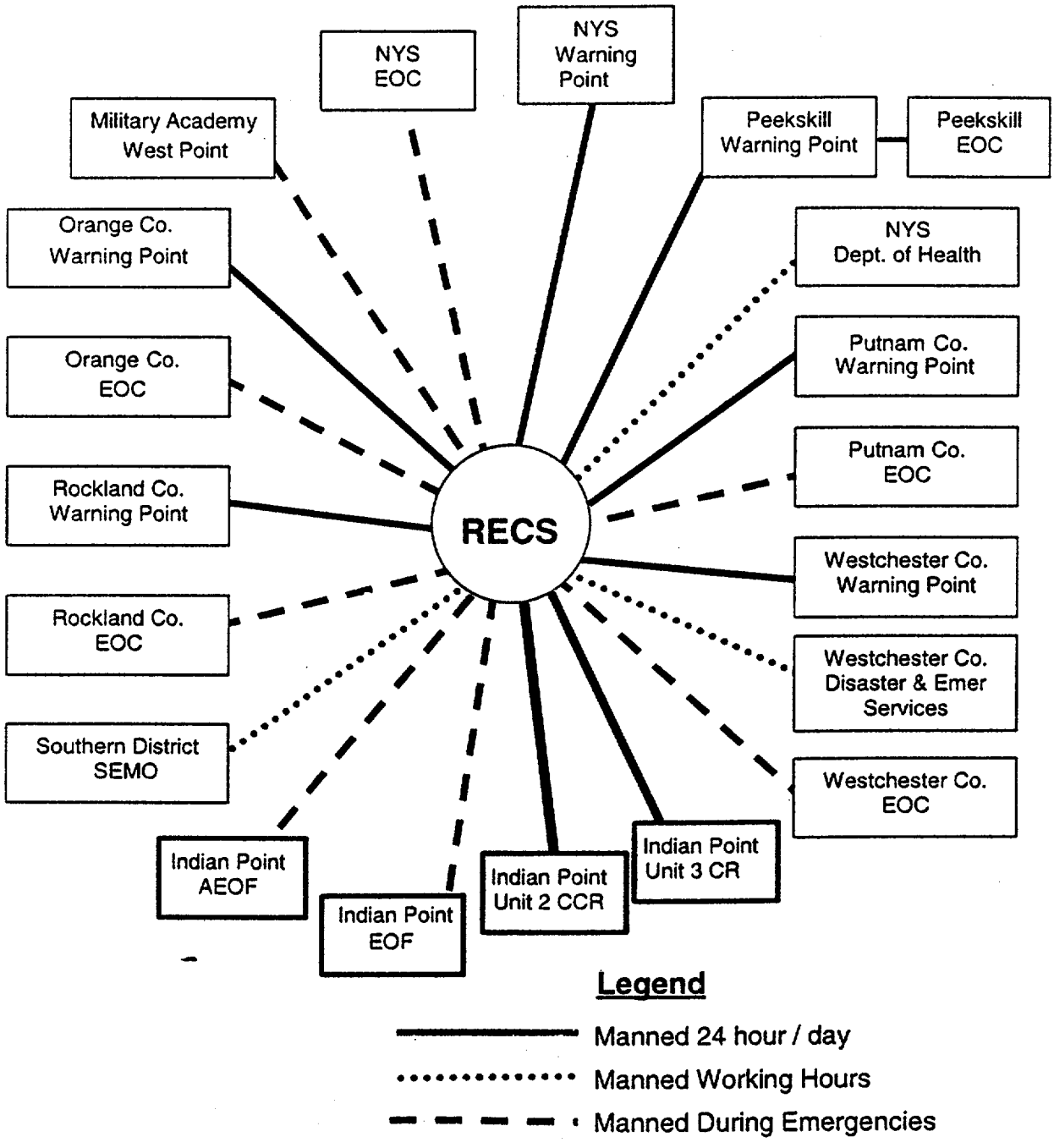


Figure 7-3
Local Government Radio Channel

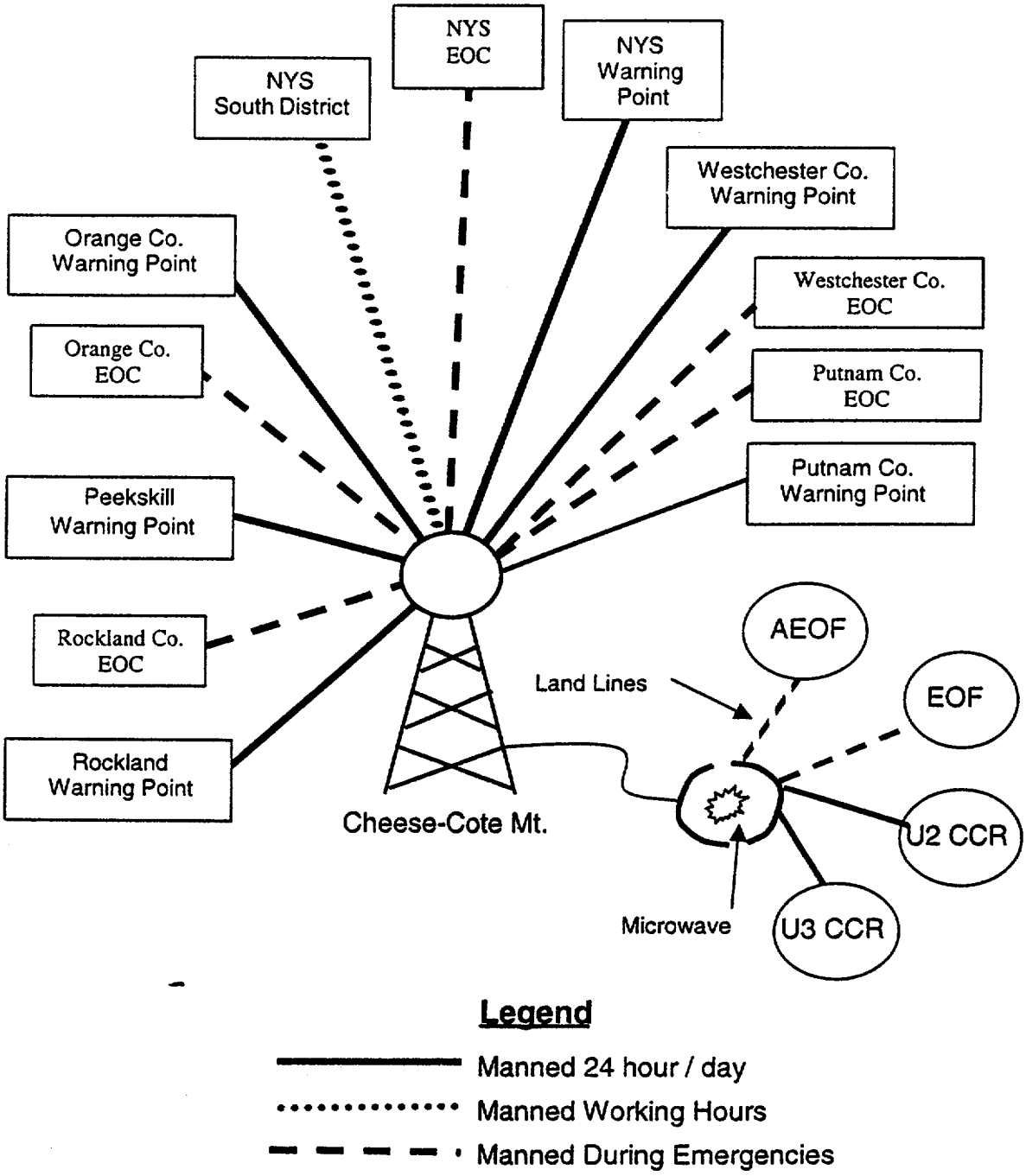


Table 7-1

Emergency Response Facility Communication Systems

Facility	Communications System	Connected to ---
CCR	Central Radio	EOF
		AEOF
	Area Radio	EOF
		AEOF
		Monitoring Teams
		Security
		Unit 2 or 3 CCR
	Local Government Radio	EOF
		AEOF
		Peekskill EOC and Warning Point
		State and County EOC and Warning Points
		Unit 2 or 3 CCR
		West Point Military Academy
		State South District
	212 Phone Exchange	All Indian Point Facilities
	914 Phone Exchange	All State and County Facilities
	Station PBX	All Federal Facilities
		All Industry Contacts
		All Private Facilities

Table 7-1

Emergency Response Facility Communication Systems

Facility	Communications System	Connected to ---
CCR (cont.)	Direct Line	EOF
		AEOF
		TSC
	RECS	EOF
		AEOF
		Peekskill EOC and Warning Point
		State and County EOC and Warning Points
		Unit 2 or 3 CCR West Point Military Academy
		State South District
	700 Exchange	NRC
EOF & (AEOF)	Central Radio	CCR
		AEOF (EOF)
	700 Exchange	NRC
	Area Radio	CCR
		AEOF (EOF)
		Monitoring Teams
		Security
		Unit 2 or 3 CCR

Table 7-1

Emergency Response Facility Communication Systems

Facility	Communications System	Connected to ---
EOF & (AEOF)	Local Government Radio	CCR
		AEOF (EOF)
		Peekskill EOC and Warning Point
		State and County EOC and Warning Points
		Unit 3 CCR
		West Point Military Academy
		State South District
	212 Phone Exchange	All Indian Point Facilities
	914 Phone Exchange	All State and County Facilities
	Station PBX	All Federal Facilities
		All Industry Contacts
		All Private Facilities
	Direct Line	CCR
		AEOF (EOF)
		TSC
	RECS	CCR
		AEOF (EOF)
		Peekskill EOC & Warning Point
		State and County EOC and Warning Points

Table 7-1

Emergency Response Facility Communication Systems

Facility	Communications System	Connected to ---
EOF & (AEOF)	RECS (cont.)	Unit 2 or 3 CCR
		West Point Military Academy
		State South District
TSC	Direct Line	EOF
		AEOF
		NRC
		CCR
	914 Exchange	All Indian Point Facilities
	PBX Exchange	All State and County Facilities
		All Federal Facilities
		All Industry Contacts
		All Private Facilities
	700 Exchange	NRC
OSC	914 Exchange	All Indian Point Facilities
	PBX Exchange	All State and County Facilities
		All Federal Facilities
		All Industry Contacts
OSC	PBX Exchange (cont.)	All Private Facilities
	Plant Radio	Hand-Held Radios

Table 7-2
Area and Process Radiation Monitors

AREA MONITORS	
Channel	Monitor
R-1	Control Room
R-2	80' Air Lock V.C.
R-4	Charging Pump Room
R-5	Spent Fuel Building
R-6	Sampling Room
R-7	In-Core Instrument Area
R-25	High Range Containment (Accident)
R-26	High Range containment (Accident)
R-37	High Radiation Sampling System
R-5987	Motor Control Center 98' Elv PAB
R-38	Air Intake For Control Room
R-39	CCW Service Water Return #21 Heat Ex.
R-40	CCW Service Water Return #22 Heat Ex.
PROCESS MONITORS	
R-41	Containment Air Particulate
R-42	Containment Gas
R-43	Plant Vent Particulate
R-44	Plant Vent Gas
R-45	Condenser Air Ejector Gas
R-46 and R-53	Containment Fan Cooling Water
R-47	Component Cooling Liquid
R-48	Waste Disposal System Liquid Effluent
R-49	Steam Generator Liquid Sample
R-20	Waste Disposal System Gas Analyze
R-27	High Range Plant Vent Gas
R-28	No. 21 Main Steam Line Radiation
R-29	No. 22 Main Steam Line Radiation
R-30	No. 23 Main Steam Line Radiation
R-31	No. 24 Main Steam Line Radiation
R-52	Sec. B/D Purification System Service Water
R-55	Steam Generator Blowdown Sample
R-57	Sewage Discharge from Station
R-59	House Service Boiler Condensate
R-60	Plant Vent Unit #1

8.0 MAINTAINING EMERGENCY PREPAREDNESS

This section of the Plan describes the means employed to ensure that the Emergency Plan will continue to be effective through-out the lifetime of the Station.

8.1 ORGANIZATION PREPAREDNESS

8.1.1 Emergency Personnel

All onsite Emergency Personnel designated to be part of the Emergency Response Organization as listed in Figure 5-4, of Section 5, are listed in the Emergency Telephone Directory. The upkeep of the Emergency Telephone Directory is coordinated by the Emergency Planning Section. Individuals are assigned by Department Managers in accordance with station administrative orders.

8.1.2 Training

An Emergency Planning Administrative Directive (EP-AD-03) provides requirements for initial and annual retraining to maintain the proficiency of emergency personnel. This procedure contains a training matrix relating Emergency Response Organization positions to training subjects. Emergency Plan training will use several methods, including formal classroom lectures, self study modules, procedure reviews, computer based training, facility walkthroughs, field exercises and/or drills. During drills, on-the-spot correction of erroneous performance shall be made and a demonstration of the proper performance offered by the instructor. The type and extent of training each individual receives depends upon the specific duties assigned to that individual in the Emergency Plan. Drills and or test are utilized to evaluate.

The content and the extent of the training for each emergency job function is specified in detail in individual position ERO Qualification Records. Initial training includes introductory lessons on the fundamentals of the Emergency Plan as well as job specific training such as emergency facility orientation and job task specific training (e.g. dose assessment, emergency classification, field team monitoring). Continuing training is provided each year which consists of annual General Employee Re-Training,

8.1.2 Training (cont.)

required reading, walkthroughs and other practical training exercises.

Training to develop skills not unique to the emergency plan job function i.e. reactor operator, multi media/first aid etc., but utilized during an emergency is included as part of the individual's normal job training program. Emergency Plan training is conducted in accordance with administrative procedures.

Emergency response training for offsite emergency organizations who may be called upon to provide assistance during an emergency (police, fire, ambulance, hospital) is coordinated by the Indian Point organization (Security, Fire Protection, Medical) which normally interfaces with these groups.

All onsite plant personnel, offsite Entergy personnel who routinely visit the site and extended onsite visitors (i.e., construction personnel, outage support personnel, etc.) receive introductory training including familiarization with emergency plan, the location of assembly areas, and accountability procedures.

8.1.3 Drills and Exercises

Annual drills are conducted at the Indian Point Station for each of the following scenarios and will be supervised by qualified drill controllers.

- A medical emergency involving a simulated contaminated individual in which the Indian Point Medical Department, the hospital, site first-aid team, radiation protection personnel and security force participate.

- A radiological emergency in which the Onsite Emergency Response Organization participates in a simulated emergency scenario. As part of this drill, plant environs and radiological monitoring (onsite and offsite) will be conducted and may include collection and analysis of sample media (e.g., water, vegetation, soil and air) and provisions for communications and record keeping.

8.1.3 Drills and Exercises (cont.)

- In addition, the scenarios may require the call for assistance of Entergy personnel to demonstrate the coordination between the two licensees.

The annual radiological emergency exercise is conducted each calendar year nine to fifteen months after the last annual radiological emergency exercise. Additional drills and communications checks designed to test various aspect of the Plan, shall be conducted as follows:

- The Radiological Emergency Communication System (RECS) link between the Control Room, EOF and the State and four county Warning Points will be tested monthly.

- The Emergency Notification System with the NRC will be tested monthly.

- The telephone links with Federal response organizations (i.e., Department of Energy Radiological Assistance Program) and State Governments within the ingestion pathways will be tested quarterly.

- The radio communication link between the Emergency Operations Facility, the Control Room and with the offsite survey team vehicles will be tested quarterly.

- The emergency communications links between facilities will be operationally checked quarterly.

- Health Physics (offsite monitoring) drills will be conducted semi-annually which involve response to, and analysis of, simulated elevated airborne and liquid samples and direct radiation measurements in the environment.

- Analysis of inplant liquid samples (chemistry drill) with actual elevated radiation levels including use of the post-accident sampling system will be conducted annually.

8.1.3 Drills and Exercises (cont.)

Any of the above drills may be performed in conjunction with other drills. The emergency drills are designed to test the adequacy of timing and content of the implementation procedures, to test emergency equipment, communication links and notification procedures, and to ensure that emergency organization personnel are familiar with their duties. Offsite support agencies are invited to participate in the annual drills and exercises.

In addition to, or in conjunction with, the above drills, a site emergency preparedness exercise involving response by offsite authorities will be conducted on biennial basis as set forth in NRC and FEMA rules. The scenarios for these exercises will be varied in an effort to assure that all major elements of the various plans and organizations are tested within a five-year period. Efforts will also be made to vary the timing of the exercises such that back-shifts will be involved once every six years (i.e. between 6:00 p.m. and 4:00 a.m.). Attempts will be made to have some drills unannounced. When feasible, drills will be conducted under adverse weather conditions.

Preplanned scenarios appropriate to the objectives of each drill or exercise are used. The scenarios for use in each drill or exercise will include, but not be limited to, the following:

- Basic objective(s) and evaluation criteria.
- Date, time period, place(s), personnel and organization(s) participating.
- Simulated events.
- A time schedule of real and simulated initiating events.
- A narrative summary of the proposed drill or exercise to describe such things as simulated casualties, rescue of personnel, use of protective clothing etc.
- Arrangements for qualified observers.

8.1.3 Drills and Exercises (cont.)

The emergency drills and exercises are observed and evaluated by qualified Indian Point personnel and Federal, State and local officials where appropriate. A critique is held following each drill or exercise at which time observers present their recommendations for improving performance and emergency preparedness. Major items that need follow-up are entered into the IP-2 Condition Reporting System (CRS). The CRS item is reviewed by the Corrective Action Group (CAG) and an action addressee is assigned and the time frame for completion. The Manager of Emergency Planning reviews the completed CRS items from the action addressee and periodically reports the results to the Corrective Action Review Board. The conduct of emergency drills and exercises is specified in greater detail in Emergency Planning Administrative Documents.

8.1.4 Emergency Planning Responsibility

The corporate officer in charge of Nuclear Power has overall authority and responsibility for radiological emergency response planning. He is assisted by the Director Emergency Planning for Entergy Nuclear Northeast. The Officer in charge of Nuclear Power assures the proper qualification of the Unit 2 Emergency Planning Manager prior to assignment to that position. Training activities such as seminars and professional development courses shall be utilized to maintain adequate knowledge by the Emergency Planning Manager and his staff.

The Unit 2 Emergency Planning Manager, a member of the normal Station staff, has been appointed to coordinate Emergency Planning. He reports to the Director Emergency Planning for Entergy Nuclear Northeast on emergency planning matters (see Figure 5-2). His responsibilities include assisting Department Managers in designating Emergency Personnel to fill the Emergency Response Organization (ERO), coordinating Indian Point emergency planning with offsite agencies, updating the Emergency Plan and the Emergency Plan Implementing Procedures to keep them compatible with State and Federal Regulations, coordinating drill activities, and maintaining Emergency Plan records.

8.2 REVIEW AND UPDATING OF PLAN AND PROCEDURES

The Emergency Planning organization shall annually review the Plan and the Emergency Plan Implementing Procedures to determine if there are needed additions or changes to increase their effectiveness. This review shall include the prior year's drill critique and Condition Reports and changes to the site and environmental parameters. A report of review results shall be sent to the Director Emergency Planning for Entergy Nuclear Northeast, the Chairman of the Nuclear Facilities Safety Committee and the Corrective Action Review Board.

Updating of the Plan and the Emergency Plan Implementing Procedures shall be accomplished by the Emergency Planning Manager as necessitated by the results of the review. All changes to the Plan and the Emergency Plan Implementing Procedures shall be reviewed and approved as stipulated in Emergency Plan Administrative Procedure EP-AD-02, Emergency Plan Controlled Documents and SA0-404 Station Nuclear Safety Committee.

Controlled copies of the Plan and the Emergency Plan Implementing Procedures are issued to individuals, locations, and offsite agencies, and are used to keep them cognizant of changes to the Plan and Emergency Plan Implementing Procedures. A return receipt routing sheet system is used to record the receipt by the controlled copy holders. Revised pages shall be marked to show where the changes have been made. Pages shall contain a Revision number which is made up of the last 2 digits of the year and the revision number for the year.

The Emergency Plan and written agreements, copies of which are included in Section 10 Appendix A, shall be reviewed and updated as needed, and certified to be current on an annual basis.

The telephone numbers of all Indian Point personnel and offsite participating support agencies and individuals listed in the Emergency Telephone Directory shall be verified on a quarterly basis.

8.2 REVIEW AND UPDATING OF PLAN AND PROCEDURES (cont.)

An assessment (audit) of the emergency preparedness program is performed by the Indian Point Nuclear Quality Assurance organization under the cognizance of the Nuclear Facilities Safety Committee. The assessment will be performed either at intervals not to exceed 12 months or as necessary, based on an assessment by NQA against the emergency preparedness performance indicators, and after changes in personnel, procedures, equipment, or facilities that could adversely affect emergency preparedness, but no longer than 12 months after the change. In any case, all elements of the emergency preparedness program are reviewed at least once every 24 months. The Quality Assurance Program provides the management controls for documenting, reporting and retaining audit results and for evaluation and correcting audit findings.

8.3 MAINTENANCE AND INVENTORY OF EMERGENCY EQUIPMENT AND SUPPLIES

Items of emergency equipment and supplies are checked quarterly and after each use to insure operational readiness. All defective or missing equipment and supplies are replaced by the responsible organization. Specific check lists are used in this determination and the calibration due date for instrumentation is recorded.

Survey instruments and counters have been placed on a rotating calibration schedule of 100 days. Other equipment requiring calibration will be calibrated as recommended by the manufacturer. Normally, equipment requiring calibration will be calibrated at the Station and will be immediately available in the event of an emergency.

In any case, sufficient reserves are available to replace defective or missing items or an item which may be out of service for calibration. Completed check lists are forwarded to the Emergency Planning Manager for record keeping.

8.4 DISSEMINATION OF EDUCATIONAL INFORMATION TO THE PUBLIC

Entergy Corporation is responsible, in consultation with New York State and the counties of Westchester, Orange, Rockland and Putnam, for periodic dissemination of educational information to the public within the 10 mile Emergency Planning Zone

Educational information to the public within the 10 mile radius of the Indian Point Site, has been prepared in a booklet form which summarizes the role of the individual and family in dealing with a local emergency. The booklet focuses on the planning area in which the individual lives and has been mailed to each household within 10 mile radius under the auspices of the Four County Nuclear Safety Committee.

Updated booklets will be distributed each year.

In addition, an advertisement containing the specified information has been prepared for insertion in telephone books, and for use as a posting in such places as motels, hotels, and workplaces.

Entergy, in cooperation with appropriate State and county officials, will annually acquaint news media personnel with the emergency plans, information concerning radiation and points of contact for release of public information in an emergency.

9.0 RECOVERY

The recovery begins after plant accident conditions are mitigated (i.e., fuel in the core is in a coolable condition or configuration; heat removal equals or exceeds the decay heat with no foreseeable danger of losing heat removal capability; radiological releases to the environment are terminated with no expected resumption). The Emergency Director shall declare the accident mitigation phase over and the recovery phase initiated.

The organization for the Recovery may be a continuation of the emergency organization with the Emergency Director replaced by the Recovery Manager. The Recovery Manager directs the organization from the Recovery Center. At the beginning of the recovery, the Manager caucuses with facility managers and other selected personnel to prepare an overall plan for the Recovery and to facilitate a smooth transition for the recovery organization.

As the Recovery continues, the Recovery Manager may decide to either reduce and eliminate or add and expand any portion of the organization. Once recovery issues have been identified and a method of tracking them to completion assured, the normal station organization may be used to complete recovery.

9.1 REENTRY TO PLANT AREAS

The Recovery Manager supervises the reentry. Generally, site problems are addressed first to make the site tenable for all with a series of radiation surveys to establish accessibility and restore the Station to normal.

All data gathered from reentry operations and additional information developed by the various technical support groups will be assessed.

The plan is to return plant conditions to within Technical Specification limits and it may include detailed schedules, specialized equipment and personnel, preparing procedures for decontamination, processing highly radioactive water, repairing equipment, and purchasing equipment. The Nuclear Facilities Safety Committee reviews and approves recovery operations in accordance with its charter and the Technical Specifications.

9.2 Offsite Actions

Offsite activities during the Recovery include assisting State and local authorities to survey, map and decontaminate areas necessary to return the general public evacuated from around the site.

9.3 General Recovery Activities

Radiation exposure to personnel involved in the recovery will be kept at a minimum and within the stated limits of 10 CFR 20. Radiation areas will be roped off and posted with warning signs indicating radiation levels and permissible entry times based on survey results. Access to these areas will be controlled, and exposures to personnel entering such areas documented. Shielding will be employed to the fullest extent possible. Survey results, interviews of individuals with direct knowledge of recent conditions in the affected area(s) and all other pertinent information collected from logs and other records or indicators in the Control Room and in the Emergency Operations Facility may be used to evaluate the advisability and the timing of reentry to affected areas.

9.4 Recovery Center

The Recovery Center will normally be located in the Vice President, Nuclear Power's office area on the south east end of the 72' elevation office area. This area will be used by the Recovery Manager to hold meetings with the various facility and discipline managers. The Recovery Manager may designate other Entergy facilities as the Recovery Center or use normal station work areas as necessary. The Toddville School, located in Peekskill, may be used as a backup Recovery Center if an onsite location cannot be used.

10.0 APPENDIX

This section contains the following appendices:

A. Letters of Agreement

B. Evaluation of Accidents

B.1 Estimated Offsite Dose During the Design Basis Accident

B.2 Methodology of Relating R-25 and R-26 Monitor Readings to Limits Given in EPA Protective Action Guides

C. Listing of Subject Matter Covered by Implementation Procedures

D. Stored Emergency Equipment and Supplies

E. NUREG-0654 Rev 1/Emergency Plan for the Indian Point Unit Nos. 1 and 2 Cross Reference

F. Assessment Resources for Radiological Monitoring

G. County Evacuation Planning Material

A. LETTERS OF AGREEMENT

Copies of agreement letters for the offsite emergency response supporting organizations listed below are contained in this section.

Verplanck Fire Department (Fire & Ambulance)

Hudson Valley Hospital Center at Peekskill/Cortlandt

Medical Consultant (RMC)

Buchanan Fire Department

Entergy Unit 3

Department of Energy Radiological Assistance Plan

Westinghouse Electric Corporation

Phelps Memorial Hospital Center

New York State Emergency Management Office

New York State Police

Institute of Nuclear Power Operations

VERPLANCK FIRE PROTECTIVE ASSOCIATION
POST OFFICE BOX 518 * EIGHTH STREET
VERPLANCK, NY 10596-0778
Chief's Office (914) 788-6943 * Fax (914) 737-3932
Business Phone (914) 737-8233

January 17, 2000

Mr. Robert Barrett
Site Executive Officer
New York Power Authority
Mr. John Groth
Chief Nuclear Officer
Con Edison
Indian Point Nuclear Power Plant
P.O. Box 215
Buchanan, NY 10511-0215

Dear Mr. Barrett and Mr. Groth:

This letter is to affirm that, in the event of an emergency situation or accident at the Indian Point Facilities, the Verplanck Fire Department and/or ambulance will respond upon notification.

The proper means of notification is to telephone the emergency number, 911, for both the fire department and ambulance. Please give all available information at the time of notification. Should the ambulance respond, and after initial first aid treatment, we will then provide ambulance transportation to the appropriate medical facility, which will determine by the extent or type of injuries.

If at any time you feel that you have a unique situation that may require a pre-plan, please feel free to contact us at your convenience at our Chief's Office number. 788-6943 or our fax number 739-3932. I may also be reached through my home phone, 739-6276.

Firematically yours,

Ted Karalak
Chief VFD

MEMORANDUM AGREEMENT TO RESPOND IN CASE OF EMERGENCY SITUATION OR ACCIDENT

This Memorandum Agreement to Respond in Case of Emergency Situation or Accident (the "Agreement") is made and entered into this 6 day of November, 2000 by and between the New York Power Authority (the "Authority") and Verplanck Fire Protective Association – Verplanck Fire Department ("VFD").

WHEREAS, the Authority owns and operates the Indian Point 3 Nuclear Power Station ("IP3");

WHEREAS, VFD provides fire fighting and ambulance services to the community, including IP3, and will respond in case of an emergency situation or accident; and

WHEREAS, VFD desires to provide emergency fire fighting assistance and ambulance services to the Authority and the Authority desires to receive such assistance and services from VFD in the event of a radiological emergency at IP3,

NOW, THEREFORE, the Authority and VFD (collectively, the "Parties") agree as follows:

1. Services Provided. VFD will provide fire fighting assistance and ambulance services to the Authority and respond to emergencies in the event of a radiological emergency or accident at IP3 (the "Services") as part of the radiological emergency preparedness program for IP3.

2. Assignment. This Agreement may be assigned by the Authority in whole or part to any purchaser of IP3 (the "Purchaser"), effective upon closing of the sale of IP3 to the Purchaser. In the event of such assignment, the Authority will notify VFD and VFD will provide the Services to the Purchaser.

3. Term and Termination.

A. This Agreement shall remain in effect for a period of one year from the date hereof, and shall automatically be renewed for an additional one-year term upon expiration of this initial term or any renewal term unless either party shall give 90-days' written notice of intent not to renew.

B. The Authority, within its sole discretion and for any reason or for no reason, may terminate this Agreement at any time, as to all or any part of the Services, upon notice in writing

to VFD. Unless otherwise specified in such notice, VFD shall immediately discontinue all terminated Services and the placing of any orders for materials, facilities or supplies in connection with such Services, shall proceed to cancel promptly any existing orders, and shall terminate contracted work. The Authority may direct VFD to bring the terminated part of the Services to an orderly conclusion.

4. Governing Law. This Agreement shall be governed by and construed in accordance with the domestic laws of the State of New York without giving effect to any choice or conflict of law provision or rule (whether of New York or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than New York.

5. Amendments. No modification or amendment to this Agreement shall be valid or binding on the Parties unless in writing and signed by authorized representatives of the Parties.

6. Entire Agreement. This Agreement constitutes the entire understanding and agreement between the Parties, whether oral or written, with respect to the subject matter hereof.

7. Counterparts. This Agreement may be executed in one or more counterparts. All counterparts so executed will constitute one document binding on the Parties, notwithstanding that the Parties have not signed the original or the same counterpart.

IN WITNESS WHEREOF, the Parties have executed this Agreement on the date first above written.

NEW YORK POWER AUTHORITY

By:
[Signature]
Robert Barrett
[Name]
Site Executive Officer
[Title]

VERPLANCK FIRE PROTECTIVE ASSOCIATION – VERPLANCK FIRE DEPARTMENT

By: T.J. Karalek
[Signature]
T.J. Karalek
[Name]
Chief - Verplanck FD
[Title]

HUDSON VALLEY HOSPITAL CENTER

January 7, 2000

Mr. Robert Barrett
Site Executive Officer
New York Power Authority

Mr. John Groth
Chief Nuclear Officer
Con Edison

Indian Point Nuclear Facility
P.O. Box 215
Buchanan, NY 10511

Dear Mr. Barrett and Mr. Groth:

This letter confirms that New York Power Authority and Con Edison will pay Hudson Valley Hospital Center a sum of $15,000 each year per Utility, in accordance with our agreement to accept as patients any personnel from Indian Point Nuclear Generating Station who may be considered to have sustained radiation injuries and/or contamination.

Sincerely,

John C. Federspiel
President

JCF/jg
attachment

HUDSON VALLEY HOSPITAL CENTER

AGREEMENT

This agreement, made this First day of April , 2000, between HUDSON VALLEY HOSPITAL CENTER, 1980 Crompond Road, Cortlandt Manor, New York 10567 (hereinafter referred to as "Hospital") and the Indian Point Nuclear Plants, P.O. Box 215, Buchanan, New York 10511.

1. The Hospital will accept as patients, in accordance with the plant and Hospital procedures, any personnel from the Indian Point Nuclear Power Plants who may be considered to have sustained radiation injuries and/or who may have been exposed to radioactive material, provided that: All potentially contaminated patients will be transported to the Hospital by the Indian Point Facility personnel; and the Indian Point Facility will take all appropriate precautionary radioactive contamination and will advise the Hospital by telephone in advance of patient's arrival, of the patient's status, and radiation hazard.

2. Both utilities at the Indian Point site will:

   a) Pay the Hospital the sum of $15,000 each year per utility and in addition thereto, will:

   b) Compensate or reimburse the Hospital for all materials and equipment consumed or which must be destroyed or replaced due to radiation.

   c) Indemnify and hold the Hospital harmless from any and all claims of third persons resulting from radiation exposure not resulting from the Hospital's negligence.

   d) Be responsible for decontaminating the Hospital's equipment and property and disposing of materials contaminated as a result of services rendered to personnel of NYPA/CON ED.

HUDSON VALLEY HOSPITAL CENTER

JOHN C. FEDERSPIEL
PRESIDENT

NEW YORK POWER AUTHORITY
INDIAN POINT NO. 3 NUCLEAR PLANT

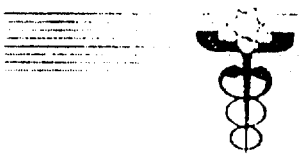
ROBERT BARRETT
IP-3 SITE EXECUTIVE OFFICER

CON EDISON
INDIAN POINT NO. 2 NUCLEAR PLANT

JOHN GROTH
IP-2 CHIEF NUCLEAR OFFICER

JOINT COMMISSION ACCREDITATION · THE QUALITY DISTINCTION

WITH COMMENDATION



RMC
Radiation Management Consultants

September 4, 2001

Mr. Robert Barrett, Site Executive Officer/Entergy
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Station
P.O. Box 215
Buchanan, New York 10511

Dear Mr. Barrett and Mr. Groth,

This confirms an agreement between Radiation Management Consultants (RMC) and the Indian Point Nuclear Station facilities (Indian Point II and III) wherein RMC agrees to furnish certain services to the nuclear stations. These services comprise of a program that is identified by RMC as an Emergency Medical Assistance Program (EMAP). This agreement remains in effect from January 1, 2001 through December 31 2001. The EMAP Program contains the following provisions:

1. Twenty-four hour per day availability of expert medical consultation on the management of radiation injuries.

2. Twenty-four hour per day availability of RMC's Radiation Emergency Medical Team (REM-Team) comprised of physicians, Certified Health Physicists, and a technician with portable instrumentation to travel to your location and assist hospital personnel attending physicians and/or plant personnel in the initial evaluation and treatment of radiation injuries.

3. Availability of, and assistance with the transfer of patients to Definitive Care Centers established at Northwestern Memorial Hospital, Chicago, IL for the treatment of radiation injuries and Loyola University Medical Center, Chicago, IL for the treatment of burns.

4. Twenty-four hour per day availability of RMC's dose assessment capabilities including:

    A. Bioassay laboratory for urine, fecal, sputum, and tissue analysis.
    B. Experienced Certified Health Physicists and Physician Team for evaluation and treatment of radiation exposures.

5. Annual training for the plant personnel in the handling and treatment of injured/contaminated patient(s).

6. Annual training for EMS personnel in the rescue and transport of injured/contaminated patient(s).

7. Annual training for hospital personnel in the handling, treatment, and evaluation of injured/contaminated patients(s).

8. Annual radiation emergency medical drill to include preparation of accident scenarios, two drill observers, and drill evaluation reports related to observations made at the plant, ambulance, and hospital.

9. Annual inventories of support hospital radiation emergency medical supplies and equipment.

10. Performance of annual telephone number verification as well as a review of the hospital procedure manual; revise and distribute changes to the manual under controlled document didstubution system.

11. Accident Response: consultation and laboratory services under RMC's employment and control are at no extra charge except for travel, lodging, and meals.

12. Preparation of incident/accident reports for NRC and other regulatory bodies at no additional charge.

13. Legal and medical appearances as required and requested by Entergy and Con Edison.

RADIATION MANAGEMENT CONSULTANTS, INC.

Roger Linnemann, M.D.
President

Buchanan Engine Co. No. 1, Inc.
Buchanan, New York 10511

January 7, 2000

Mr. Robert Barrett
Site Executive Officer
New York Power Authority

Mr John Groth
Chief Nuclear Officer
Con Edison

Indian Point Nuclear Facility
P. O. Box 215
Buchanan, New York 10511

Dear Sirs,

This letter is to confirm your intention for Buchanan Engine Co. No. 1, Inc. to respond to fires at the Indian Point Station when called upon under the mutual aid system.

Sincerely,

Tim Donahue
Chief
Buchanan Engine Co. No. 1, Inc.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC
INDIAN POINT STATION
BROADWAY AND BLEAKLEY AVENUES BUCHANAN, NY 10511

NEW YORK POWER AUTHORITY
P. O. BOX 215
BUCHANAN, NY 10511

January 04, 2000
IP3-EPG-99-099

Buchanan Engine Co. No. 1, Inc.
Buchanan, New York 10511

Attention: Tim Donahue
Chief

Dear Mr. Donahue:

As part of the Indian Point Emergency Preparedness Program we are required to review and update all Letters of Agreement every two years.

The current Letter of Agreement dated January 1, 1996, confirms that Buchanan Engine Co. No. 1 agrees to respond to fires at the Indian Point Faclity when called upon under the mutual aid system.

Please confirm your acceptance by signature and return copy by February 1, 2000.

Please address the new letter to:

Mr Robert Barrett, Site Executive Officer/NYPA
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511

Any questions, please call Mary Ann Wilson at (914)736-8404.
Thank you for your continued support.

Sincerely,

Mary Ann Wilson
NYPA
Emergency Preparedness Coordinator
Indian Point No. 3

MAW/rde

Sincerely,

Frank Inzirillo
ConEd
Emergency Planning Manager
Indian Point No. 2

Accepted:
Tim Donahue
Chief

MEMORANDUM OF UNDERSTANDING

SSZ-94-01 No. 28 REV. 4 Date: 11/21/00

RULES GOVERNING THE IMPLEMENTATION OF THE EMERGENCY PLAN AT THE INDIAN POINT SITE

The following rules shall govern the implementation of the Site Emergency Plans and use of the associated facilities and personnel for Alert, Site Area, and General Emergencies declared by the Owner of either the Indian Point 2 (IP2) or Indian Point 3 (IP3) Nuclear Power Station.

A. All revisions to each party's Emergency Plan and Emergency Plan Implementation Procedures shall be submitted to the other party for review. As used in this Memorandum of Understanding the term "emergency" shall also include an Emergency Plan Drill.

B. If an emergency is caused by conditions at IP3, an IP3 representative will be designated the Emergency Director. If an emergency is caused by conditions at Indian Point 1 or 2, an IP2 representative will be designated as Emergency Director. It is agreed that all actions requested by the Emergency Director of either IP2 or IP3 during an emergency will be followed as quickly and precisely as possible. Except during a drill, this includes a request to shut down an operating plant if its operation is hampering emergency actions.

C. In the event of an emergency, as defined in IP3's Emergency Plan, which stems from Indian Point Unit No. 3, the Owner of IP2 shall provide to IP3:

1. Dedicated use during a Unit 3 emergency of the Emergency Operations Facility (EOF), located at the IP2 Buchanan Service Center. This includes access authorization and the issuance of keys to IP3 EOF staff personnel.

2. Physicians for both routine and emergency situations, to the extent that they are available for an emergency on Unit 2. This includes physicians specializing in radiation emergency patient care.

3. Use of the various normal communications avenues and assessment equipment available in the plant (i.e. public address system, party lines, dial phones) and the following specific avenues and equipment:

   a. 451.10 Mhz (or substitute frequency) UHF radio system to link together the EOF, IP3 Control Room, IP1 and IP2 Control Room, Emergency Environmental Sampling Vehicles and the portable walkie-talkies used by the Security Guards and Survey Teams.

   b. The MIDAS computer.

   c. The Radiological Emergency Communication System (RECS).

4. Use of IP2 personnel and equipment as available and determined necessary by IP3 Emergency Director or his designee, to support emergency corrective actions.

D. In the event of an emergency, as defined in IP2's Emergency Plan, which stems from Indian Point Unit No. 1 or 2, the Owner of IP3 will provide IP2:

1. Dedicated use during a Unit 1 or 2 emergency of the Joint News Center located at the Westchester County Airport.

2. Use of IP3 personnel and equipment, as available and determined necessary by the IP2 Emergency Director or his designee, to support emergency corrective actions.

E. In the event of an emergency referred to in Section C or D, the party having the emergency will be provided by the other party with the use, to the same extent that they are available for an emergency at the other party's unit(s), of the site environmental monitoring facilities, personnel and equipment of the other party, with authorization for personnel of the party having the emergency to call in necessary personnel of the other party as needed (each party to provide appropriate call lists).

F. IP2 and IP3 periodically test equipment associated with Sections C and D. Each party is invited to monitor testings or calibrations. Upon request each party will provide a schedule for testing so the other party can arrange to participate.

G. Each party will notify the other of periodic drills and exercises relating to simulated radiation incidents detailed in their respective emergency plans, and the other party may participate in the drills if it so chooses.

H. All assets included in the Prompt Notification System (the "PNS") consisting of sirens and associated facilities located throughout the Counties of Rockland, Putnam, Orange and Westchester in the State of New York are owned by the Owner of IP2 ~~and~~ the Owner of IP3. The PNS is used by governmental officials in the Counties set forth above in support of the plans and commitments associated with emergency planning efforts and declarations made by the Owner of IP2 or the Owner of IP3 related to a nuclear power site emergency. To the fullest extent permitted by law and upon such reasonable conditions as it may impose, the Owner of IP3 will, to the extent of its ownership interest in the PNS, permit use thereof and access thereto by the Owner of IP2. The Owner of IP2 and the Owner of IP3 shall negotiate in good faith to reach agreement concerning the responsibilities for maintenance of the PNS and reimbursement of the cost and expense thereof.

I. Each party reserves the right to periodically audit the common facilities, equipment, and administrative controls of the Emergency Plan that are under the control of the other party.

If either party finds, as a result of an audit, any items failing to meet regulatory requirements, the auditing party shall notify the other party of the audit results. Corrective actions will be taken by the responsible party in a manner and time frame as mutually agreed to by IP2's Vice President – Nuclear Power and the IP3's Site Executive Officer.

J. Joint Operation of the EOF will occur only when both IP2 and IP3 are considered to be causing agents of an emergency. Otherwise, it is understood that only the organization which is having an emergency will be required to man the EOF and assign an Emergency Director. To ensure that the EOF will operate smoothly in the event of a joint

emergency, and that the ultimate responsibility of directing emergency actions is placed on one individual, the following is agreed:

1. A Joint Emergency Director (JED) will be designated.

2. The designation will be the result of an oral agreement between the highest ranking Emergency Director from each organization present at the site at the time of the joint emergency.

3. The JED will be responsible for all actions necessary to initially recover from the emergency.

4. Following initial recovery, the highest ranking Emergency Director from each organization present at the site will assume ultimate responsibility for his organization's unit and property.

5. Some factors that should be used in deciding who will be designated JED are as follows:

   a. Which unit is the primary causing agent (if it can be determined);

   b. Which organization's property is most affected by the emergency (based on radiation fields, contamination levels, damage incurred and wind direction); and

   c. Which unit will require the most corrective actions to return it to a stable condition.

K. Each party will coordinate activities associated with training exercises, meetings, etc., with outside agencies or services that may respond to any emergency at Indian Point.

This Memorandum of Understanding is subject to the termination stipulations detailed in Memorandum of Understanding No. 32.

Costs incurred by either party as a result of this Memorandum of Understanding shall be determined and billed as per Memorandum of Understanding No. 33.

Site Executive Officer

Vice President – IP2

NYC1 #250646 v3

Department of Energy
Brookhaven Group
Building 464
P.O. Box 5000
Upton, New York 11973

JAN 1 9 2001

Mr. Robert Barrett, Site Executive Officer/NYPA
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Power Plant
P.O. Box 215
Buchanan, NY 10511

Dear Mr. Barrett and Mr. Groth:

SUBJECT: RADIOLOGICAL ASSISTANCE

This letter constitutes a renewal of the Department of Energy's (DOE) commitment to provide emergency radiological assistance to your organization. Since your nuclear facility(s) is/are located in Region I, the Brookhaven Group Office is the DOE office charged with the responsibility for providing radiological assistance in the event of a radiological emergency. Such assistance can be requested at all times by calling (631) 344-2200 and asking for radiological assistance, indicating the nature of the incident, the location, and which authorities have been notified so that we can coordinate our response with them.

DOE will respond to requests for emergency radiological assistance from Federal, State, and local agencies, licensees, private organizations, or individuals involved in or cognizant of an incident believed to involve source, by-product, or special nuclear materials as defined by the Atomic Energy Act of 1954, as amended, or other ionizing radiation sources.

Unless the DOE or a DOE contractor is responsible for the activity, ionizing radiation source, or radioactive material involved, the rendering of assistance to control the immediate hazards to health and safety will be terminated as soon as the emergency situation is under control. Therefore, responsibility for post-incident recovery, including further action for the protection of individuals and the public health and safety, should be assumed by the appropriate responsible Federal, State, or local government agency, or private authority as soon as the emergency conditions are stabilized.

If you have any questions or desire further information, please contact Steve Centore of my staff at (631) 344-7309.

Sincerely,

George J. Malosh
Brookhaven Group Manager

cc: J. McBroom, SO-40, FORS

Westinghouse
Electric Company LLC

100 Mill Plain Road
Danbury, CT. 06811
Phone (203) 791-3833

May 8, 2000

INT-00-528
IPP-00-528

Mr. Robert Barrett, Site Executive Officer/NYPA
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Power Plant
P.O. Box 215
Buchanan, NY 10511

Gentlemen:

Westinghouse Emergency Response Plan Initial Contacts

The purpose of this letter is to provide an update to the Westinghouse Emergency Response Plan roster in response to your recent request. Following is a list of Westinghouse personnel to contact should it be necessary under your Emergency Response Plan.

Title	Name	Office	Home	Beeper/ Cell Phone
First Contact	Steve Ira	(724) 722-5658	(724) 744-1920	Cell (412) 996-6888 Pager (888) 897-2755
1st Alternate	Carl Schwartz	(412) 374-3678	(412) 373-2426	(800) 984-6218
2nd Alternate	Dave Lewis	(203) 791-3833	(203) 775-5168	Cell (203) 470-6435 Pager (888) 894-8572

Very truly yours,
WESTINGHOUSE ELECTRIC COMPANY LLC

David G. Lewis

David G. Lewis
Account Manager

Phelps Memorial Hospital Center
701 North Broadway
Sleepy Hollow, New York 10591-1096

PHELPS

January 7, 2000

Mr. Robert Barett, Site Executive Officer
New York Power Authority

Mr. John Groth, Chief Nuclear Officer
Con Edison
Indian Point Nuclear Facility
P. O. Box 215
Buchanan, New York 10511

Dear Sirs:

This letter will confirm that the New York Power Authority and Con Edison will each pay the Phelps Memorial Hospital Center a sum of $15,000 per year, in accordance with our agreement to accept as patients any personnel from Indian Point Nuclear Generating Station who may be considered to have sustained radiation injuries and/or contamination.

Sincerely,

Keith F. Safian

Keith F. Safian, FACHE
President and CEO

KFS:bd

INDIAN POINT STATION
BROADWAY AND BLEAKLEY AVENUES BUCHANAN, NY 10511

NEW YORK POWER AUTHORITY
P. O. BOX 215
BUCHANAN, NY 10511

January 04, 2000
IP3-EPG-99-079

Phelps Memorial Hospital
North Broadway
North Tarrytown, New York 10591

Attention: Mr. Kieth F. Safian
President and C.E.O.

Dear Mr. Safian:

As part of the Indian Point Emergency Preparedness Program, we are required to review and update all Letters of Agreement every two years.

The current Letter of Agreement dated January 13, 1998, confirms an agreement between Phelps Memorial Hospital Center and Indian Point Nuclear Facility, wherein PMHC agrees to accept as patients any personnel from Indian Point Facility who may be considered to have sustained radiation injuries and/or contamination.

Indian Point Facility will pay the Phelps Memorial Hospital Center a sum of $15,000 each year per Utility, for this service.

Please sign below and return by February 1, 2000.

Please address the new letter to:

Mr Robert Barrett, Site Executive Officer/NYPA
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Power Plant, P.O.Box 215
Buchanan, New York 10511

Any questions, please call Mary Ann Wilson at (914)736-8404.
Thank you for your continued support.

Sincerely,

Mary Ann Wilson

Mary Ann Wilson ,NYPA
Emergency Preparedness Coordinator
Indian Point No. 3

MAW/rde

Sincerely,

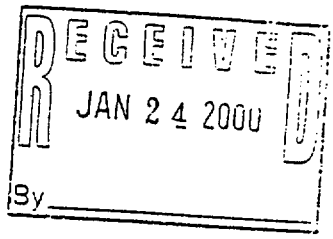
Frank Inzirillo, ConEd
Emergency Planning Manager
Indian Point No. 2

Accepted: Kieth F. Safian
President & CEO
Phelps Memorial Hospital Center

Edward F. Jacoby, Jr., Director

New York State Emergency Management Office
1220 Washington Avenue
Building 22, Suite 101
Albany, NY 12226-2251

January 13, 2000



Mr. Robert Barrett, Site Executive Officer//NYPA
Mr. John Groth, Chief Nuclear Officer/ConEd
Indian Point Nuclear Power Plant
PO Box 215
Buchanan, New York 10511

Dear Mr. Barrett and Mr. Groth:

This serves to update the annual agreement letter between the Indian Point Nuclear Facilities and the State Emergency Management Office for the Radiological Emergency Preparedness Program.

In the event of an emergency at the Indian Point Nuclear Power Plants, New York State will respond in accordance with procedures contained within the State Radiological Emergency Preparedness Plan. Notification to New York State of the emergency should be initiated via the Radiological Emergency Communication System hotline. The State will also continue to participate in necessary training exercises and drills.

Sincerely,

Edward F. Jacoby, Jr., Director

Cc: Mary Ann Wilson
Emergency Preparedness Coordinator
Indian Point No. 3

NEW YORK STATE POLICE
BLDG. 22, 1220 WASHINGTON AVE.
ALBANY, NY 12226-2252

JAMES W. McMAHON
SUPERINTENDENT

January 27, 2000

Mr. Robert Barrett
Mr. John Groth
Indian Point Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511

Dear Mr. Barrett and Mr. Groth:

The Division of State Police will continue to respond to requests for routine police service at your facility. In addition, the Division will supply support activities as set forth in the New York State Radiological Emergency Preparedness Plan and Article 2-B of the State's Executive Law. In regards to other matters of a police nature, our members are governed by statute and will respond within the constraints of such laws when a violation of law appears probable, is attempted, or occurs.

The radio communication equipment installed at our Peekskill station allows for continuous communication capability with the Indian Point nuclear facilities, and for any emergency contingency that may arise.

Please be assured of our continued cooperation in all matters of mutual interest.

Sincerely,

James W. McMahon
Superintendent

INPO

Institute of Nuclear Power Operations

700 Galleria Parkway, SE
Suite 100
Atlanta, GA 30339-5957
770-644-8000
FAX 770-644-8549

November 15, 2000

Dear Administrative Point of Contact:

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 86-032, (Revision 11). If requested, INPO will provide the following assistance:

- facilitate technical information flow from the affected utility to the nuclear industry
- locate replacement equipment and personnel with technical expertise
- obtain technical information and industry experience regarding plant component and systems
- provide an INPO liaison to facilitate interface

This agreement will remain in effect until terminated in writing. Should you have questions, please call me at (770) 644-8210 or via e-mail to igyartodp@inpo.org.

Sincerely,

David P. Igyarto
Acting Director
Plant Operations Division

DPI:eb

cc: Emergency Preparedness Point of Contact
INPO Coordinator
Mr. Gary R. Leidich

L00-5Q025

B. EVALUATION OF ACCIDENTS

B.1 Estimated Offsite Doses During the Design Basis Accident

B.2 Methodology of Relating R-25 & R-26 Monitor Readings to Limits given in EPA Protected Action Guides

B.1 Estimated Offsite Doses During the Design Basis Accident

The dose assessment of the most serious design basis accident (Loss-of-Coolant Accident) on the OFFSITE population is illustrated in Figures B.1-1, 2, and 3. Figures B.1-1 and 2 provide isodose graphs for thyroid and whole body doses respectively for time vs. distance. Figure B.1-3 illustrates thyroid dose vs. distance for the specific case of two hours. For comparative purposes, two curve sets are shown on each figure to illustrate two different meteorological conditions:

(1) Meteorological condition which is exceeded only 5% of the time (5% worst condition).

(2) Meteorological condition which is exceeded only 50% of the time (median condition).

The dose received during the median condition will be less than the dose received during a 5% worst meteorological condition, since greater effluent dilution is experienced under the median condition. These figures illustrate that the dose received by the OFFSITE public is influenced by the specific meteorological existing at the time of an accident. In the unlikely event of an actual accident, dose estimates will be made using existing site meteorological conditions and will be continuously updated with information received by monitoring teams.

The assumptions used to develop these figures are tabulated in Table B.1-1. References justifying these assumptions are also provided. A review of the assumptions used to develop these figures will show that these figures represent conservative estimates of OFFSITE doses.

The assumed containment leakrate is 0.075%/day; previous leak tests on containment have shown the actual leakrate to be less than this assumed value. Also, these previous tests were performed without use of two Engineered Safeguards: The Isolation Valve Seal Water System and the Weld Channel and

B.1 Estimated Offsite Doses During the Design Basis Accident (cont.)

Containment Penetration Pressurization System. If these two systems were operating during this test, the actual leakrate would approach zero. These two systems were designed and constructed to rigorous criteria and are required to be operational under Unit 2 Technical Specifications[1]. Thus, it is extremely conservative not to take credit for these two safeguards in the analysis, because they are designed to operate during a loss of coolant accident and would substantially reduce, if not effectively eliminate, Containment leakage.

The Containment leakrate value depends on the pressure differential across the Containment boundary; thus, the lower the pressure inside Containment, the smaller the leakrate. This analysis, in order to be conservative, assumes a constant 0.075%/day leakrate, whereas, physically, the leakrate will decrease with time as the pressure inside Containment drops. Internal pressure would decrease due to both Containment leakage and steam condensing inside Containment through continuous heat removal by the Containment Spray and/or Containment Fan Cooler Recirculation Systems.

The percentage of core fission products inventory available for release from Containment during a loss of coolant accident are defined by values given in Regulatory Guide 1.4[2].

Accordingly, 25% of the core's iodine inventory is immediately available for leakage from Containment. It is expected that, with operation of the Safety Injection System (with two out of three Diesel Generators supplying power) the fuel clad temperature will be maintained well below the melting point of Zircaloy-4 and limit the zirconium-water reaction to an insignificant amount, although some cladding

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[1]Appendix A to operating License DPR-26, Technical Specification and Bases, Section 3.3, 4.4

[2]NRC Regulatory Guide 1.4, Rev. 2 "Assumptions used in Evaluating the Potential Radiological Consequences of a Loss of Coolant for Pressurized Water Reactors".

B.1 Estimated Offsite Doses During the Design Basis Accident (cont.)

failure may result in the hotter regions of the core. Clad failure results in the release of the volatile fission products in the pellet-cladding gap. It would be therefore conservative to assume that all gap activity is available for release, since not all the cladding is expected to fail. The iodine isotope gap activities are listed in Table 14.3.5-1 of the FSAR[3] as a function of percentage of core inventory. Iodine 131 has the highest percentage of those listed, therefore it is conservative to equate other iodine isotope core inventory percentages to that of Iodine 131.

This highest percentage (2.3%) is still more than factor of ten less than the iodine percentage (25%) given by Reg. Guide 1.4 available for release from Containment. Reg. Guide 1.4 defines the percentage of noble gas core inventory immediately available for leakage from Containment as 100%. The actual amount which escapes from the pellet-clad gap and is available for leakage will be significantly less. Therefore, it is clearly overly conservative to use the percentage defined in Reg. Guide 1.4, for noble gas and iodine releases to derive these figures.

The organic iodine charcoal filter efficiency assumed for this analysis is only 30%; an actual efficiency of 70% or greater is expected.[4]

The meteorological condition assumed in development of Figures B.1-1, 2, and 3 is a windspeed of 0.73 meters/sec and a Pasquill stability class F. These parameters are derived from the atmospheric dilution factor (X/Q) which is exceeded only 5% of the time as computed by the NRC Staff[5] for the Indian Point Site.

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[3]Final Facility Description and Safety Analysis Report, Indian Point Unit No. 2, Table 14.3.5-1.

[4]Final Facility Description and Safety Analysis Report, Indian Point Unit No. 2, Docket 50-247 Section 14.3.5.

[5]Safety Evaluation of the Indian Point Nuclear Generating Unit No.3, Docket No. 50-286, US AEC, Directorate of Licensing, Sept 21, 1973, pg. 244.

B.1 **Estimated Offsite Doses During the Design Basis Accident (cont.)**

A windspeed of 0.73 meters/sec was computed using this 5% X/Q value, the methodology presented in ERL-ARL-4[6], and assuming a Pasquill F stability class.

Credit for plume meander is accounted for by equation (3) of Regulatory Guide 1.145[7]; it is applied when windspeeds are less than 6 meters/sec coincident with Pasquill neutral (D) or stable (E, F, or G) conditions. Pasquill F stability class and 0.73 meters/sec windspeed satisfy the conditions for using this plume meander equation. Accordingly, centerline X/Q values per distance were computed using equation (3) of Reg. Guide 1.145.

This methodology is conservative in that the dose received, using these computed X/Q values, occurs only along the plume centerline. Under stable conditions, the plume crosswind dimension of the one percent isopleth (line of constant concentration which is one percent of the plume's centerline value) is relatively small. Specifically, the distances from the plume centerline to the one percent isopleth at the LOW POPULATION ZONE boundary (1100 meters) are 170 meters and 120 meters for Pasquill E and F, respectively. Therefore, an individual located on the plume centerline at the LOW POPULATION ZONE boundary need only move in a direction perpendicular to the centerline, 170 meters during a Pasquill E or 120 meters during a Pasquill F in order to reduce the dose rate by a factor of 100. Figure B.1-4 illustrates the distance to the one percent isopleth from the plume centerline (plume halfwidth) versus downwind distance for the Pasquill E and F stability classes.For any time interval of interest on the vertical axis of Figures B.1-1 and 2, the meteorological condition (5% or 50%) is assumed to prevail for that entire time interval.

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[6]NOAA Technical Memorandum ERL-ARL-42, "A Program for Evaluating Atmospheric Dispersion from a Nuclear Station, Jerrold F. Sagendorf, May 1974.

[7]NRC Draft Regulatory Guide 1.145, Rev. 1, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants", re-issued Feb. 1, 1983.

B.1 Estimated Offsite Doses During the Design Basis Accident (cont.)

The larger the time interval chosen, the more conservative it is to assume that the meteorological condition, and therefore wind direction, remain constant during that interval. Wind persis- tence analysis has illustrated that higher wind speeds are correlated to a persistent wind direction, while under low wind speeds, the probability of constant direction diminishes and the relative concentrations are dispersed over a larger area thereby decreasing the peak value. As the time interval in- creases, the probability of the wind direction remaining steady decreases. The valley wind system at Indian Point illustrates this wind direction variation effect. Analysis of 1977, Indian Point Site meteorological data shows that with stable conditions and low wind speed, the wind persistence diminishes as the time interval increases. Successive overlapping two hour intervals were analyzed; under stable conditions and windspeed less than 2 meters/sec, the wind persisted from a single 22.5° sector for the entire two hours in less than four percent of the total annual intervals analyzed. For eight hour time intervals, this percentage decreased to 0.012 percent.

Analysis of 1977 hourly meteorological data for the Indian Point Site shows the Pasquill F stability occurs almost entirely (92.5%) during non-working hours (1800 to 0700). The breathing rate approximated during non-working (non-active) hours is the standard man's average. Since this analysis assumes that the accident occurs during a Pasquill F stability and therefore during non-working hours, the breathing rate assumed in computation of the 5% curves of Figures B.1-1, 2, and 3 is the standard man's average.

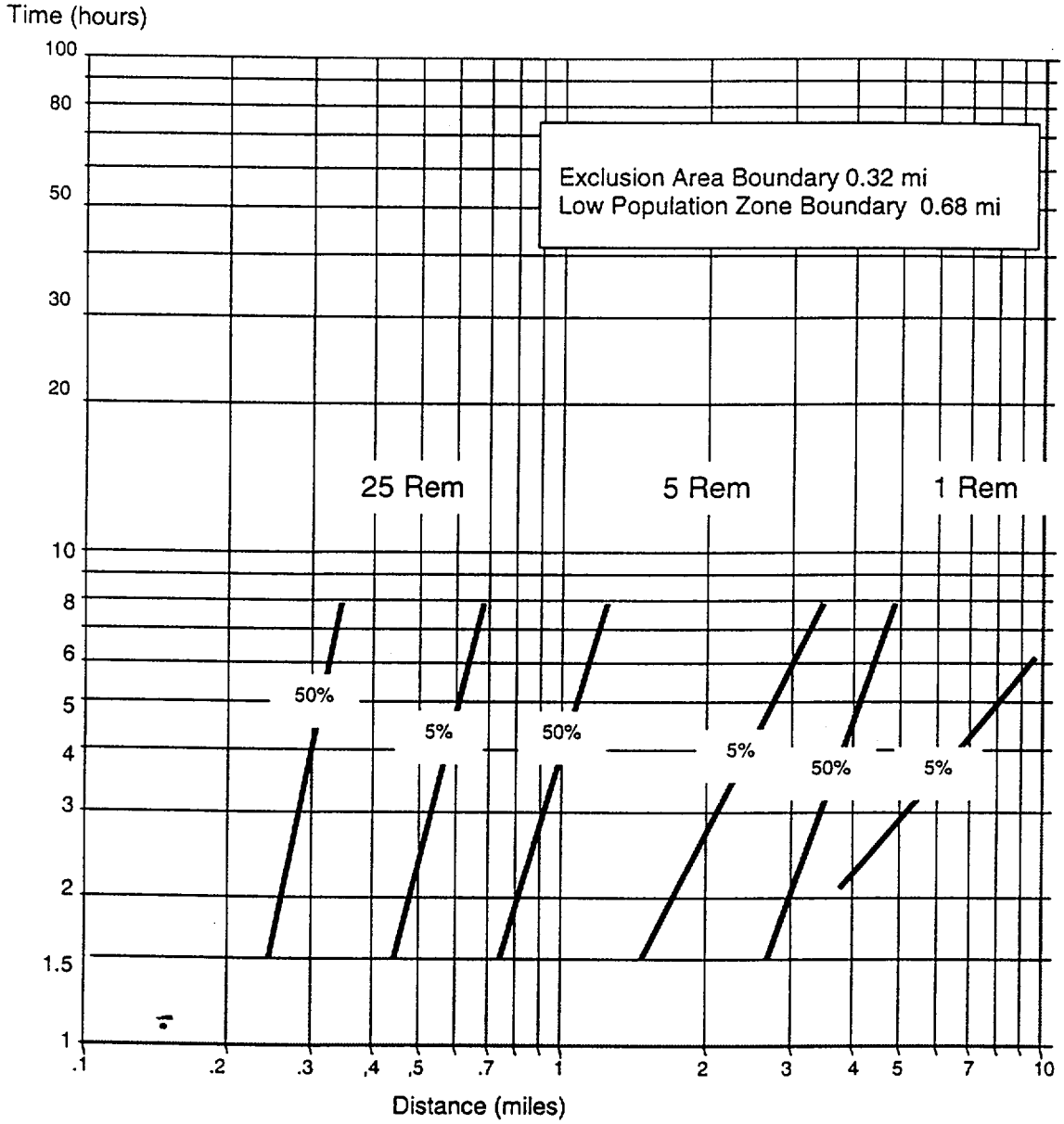
For comparison, dose curves, assuming the median (50% value) meteorological condition, are provided on Figures B.1-1, 2, and 3. The median meteorological condition was again derived from methodology presented in ERL-ARL-42 using site hourly meteorological data for the entire year of 1977. This resulted in determining that the median X/Q value is not exceeded more than 50% of the time. Assuming a Pasquill E stability (occurrence exceeded 50% of the hourly cases during 1977) and the above median X/Q, a windspeed of 1.67 meters/sec was derived.

B.1 Estimated Offsite Doses During the Design Basis Accident (cont.)

Therefore, this defines the median meteorological condition as being a windspeed of 1.67 meters/sec and Pasquill E stability class.

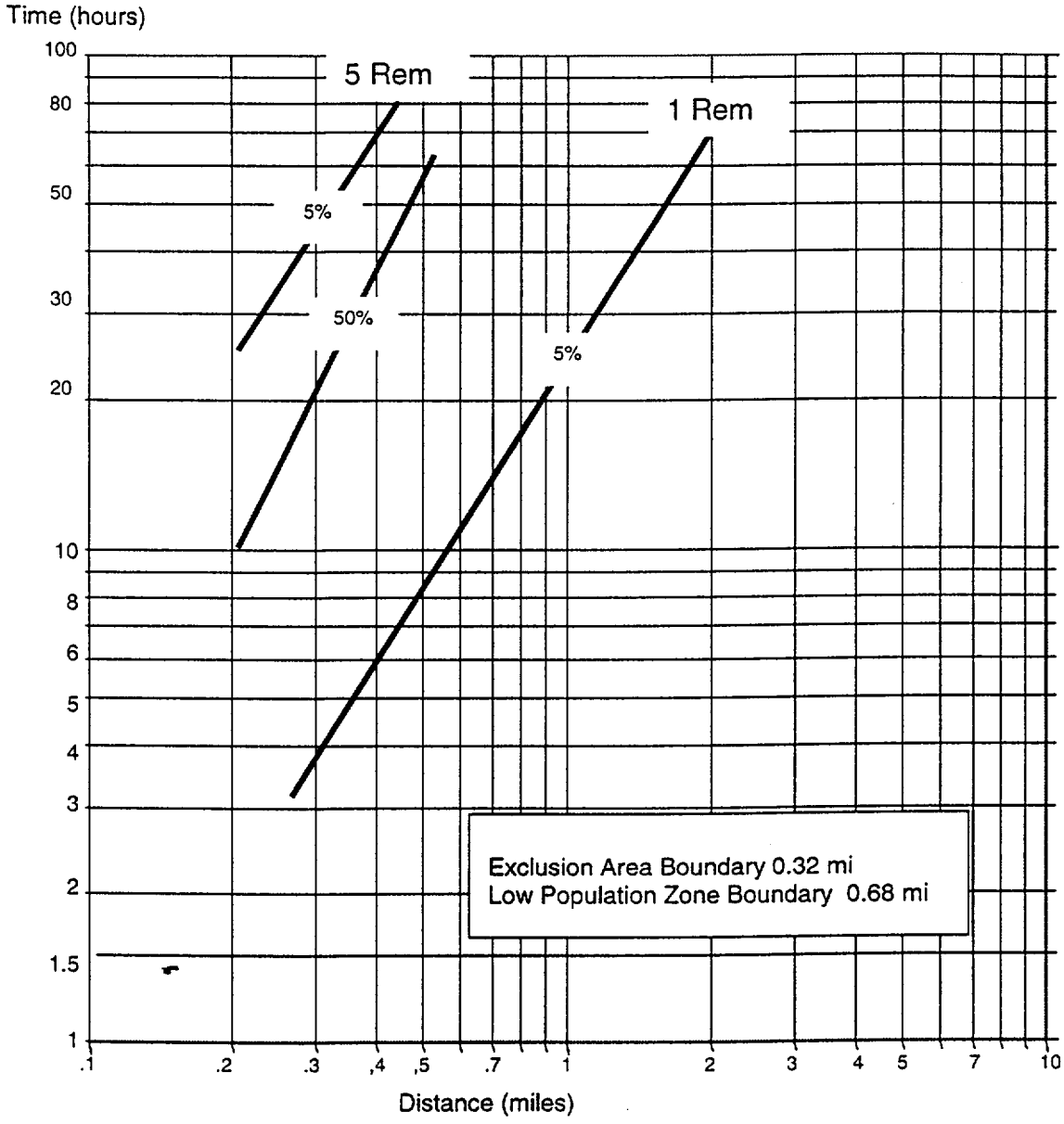
The breathing rates of individuals vary over different periods of the day. Since the Pasquill E stability, based on 1977 data randomly occurs over a twenty-four hour period, the maximum breathing rate (347 cc/sec) is conservatively assumed for computation of thyroid dose, when the accident is assumed to occur during the median meteorological condition.

Figure B.1-1
Thyroid Dose
Time-Dose-Distance Curves
Loss of Coolant Accident
Indian Point Unit Two



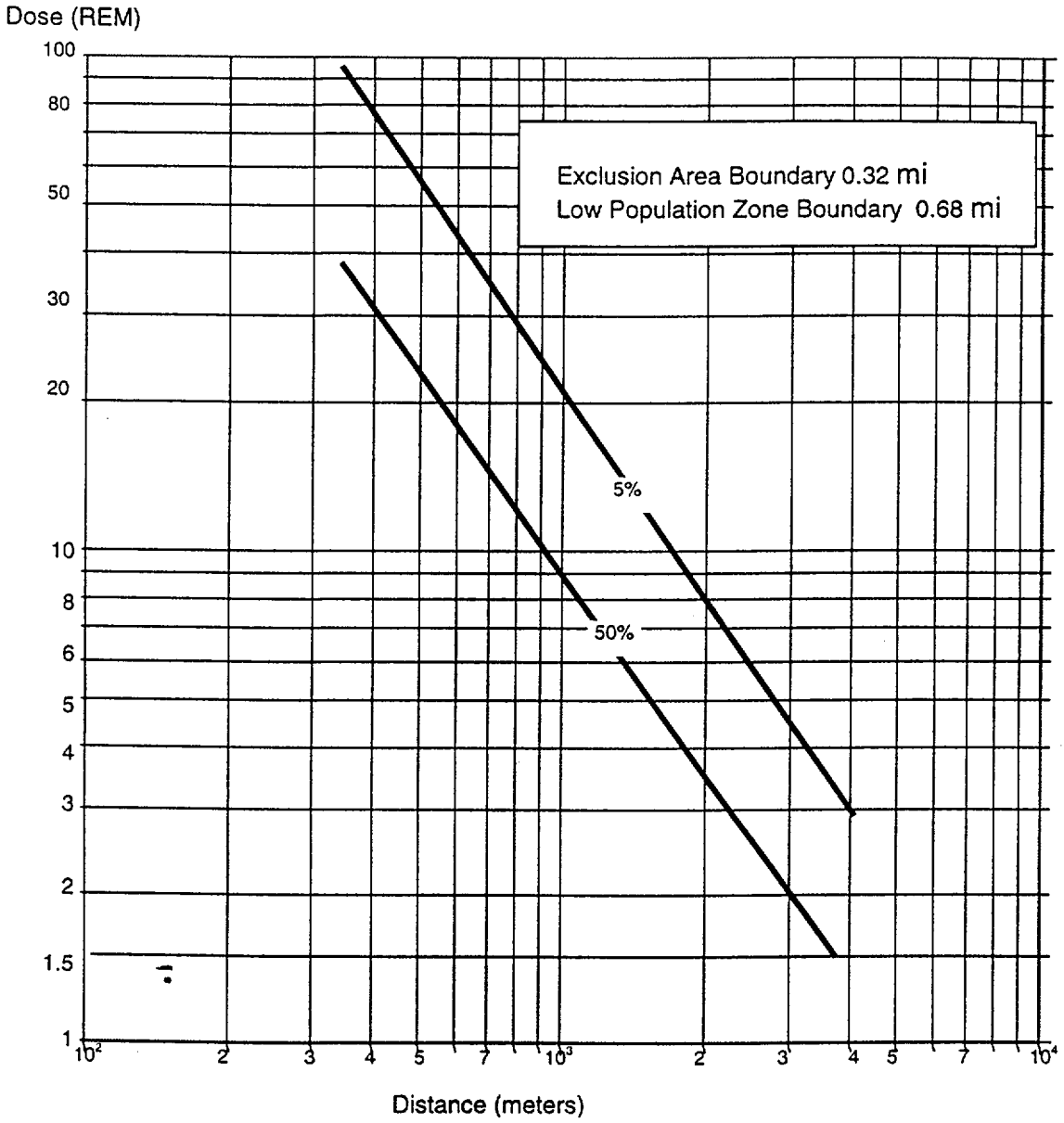
5% = Meteorological condition which is exceeded only 5% of the time (worst condition)
50% = Meteorological condition which is 50% of time (median condition)

Figure B.1-2
Whole Body Dose
Time - Dose - Distance Curves
Loss of Coolant Accident
Indian Point Unit Two



5% = Meteorological condition which is exceeded only 5% of the time (worst condition)
50% = Meteorological condition which is 50% of time (median condition)

Figure 6.1-3
Thyroid Dose
Two Hours - Distance vs. Dose
Loss of Coolant Accident
Indian Point Unit Two



5% = Meteorological condition which is exceeded only 5% of the time (worst condition)
50% = Meteorological condition which is 50% of time (median condition)

Figure B.1-4
Plume Half-Width

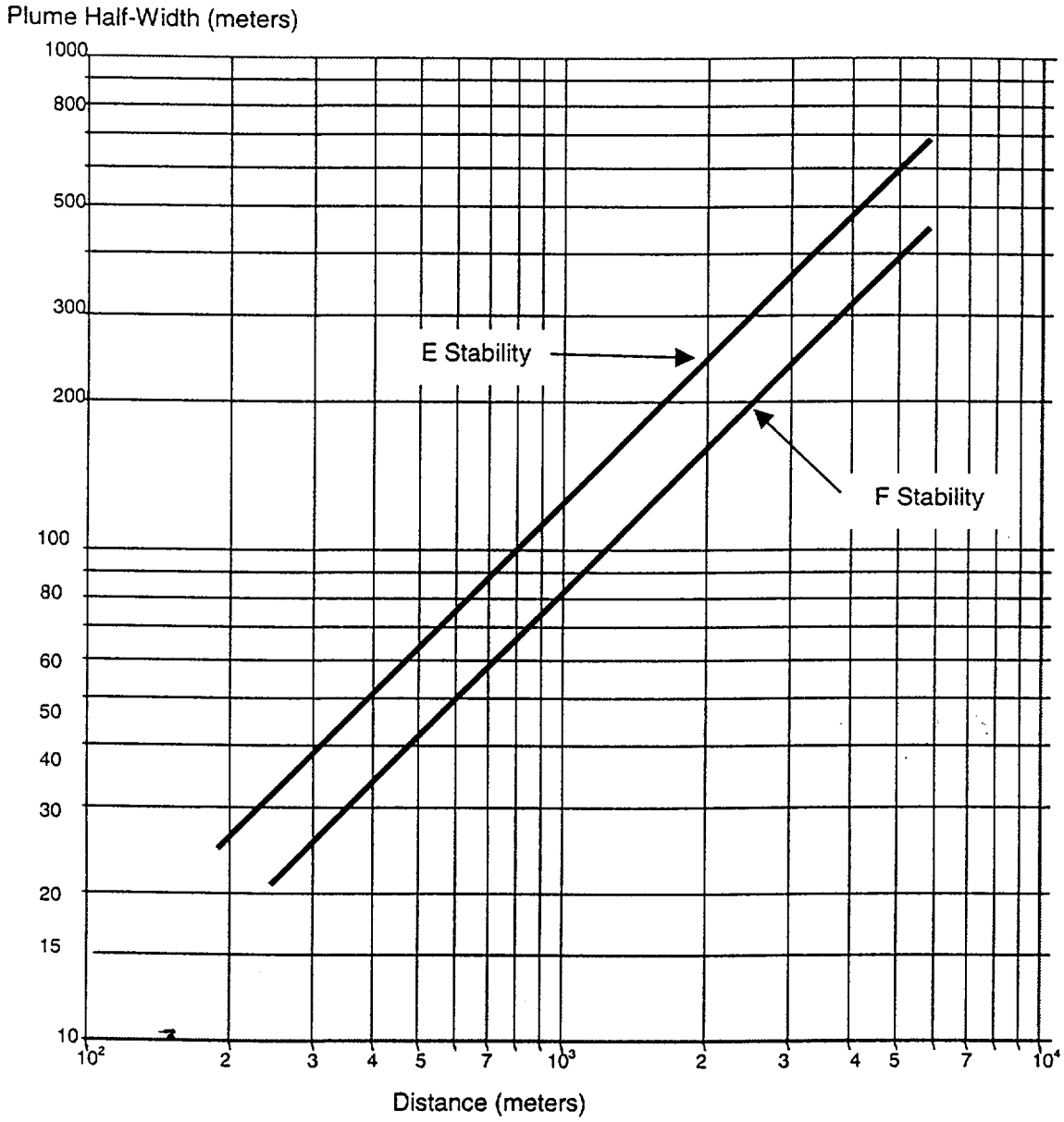


Table B.1-1
ASSUMPTIONS FOR THYROID AND WHOLE BODY DOSES - INDIAN POINT UNIT 2
LOSS OF COOLANT ACCIDENT

NO.	Assumptions	
1)	Isotope Inventory [1]	See Reference
2)	Containment Leakrate [2]	0.075%/day
3)	Charcoal Filter Efficiency:[3]	
	Inorganic Form	90%
	Organic Form	30%
	Particulate Form	90%
4)	Fraction of Iodine Released [4]	25%
5)	Fraction of Iodine Forms:[4]	
	Inorganic Form	91%
	Organic Form	4%
	Particulate Form	5%
6)	Radiological decay considered during holdup in Containment[4]	See Reference
7)	Plant Power Level[5]	2758 MWt
8)	Spray Removal Coefficient[3]	
	Inorganic Form	$9.83hr^{-1}$
	Methyl Form	$0hr^{-1}$
	Particulate Form	.45hr
9)	Ventilation/Filtration System[3]	
	Ventilation flow rate per uni	8000 cfm
	Number of Units assumed operating	3 of 5
10)	Breathing Rate	231 cc/sec
11)	Meteorological Condition Assumed	Pasquill Clas F, 0.73m/sec wind speed
12)	Containment Free Volume[3]	$2.61x106ft^3$
13)	Credit for Plume transit time and Radiological decay during transit[6]	See Reference
14)	Use of Reduction Factors expressing deviation between a finite and infinite cloud when computing whole body dose[7]	See Reference
15)	Duration of spray effectiveness[3]	1 day

Table B.1-1
References

(1) Technical Information Document 14844, March 23, 1962, U.S. Atomic Energy Commission, Table I. Page 20.

(2) Appendix J, 10CFR 50, "Reactor Containment Leakage Testing for Water Cooled Power Reactors".

(3) Final Facility Description and Safety Analysis Report, Indian Point Unit Three, Table Q14.11-1. (Ventilation and Spray Equipment, and Containment free volume, are the same for Indian Point Two and Three).

(4) NRC Regulatory Guide 1.4, Rev. 2, June, 1974 "Assumptions Used for Evaluating the Potential Radiological Conse- quences of a Loss of Coolant Accident for Pressurized Water Reactors".

(5) Appendix A to Facility Operating License DPR-26, Docket No. 50-247, "Technical Specifications and Bases", 1.1(a).

(6) NRC Regulatory Guide 1.70.14, Dec. 1974. "Information for Safety Analysis Report Emergency Planning".

(7) Meteorology and Atomic Energy, U.S. Atomic Energy Commission, 1968, 7-5.2.3.

B.2 Methodology of Relating R-25/R-26 Monitor Readings to Limits Given in EPA Protective Action Guides

The R-25 and R-26 monitors are area radiation monitors located inside Containment. For the calculations that estimate radiation fields as seen by these monitors, the monitors were assumed to be located 5' above the 95' elevation on the wall surrounding Steam Generators #21 and #22; the R-26 radiation monitor was located 27' above the 95' elevation on the wall surrounding the pressurizer. These monitors are presently used for accident categorization based on the following data provided by calculations performed in-house:

Postulated Accident	Maximum Calculated Radiation Level R/hr	
	R-25	R-26
LOCA & 100% equivalent core meltdown	4.70×10^5	5.50×10^5
LOCA & fuel rod gap release	3.90×10^3	4.50×10^3
LOCA & reactor coolant activity release (1% equivalent fuel rod defects)	9.60×10^0	1.50×10^1

The above values were verified using QADCG, a point kernel integration code. The input to this code included a simple physical configuration and core fission product inventories consistent with the information provided in Section 14 of the Final Safety Analysis Report. A functional relationship between airborne activity within the Containment Building and

the R-25 and R-26 monitor readings can then be established for the above postulated accidents and a linear interpolation of the corresponding radiation levels at the monitor location.

By relating the airborne activity levels within the Containment Building to corresponding offsite dose levels, the relationship between the R-25 and R-26 readings and any such offsite level can be ascertained. The calculations have assumed a noble gas to iodine release rate of 10000 to 1.

B.2 Methodology of Relating R-25/R-26 Monitor Readings to Limits Given in EPA Protective Action Guides (cont.)

Using the assumptions given in Table B.2-1 as input, the governing pathway offsite dose corresponding to those assumptions was calculated. Since, with all other variables held constant, a direct proportionality exists between the airborne source within Containment and the resulting offsite dose, the Containment airborne activity corresponding to the EPA Protective Action Guide (PAG) limits could then be determined. The R-25 and R-26 Monitor readings were determined to be as follows:

	Site Boundary Whole Body Dose	
	1 Rad	5 Rads
R-25 Readings	1.77×10^5	$>4.7 \times 10^5$
R-26 Readings	2.08×10^5	$>5.5 \times 10^5$

R-25 and R-26 readings given in R/hr.

C LISTING OF SUBJECT MATTER COVERED BY IMPLEMENTATION PROCEDURES

Implementation procedures have been written that implement the Indian Point Emergency Plan and are contained in the Emergency Plan Implementing procedures. They cover the following subjects:

- Mobilization of emergency organization
- Emergency Notification
- Methods of calculating release rates to the environment
- Methods of determining the radiological exposure to the population
- Offsite sampling and field surveys
- Use of radiation monitoring and counting equipment
- Search and rescue
- Repair and corrective action
- Medical emergencies
- Obtaining meteorological data
- Operation of facilities
- Use of communication systems
- Accountability and evacuation of personnel
- Emergency personnel exposures
- Recovery

D. STORED EMERGENCY EQUIPMENT AND SUPPLIES

Radiological equipment and supplies are stored at various locations for immediate use by emergency forces. A general listing of the equipment and supplies stored at each location is presented below.

Unit 1-2 Control Room

- Air Sampler and Counting Equipment
- Respirators
- Anti "C" Clothing
- Log Books
- Potassium Iodine
- Survey Instrument
- Emergency Procedures Document
- Maps, Overlays
- Self Contained Breathing Apparatus

Emergency Operations Facility

- Air Sampler and Counting Equipment
- Potassium Iodide
- Dosimeters
- Survey Instruments
- Maps and Overlays
- Emergency Plan & Implementing Procedures
- Log Books
- Radiological Health Handbook
- Decon Kit

Emergency Operations Facility (cont.)

- Communications Equipment and Directories
- Respirators
- Thermoluminescent Dosimeter Badges
- Anti "C" Clothing

Survey Vehicles (kits)

- Dosimeters
- Respirators
- Thermoluminescent Dosimeter Badges
- Maps
- Procedure Book
- Air Sampler and Counting Equipment
- Survey Instruments

Command Guard House

- Thermoluminescent Dosimeter Badges
- Dosimeters
- Potassium Iodide
- Respirators

Technical Support Center

- Air Sampler and Counting Equipment
- Survey Instruments
- Emergency Plan & Implementing Procedures
- Noble Gas Monitor

Operational Support Center

- Air Sampler and Counting Equipment
- Survey Instruments
- Dosimeters
- Respirators
- Anti "C" Clothing
- Friskers

E. NUREG 0654-Rev 1 / Emergency Plan Cross Reference

This Appendix provides a cross-reference of NUREG 0654 / FEMA-REP-1, Revision 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants to sections of the Emergency Plan for Indian Point Unit Nos. 1 & 2.

NUREG-0654-REV 1	Plan Section
A.1.a	5.2, 5.3, 5.4
A.1.b	3., 5.1, 5.2, 5.2.2
A.1.c	Figures 5-3 & 5-4
A.1.d	5.2, 5.2.1
A.1.e	5.2, 5.2.2.2
A.2.a	Note 1
A.2.b	Note 1
A.3	Section 10 Appendix A
A.4	5.3.1
B.1	5.1, 5.2, Table 5-1, Figure 5-4
B.2	1.0, 5.2.1
B.3	5.2.1
B.4	5.2.1, 5.2.1.1
B.5	5.2, Table 5-1
B.6	Figure 5-3
B.7	5.2, Figures Table 5-1, Figure 5-4
B.7.a	Figure 5-4
B.7.b	Figures 5-4 & 5-4
B.7.c	5.2.4
B.7.d	5.2.3
B.8	5.3.4
B.9	5.3.2, 6.5.3, Section 10 Appendix A

NUREG-0654-REV 1	Plan Section
C.1.a	5.2.1.1, 5.4.2
C.1.b	5.4.2
C.1.c	5.4.2, Section 10 & Appendix A
C.2.a	Note 1
C.2.b	6.2
C.2.c	Note 3
C.3	5.3.4, 7.3.2.2
C.4	5.3, Section 10 Appendix A
C.5	Note 3
D.1	4.1
D.2	4.2
D.3	Note 1
D.4	Note 1
E.1	6.1
E.2	6.1
E.3	6.1, 6.2
E.4.a-n	6.1, 6.2
E.5	Note 1
E.6	6.6
E.7	6.1
E.8	Note 3
F.1.a	5.1, 5.2.2.2, 7.2.3
F.1.b	7.2.3
F.1.c	7.2.3
F.1.d	7.2.2, 7.2.3, 7.2.4
F.1.e	6.4.1, 7.2.5
F.1.f	7.1.1, 7.2.3, 7.2.4

NUREG-0654-REV 1	Plan Section
F.2	5.3.2.1, 7.2.2
F.3	8.1.2
G.1	8.4
G.2	8.4
G.3.a	5.2.3
G.3.b	7.1.7
G.4.a	Figure 5-4
G.4.b	5.2.3, 7.1.7
G.4.c	5.2.3, Table 5-2
G.5	8.4
H.1	7.1.4, 7.1.5
H.2	7.1.2
H.3	Note 1
H.4	6.1, 7.1
H.5	7.3.1
H.5.a	7.3.1.1, 7.3.1.2
H.5.b	7.3.1.3, 7.3.1.5, 7.3.1.6
H.5.c	7.3.1.4, 7.3.1.7
H.5.d	7.3.1.8
H.6.a	7.3.2.4
H.6.b	7.3.2.2, Section 10 Appendix F
H.6.c	5.3.4.1, 7.3.2.2, Section 10, Appendix A
H.7	7.3.2.1, 7.3.2.2, 7.3.2.3, Section 10 Appendix F
H.8	7.3.1.2
H.9	7.1.3, Section 10 Appendix D
H.10	8.3

NUREG-0654-REV 1	Plan Section
H.11	Section 10 Appendix D
H.12	7.1.1
I.1	4.1, Table 4-1
I.2	7.3.1.3, 7.3.1.5, 7.3.1.6
I.3a	6.2.3, Section 10, Appendix B
I.3.b	6.2.3
I.4	6.2.3
I.5	7.3.1.2
I.6	6.2.3
I.7	Section 10 Appendix F
I.8	6.1, 6.2.3, 7.3.2, Table 5-1, Section 10 Appendix F
I.9	7.3.2.1
I.10	6.2.3
I.11	Note 1
J.1.a-d	6.4.1
J.2	6.4.1
J.3	6.4.1
J.4	6.4.1, 6.4.3, 6.5.2, 7.5.3
J.5	5.2.2.10, 6.4.1
J.6.a	6.4.2
J.6.b	6.4.2
J.6.c	6.4.2
J.7	6.1, 6.4.2
J.8	Appendix G, Evacuation Time Estimate
J.9	Note 1

NUREG-0654-REV 1	Plan Section
J.10.a	Appendix F
J.10.b	Appendix G, Note 2
J.10.c	6.4.2, 6.6, 8.4
J.10.d-1	Note 1
J.10.m	6.4.2
J.11	Note 1
J.12	Note 1
K.1.a-g	6.5.1
K.2	6.4.2, 6.5.1
K.3.a-b	6.5.1
K.4	Note 1
K.5.a	6.4.3, 6.5.2, 6.4.4.2
K.5.b	6.5.2, 7.5
K.6.a-c	6.4.4
K.7	6.4.1
L.1	6.5.4
L.2	6.5.2, 7.5
L.3	Note 1
L.4	6.5.3
M.1	9.1
M.2	9.0, 9.1
M.3	9.0
M.4	6.2.3
N.1.a	8.1.3
N.1.b	8.1.3
N.2.a-e	8.1.3
N.3.a-f	8.1.3

NUREG-0654-REV 1	Plan Section
N.4	8.1.3
N.5	8.1.3
O.1	8.1.1
O.1.a	8.1.2
O.1.b	Note 1
O.2	8.1.2
O.3	8.1.3
O4.a-j	8.1.2
O4.k	Note 3
O.5	8.1.2
P.1	8.1.4
P.2	8.1.4
P.3	8.1.4, 8.2
P.4	8.2
P.5	8.2
P.6	5.4
P.7	Section 10 Appendix C
P.8	Section 10 Appendix E, Table of Contents
P.9	8.2
P.10	8.2

Note 1 - Applicable to State and/or local plans only.

Note 2 - Located in County Plans.

Note 3 - Applicable to utility supplied offsite response organization.

F. ASSESSMENT RESOURCES FOR RADIOLOGICAL MONITORING

The capability for monitoring the area around the Indian Point Nuclear Power Station for released radioactivity, for following and predicting its movement and spread, and for assessing its potential hazard exists under programs developed and maintained by Entergy.

I. METEOROLOGICAL INFORMATION AND DOSE ASSESSMENT SYSTEM (MIDAS)

A. The Indian Point Station has procured and installed the MIDAS system, a minicomputer based system, which is capable of:

1. Calculating the dispersion path of radioactive material if released to the atmosphere by the plant;

2. Obtaining meteorological information from a primary and backup meteorological tower, thus providing assurance that basic meteorological information is available during and immediately following on accidental airborne radioactivity release;

3. Calculating the radiological consequences of accidental radioactive releases to the atmosphere;

4. Providing simultaneous real-time meteorological data and transport and diffusion estimates in the vicinity of the site to the licensee, emergency response organizations and the NRC Staff, via telephone computer access;

5. Obtaining additional radiological and meteorological inputs which assist in defining the site generated dispersion path calculations.

6. Producing the present location and shape of the plume in two modes, Class A static model and Class B dynamic model, utilizing the information on a real time basis.

I. METEOROLOGICAL INFORMATION AND DOSE ASSESSMENT SYSTEM (MIDAS) (cont.)

B. Radiological instruments with telemetry capability.

1. A Reuter Stokes Sentri 1011 Environmental Radiation Monitoring System consisting of a network of monitors is installed in each of the 16 standard meteorological sectors around the Indian Point Site at a distance of 0.5 to 2.5 miles. These devices will continuously telemeter, over dedicated telephone lines, radiation level readings to the MIDAS.

II. ENVIRONMENTAL MONITORING

Indian Point emergency personnel have the responsibility for gathering and documenting ongoing radiological and meteorological readings in the ten mile Emergency Planning Zone. In addition, they have the operational responsibility for the equipment described below and for supplying teams of trained technicians who utilize special portable equipment for surveys at predesignated emergency sampling sites (refer to subsection III). The identification of radiological sampling and monitoring points is discussed in detail in the implementing procedure.

A. Reuter Stokes Equipment - Refer to subparagraph I.B.1.

B. Thermoluminescent Dosimeters (TLD's) - TLD's are deployed in three (3) rings at approximately 1, 5 and 10 miles from the site. Each ring has 16 TLD stations, one in each of the sectors, for a total of 48 stations. TLD's are sensitive to Gamma radiation and are gathered and read periodically.

C. Air Samplers deployed at a number of the sampling sites where they are constantly in operation passing ambient air through a series of filters capable of trapping radioactive iodine and other radioisotopes in the air. The filters are periodically removed and analyzed by the Nuclear Power personnel.

II. ENVIRONMENTAL MONITORING (cont.)

D. Portable Equipment - Field teams utilize portable equipment during an emergency to gather data from any of the sixty-one predesignated emergency sampling locations around the Indian Point Site. These sampling locations as described in an implementation procedure, are located so that there are 3 or 4 in each of the 16 sectors, at approximately 1, 3, 6 and 10 miles from the site. Large scale maps showing the locations are in the Control Room and Emergency Operations Facility for use by the Emergency Director. Readings taken by these teams are relayed back to the site via radio, using commercial telephones as back-up. A partial list of the equipment utilized by these teams is presented in subsection III.

III. EMERGENCY OFFSITE MONITORING TEAMS

The Indian Point Station has trained members of their staff in the operation of radiological monitoring equipment. In general, personnel utilized for this work have prior experience and demonstrated capability working in areas of radioactivity exceeding normal levels. These individuals would supplement and assist the radiation monitoring teams already assigned to the monitoring task in the event of an emergency at either of Units 2 or 3.

Kits containing necessities including the following radio- logical equipment area maintained in a ready state and would be utilized by the teams:

A. Radiation field survey instruments used to perform beta and gamma radiation field surveys.

B. Air Sampler which is basically a blower with a filter holder in the inlet, utilized to take samples of ambient air and pass the air through a fiberglass and an acti- vated charcoal or silver zeolite filter. The filters remove and absorb radioisotopes from the air.

C. Sample counter which is a device used to measure the radioactivity of filters used in the air sampler.

III. EMERGENCY OFFSITE MONITORING TEAMS (cont.)

D. Equipment for personnel protection such as ANTI-C clothing and special respirators for use in radiation environments.

E. Support equipment and supplies such as spare filters, a stopwatch, a filter holder, instruction kits, spare batteries, tools and spare rolls of chart paper.

G. EVACUATION PLAN

Evacuation plan for Westchester, Rockland, Orange and Putnam counties.

I. INTRODUCTION

The evacuation plan is based on the identification of both the population to be evacuated and the transportation facilities required to accomplish this evacuation. These are the essential data around which the plan and detailed procedures are built. Because the population in the areas to be evacuated can vary with the time of day, the day of the week, and the seasons, a set of six time-based scenarios has been developed as a means of characterizing the population shifts. These scenarios, prepared for both fair and adverse weather conditions, address variations in both the general population, transient population and the special facilities (e.g., schools, nursing homes, hospitals, and recreation areas), include: (1) winter weekday - school in session - early dismissal; (2) winter weekday - school in session - direct evacuation; (3) winter night; and (4) summer weekend - holiday.

Several important contingencies can introduce significant variations in emergency action and in the execution of an actual evacuation and are thus addressed in the detailed Procedures. The contingencies include situations such as loss of particular evacuation routes or segments of routes, called links, because of construction work, accidents or flooding; severe weather conditions, such as a blizzard; and special single events.

In order to provide the plan with the flexibility to evacuate sub-areas of the EPZ in the event that a full evacuation is not necessary, the 10 Mile EPZ has been divided into 51 Emergency Response Planning Areas (ERPAs) (See Figure 1). The delineation of the ERPAs is based on the following criteria:

1. Major population areas have been preserved or grouped.

2. The boundary definitions have been simplified as much as possible (by using, e.g., political divisions or major roads) for purposes of clarity.

I. INTRODUCTION (cont.)

3. Important topographic features, such as rivers, hills, and valleys, have been utilized as boundaries when practical.

4. The size and orientation of the planning areas are adequate to respond to various levels of accident severity.

5. The effects of meteorological conditions and patterns which can be responded to.

In general evacuation is necessary, individual ERPAs will be evacuated as units. In other words, if it is decided that any given portion of an ERPA is required to evacuate, then the entire ERPA will be required to evacuate. The ERPA definitions for the EPZ surrounding the Indian Point Nuclear Power Plant Site are presented on pages G-4 through G-12. Estimates of the 1980 resident population for each of the planning areas and totals for the ERPA's are shown on Table 1.

For each ERPA within the EPZ, primary evacuation routes have been identified. The ERPAs have been further subdivided into traffic zones. Each traffic zone is assigned an evacuation route for each mode of travel. Descriptions of the traffic zones and their associated evacuation routes are given in the county plan procedures. Listings and maps of reception centers for each traffic zone are also included in the county procedures.

As part of the public education program associated with the implementation of the County Radiological Emergency Response Plan (RERP), the general public will be provided with materials to enable identification of their residential locations within a given traffic zone in the appropriate ERPA, thus identifying the recommended evacuation route and reception center as well.

II. EVACUATION ROADWAY TRAVEL TIME ESTIMATES

Evacuation travel time estimates by ERPA and evacuation area for each of the four scenarios for the resident general population (with and without vehicles) are presented for fair and adverse weather conditions in tables 2 through 5. For a more detailed discussion, consult the actual Evacuation Travel Time Estimates report prepared by HMM Associates, Incorporated.

III. DESCRITPION OF THE EVACUATION PLAN

The evacuation plan comprises four major phases: mobilization, egress, maintenance and re-entry. As a Response Action, the first phase of evacuation--mobilization--may be initiated for an incident classified as an Alert, a Site Area Emergency or a General Emergency. The decision to proceed with the second phase of the plan--egress--will be made as the status of the incident is assessed. The final phases of the plan--maintenance and re-entry--are applicable only after an evacuation has occurred.

EMERGENCY RESPONSE PLANNING AREAS:

DEFINITION OF BOUNDARIES

The plume exposure Emergency Planning Zone (EPZ) for the Indian Point Nuclear Power Station (IPNPS) has been subdivided into 51 discrete Emergency Response Planning Areas (ERPAs) as shown in Figure 1. Preliminary 1990 population estimates for each ERPA are shown in Table 1. The boundaries of the various ERPAs are described below:

ERPA 1 The Village of Buchanan.

ERPA 2 City of Peekskill, including Blue Mountain Reservation North of Dickey Brook.

ERPA 3 West-central part of Town of Cortlandt: The hamlet of Verplanck, being defined as the Verplanck Fire District south of the Village of Buchanan, bounded on the south by Kings Ferry Road and the Cortlandt Yacht Club.

ERPA 4 Central to southwest part of the Town of Cortlandt: The hamlet of Montrose and the Blue Mountain Reservation; south of the City of Peekskill, the Village of Buchanan and the Verplanck Fire District, and including all of the Montrose Postal Area (10548) except the Verplanck Fire District and the FDR VA Hostipal.

ERPA 5 Southeast Town of Cortlandt (including "Mount Airy"): South of a line from the Benchmark near the intersection of Croton Avenue and Baptist Church Road to 450+ foot promentary on the west-northwest side of Salt Hill, thence to the headwaters of the Brook which rises in the eastern end of Pine Lake Park, thence to the line dividing the properties which are accessed from Colabaugh Pond Road and Reber Road from the properties which are accessed from Furnace Dock Road, thence southwesterly along a line northwest of the properties which front upon the northwest of Woodybook and of the Brinton Book Santuary; north of the incorporated Village of Croton-on-Hudson and of the Croton River near Croton Reservoir.

ERPA 6 The Village of Croton-on-Hudson.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 7 Camp Smith Military Reservation, and the adjacent portions of the Town of Cortlandt (to the W, S, and SE of Camp Smith) along the Hudson River and along Annsville Creek, south of the intersection of Doris Lee Road with U.S. Route 9 (New York-Albany Post Road), about 0.2 miles north, northeast of the juncture of Annsville Creek and Sprout Brook.

ERPA 8 Northeastern area in the Town of Cortlandt: bounded on the west by Camp Smith and Annsville Creek (South of the intersection of Doris Lee Road and U.S. Route 9), and on the south by the City of Peekskill and Bear Mountain State Parkway (also Route 202 - Route 35 to the East).

ERPA 9 East-central area in the Town of Cortlandt ("Toddville"): South of Bear Mountain State Parkway (also U.S. Route 202 - Route 35 to the East), east of the City of Peekskill, and north of west side of Dickey Brook of Matasak Road and of the Hendrick Hudson Central School District and of the Benchmark near the intersection of Croton Avenue and Baptist Church Road.

ERPA 10 Northeastern area of the Town of Yorktown, west of the Taconic State Parkway, and north of Route 202 - Route 35.

ERPA 11 Northeastern area of the Town of Yorktown, east of the Taconic State Parkway and north of Route 202 - Route 35.

ERPA 12 Southeastern part of the Town of Yorktown, west of the Taconic State Parkway northbound, and south of Route 202 - Route 35.

ERPA 13 Southeastern part of the Town of Yorktown, east of the Taconic State Parkway northbound, and south of Route 202 - Route 35.

ERPA 14 Northerwestern part of the Town of Somers, west of the Route 118 and Route 202, and North of Route 202 - Route 35-118.

ERPA 15 Southwestern part of the Town of Somers south of Route 35; west of (north to south) Route 35, Wood Street, and Moseman Avenue; and north of Route 100.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 16 Southwestern portion of the Town of Philipstown, except for the area of Continental Village included in ERPA 18, bounded on the north and east by (Southeast to Northwest) U.S. Route 9 (New York-Albany Post Road), Cat Rock Road (Route 403), Lower Station Road, and a short line from Lower Station Road as it nears the river to the boat basin just south of the Village of Garrison.

ERPA 17 Central portion of the Town of Philipstown, bounded on the south and west by (east and west) Canopus Hollow Road, Old West Point Road, Capistrano Avenue, U.S. Route 9 (New York-Albany Post Road) northward, Cat Rock Road (Route 403). Lower Station Road as it nears the river to the boat basin just south of the Village of Garrison; on the north (west to east) by the Cold Spring eastern Village line, Moffet road north-eastwardly, Lane Gate Road, U.S. Route 9 (New York- Albany Post Road), Old Albany Post Road, Indian Brook Road, and the Southwest boundary of Clarence Fahnestock Memorial State Park.

ERPA 18 Southwestern portion of Putnam County, including Continental Village in the southeastern corner of the Town of Philipstown, bounded on the west by U.S. Route 9 (New York-Albany Post Road) and on the north by Capistrano Avenue, Old West Point Road, Old Albany Post Road, and Canopus Hollow Road; and the Village of Lake Peekskill in the southwestern corner of the Town of Putnam Valley, bounded on the north by an east-west line through the unpopulated area north of the village from the town line to the north end of Howard Street, and on the east by Howard Street and Oscawana Lake Road.

ERPA 19 The central and southern part of the Town of Putnam Valley, except for the area of the village of Lake Peekskill included in ERPA 18, bounded on the north (west to east) by the south boundary of Clarence Fahnestock Memorial State Park, Sunken Mine Road, Northshore Road, Lake Road (Route 20), Tinker Hill Road, Peekskill Hollow Road, and Bryant Pond Road; and on the east by the Taconic State Parkway.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 20 Southeastern corner of the Town of Putnam Valley, bounded on the west by the Taconic State Parkway, and on the north by Bryant Pond Road and Lake Secor Road; and the southwestern corner of the Town of Carmel, bounded the east by Austin Road, Route 6N, Stillwater Road (including northern branch), and the Muscoot River.

ERPA 21 Western part of the Town of New Castle, bounded on east (south to north) by Hardscrabble Road, Quaker Street (Route 120), Millwood Road (Route 133), and Seven Bridges Road (Route 5).

ERPA 22 The incorporated Village of Ossining and the unincorporated area of the Town of Ossining.

ERPA 23 The Village of Cold Spring; the Village of Nelsonville except for the portion in Hudson Highlands State Park; and a small part of the Town of Philipstown, south of Route 301 (Cold Spring - Carmel Road) and west of Moffet Road.

ERPA 24 U.S. Military Academy West Point Military Reservation.

ERPA 25 Northwestern part of the Town of Highlands north and west of the West Point Military Reservation; and the southern part of the Town of Cornwall, bounded on the east and north by Route 9W (not included in the EPZ), and on the Northwest by (Northeast to Southwest) Angola Road (County Route 9), Long Hill Road, and Woodbury Road.

ERPA 26 Town of Highlands east and south of West Point Military Reservation; and north of the Palisades Interstate Parkway - U.S. Route 6, and on a east-west line connecting PIP - U.S. Route 6 to the West Point Military Reservation boundary, about 1 1/2 miles west of the Bear Mountain Bridge.

ERPA 27 Northeastern part of the Town of Woodbury, bounded on the east by (north to south) the West Point Military Reservation boundary, the Harriman State Park boundary, on the south by the northerly boundary of U.S. Route 6 and on the west by (south to north) the easterly boundary of the New York State Thruway in the Town of Woodbury.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 28 Southern part of the Town of Woodbury west of Harriman State Park and south of the Village of Harriman; and northern part of the Town of Tuxedo, bordered on the east, and south, by Harriman State Park, bordered on the west by the easterly boundary of the New York State Thruway and the easterly boundary of the Village of Harriman.

ERPA 29 Northeastern portion of the Town of Stony Point, south of Bear Mountain State Park, bounded on the south and west by (southeast to northwest) the southern boundary of Stony Point State Park, Park Road north, Routes 9W-202 (Liberty Drive), Free Hill Road and Buckberg Road (Road 78), the western edge of the Tomkins Lake Community (North of Mott Farm Road), and a short line connecting the road to the north and northwest of Tomkins Lake to the Bear Mountain State Park boundary where the road is closest to the boundary.

ERPA 30 Town of Stony Point east of the main body of Harriman State Park and south of Bear Mountain State Park, except for the northeastern portion constituting ERPA 29; and the industrial and marshy northeastern corner of the Town of Haverstraw to the east and north of the Villages of West Haverstraw and Haverstraw.

ERPA 31 Town of Haverstraw east of the Palisades Interstate Parkway, except for the northeastern corner included in ERPA 30, and the portion of High Tor State Park in the Town of Clarkstown.

ERPA 32 Northeastern part of the Town of Clarkstown, excepting High Tor State Park, bounded on the south and west by (southeast to northwest) the south and west boundaries of Nyack Beach State Park, Hook Mountain State Park, and Rockland Lake State Park, Lake Road and Congers Road (Route 92), the western edge of DeForest Lake, the small stream entering DeForest Lake just west of its north end, Route 304 northeastward for about 0.1 mile, the north-northwest running road connection Route 304 with Long Clove Road, a short section of Long Clove road, Scratchup Road, and Route 101.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 33 Eastern-central part of the Town of Clarkstown, bounded on the north by Congers Road and Lake Road (Route 92); on the east by the boundaries of Rockland Lake State Park and Hook Mountain State Park and Route 9W southward; on the south by (east to west) Christian Herald Road, Morris Road, Crusher Road, and the southern edge of DeForest Lake from the intersection of Crusher Road with Old Mill Road; and on the west by the western edge of DeForest Lake.

ERPA 34 Northwestern part of the Town of Clarkstown, excepting High Tor State Park, bounded on the east by the western boundary of ERPA 32, and on the south by (east to west) Congers Road, Goebel Road northward, Route 304, Squadron Boulevard, Main Street northward, West Phillips Hill Road, Old Phillips Hill Road, Buena Vista Road northward, and Conklin Road; and the northeastern part of the Town of Ramapo, bounded on the west by the Palisades Interstate Parkway, and on the south by Conklin Road and a short section of Route 45.

ERPA 35 Central part of the Town of Clarkstown, bounded on the south by (west to east) Clarkstown Road, a short segment of the Palisades Interstate Parkway, Church Road, Germonds Road, Parrott Road (excluding facilities on the north side), McCarthy Way, a short segment of Strawtown Road, and Hillcrest Road; on the east by the western edge of DeForest Lake; on the north by (east to west) Congers Road, Goebel Road northward, Route 304, Squadron Boulevard, Main Street northward, West Phillips Hill Road, Old Phillips Hill Road, Buena Vista Road northward, and Conklin Road; and an eastern portion of the Town of Ramapo, east of the Palisades Interstate Parkway and south of Conklin Road and a short section of Route 45 connecting Conklin Road to the Palisades Interstate Parkway.

ERPA 36 The northereastern part of the Town of Ramapo, west of the Palisades Interstate Parkway and east of Harriman State Park, bounded on the south by (east to west) Route 45, Pomona Road, Camp Hill Road northward, Route 202, Route 306 (Monsey-Ladentown Road) northwestward, Calls Hollow Road northward, and Mountain Road; and the central part of the Town of Haverstraw east of Harriman State Park and West of the Palisades Interstate Parkway.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 37 Eastern part of the Town of Ramapo, west of Palisades Interstate Parkway and east of Harriman State Park, bounded on the north by (east to west) Route 45, Pomona Road, Camp Hill Road northward, Route 202, Route 306 (Monsey-Ladentown Road) northeastward Calls Hollow Road northward, and Mountain Road; on the south by (east to west) Eckerson Road (Route 107, Union Road, and Viola Road (Route 106); and on the west by Spook Rock Road (U.S. Route 6), Sky Meadow Road, and a line formed by extending the east-west running section of Sky Meadow Road west to Harriman State Park boundary.

ERPA 38 Eastern part of Bear Mountain State Park and the Jones Point and Dunderberg areas, south of Salisbury Meadow and Ring Meadow and east Routes 9W-202, and including the non-park areas east and south of Dunderberg Mountain, north of the main southern boundary of Bear Mountain State Park.

ERPA 39 The eastern part of Harriman State Park and Bear Mountain State Park, bounded on the west and north by the Palisades Interstate Parkway northbound and U.S. Route 6 to the Bear Mountain Bridge, and south of Salisbury Meadow and Ring Meadow on the east by Routes 9W-202 and the Park boundary, where the boundary is west of Routes 9W-202.

ERPA 40 The central and eastern parts of Harriman State Park, bounded on the east by the Palisades Interstate Parkway northbound and a line connecting PIP-U.S. Route 6 to the West Point Military Reservation boundary, about 1 1/2 miles west of the Bear Mountain Bridge; on the south by the Ramapo- Haverstraw Town line and the Rockland-Orange County line southwestward; and on the west by the New York State Thruway and the (northwest - southeast) running utility right-of-way crossing Smith Rock and Pound Mountain.

ERPA 41 The southern part of Harriman State Park, contained in the Town of Ramapo, bounded on the west and south by the utility right-of-way running northwest - southeast across Pound Mountain to a point near where Johnsontown Road and Spring Brook cross the Park boundary, and running west-northwest - east-southeast from that point to Kakiat County Park, about 1 mile west of Wesley Chapel.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 42 Hudson River north of Hook Mountain and south of the north tip of Croton Point.

ERPA 43 Hudson River north of the north tip of Croton Point and south of Stony Point.

ERPA 44 Hudson River north of Stony Point and south of Round Island.

ERPA 45 Hudson River north of Round Island and south of Con Hook.

ERPA 46 Hudson River north of Con Hook and south of Little Stony Point.

ERPA 47 The Franklin D. Roosevelt Veterans Administration hospital in Montrose.

ERPA 48 Southwestern part of the unincorporated Town of Cortlandt: The hamlets of Crugers and Oscawana (including Amberlands Apartments) bounded on the north by Montrose and on the northeast by Washington Street, Furnace Dock Road and Mount Airy Road West to a point approximately one furlong (approximately 220 feet) west of Reber Road and on the southeast by the Village of Croton-on- Hudson, Brinton Brook Sanctuary and properties which front upon the northwest side of Woodybrook.

ERPA 49 Central part of the Town of Cortlandt ("Furnace Woods"-"Pleasantside"): east of the Blue Mountain Reservation, south of the east side of Dickey Brook, and of the Lakeland and Yorktown Central School Districts, north of a line from the Benchmark near the intersection of Croton Avenue and Baptist Church Road to 450+ foot promentary on the west-northwest side of Salt Hill, thence to the headwaters of the Brook which rises in the eastern end of Pine Lake Park, thence to the line dividing the properties which are accessed from Colabaugh Pond Road and Reber Road from the properties which are accessed from Furnace Dock Road; north east of Washington Street - Furnace Dock Road - Mount Airy Road West.

EMERGENCY RESPONSE PLANNING AREAS (cont.)

ERPA 50 The extreme southeastern portion of the Town of Cortlandt, all of which lies south of Croton River/New Croton Reservoir.

ERPA 51 The incorporated Village of Briarcliff Manor and unincorporated area of the Town of Mount Pleasant northwest of Washburn Road and south of Underhill and Chappaqua Roads.

TABLE 1

1990 POPULATION ESTIMATES EMERGENCY RESPONSE PLANNING AREAS

Emergency Response Planning Area	1990 Resident Population Estimate
1	1,970
2	19,536
3	1,858
4	3,406
5	1,460
6	7,018
7	46
8	11,016
9	3,428
10	6,980
11	17,165
12	2,504
13	6,818
14	2,672
15	1,040
16	470
17	1,984
18	3,560
19	5,511
20	3,740
21	4,399
22	27,658
23	2,598
24	8,024
25	790
26	5,639
27	1,667
28	92

TABLE 1 (cont.)

1990 POPULATION ESTIMATES EMERGENCY RESPONSE PLANNING AREAS

Emergency Response Planning Area	1990 Resident Population Estimate
29	1,070
30	11,710
31	30,314
32	4,169
33	11,679
34	7,329
35	21,827
36	2,804
37	20,602
38	76
39	60
40	80
41	29
42	0
43	0
44	0
45	0
46	0
47	753
48	3024
49	2906
50	472
51	7459
Total	279,412

Totals by Counties:

- Orange County 16,212
- Putnam County 17,863
- Rockland County 111,749
- Westchester County 133,588

Source of Table 1 are the County Radiological Response Plans

TABLE 2
Evacuation Time Summary by ERPA -- All Conditions
Evacuation Time (hours:minutes)

ERPA	Winter Weekday School in Session Early Dismissal				Winter Weekday School in Session Direct Evacuation			
	Fair Weather		Adverse Weather		Fair Weather		Adverse Weather	
	90%	100%	90%	100%	90%	100%	90%	100%
1	2:50	3:20	3:15	3:50	2:50	3:20	3:15	3:50
2	3:10	4:10	4:00	5:40	3:15	4:40	3:55	6:50
3	2:45	2:50	2:50	3:00	2:50	3:00	3:00	3:10
4	3:10	4:10	3:50	5:40	3:15	4:30	4:05	6:00
5	3:50	4:10	4:35	5:30	3:55	4:10	4:45	6:00
6	4:25	5:00	6:00	7:10	4:30	5:20	6:15	7:30
7	2:50	3:40	3:15	4:00	3:00	3:40	3:15	4:00
8	3:50	5:10	5:35	6:50	4:30	5:20	6:10	7:10
9	3:30	4:00	4:15	5:00	3:35	4:00	4:25	5:10
10	4:30	5:20	6:00	7:20	4:40	5:30	6:15	7:30
11	3:25	5:20	4:35	7:20	3:30	5:30	4:40	7:40
12	3:30	5:10	4:20	7:20	3:35	5:20	4:30	7:40
13	3:40	5:20	4:35	7:20	3:40	5:30	4:45	7:40
14	3:55	5:20	5:10	7:20	4:00	5:30	5:20	7:40
15	2:45	4:10	3:10	5:10	2:45	4:20	3:05	5:20
16	3:00	3:40	3:15	4:10	3:00	3:40	3:20	4:10
17	3:00	3:50	3:15	4:20	3:00	3:50	3:15	4:20
18	3:10	4:30	3:55	6:30	3:25	5:20	4:25	7:20
19	4:05	5:20	5:40	7:20	4:25	5:30	6:00	7:40
20	3:35	5:20	6:25	7:20	3:40	5:30	4:55	7:40
21	4:10	5:20	5:25	7:20	4:10	5:30	5:30	7:40
22	4:25	5:20	5:55	7:20	4:30	5:30	6:10	7:40
23	2:50	3:50	3:00	4:20	2:45	3:50	2:55	4:20
24	2:25	2:50	4:15	5:10	2:35	3:10	4:35	5:30
25	2:00	2:40	3:25	5:10	2:00	2:40	3:40	5:30
26	2:30	2:50	4:20	4:50	2:40	3:00	4:35	5:10
27	2:40	3:00	3:10	5:20	2:40	3:00	3:25	5:40
28	2:35	3:00	4:45	5:20	2:35	3:00	5:00	5:40
29	2:05	2:30	2:05	2:30	2:05	2:30	2:05	2:30
30	3:05	3:30	4:10	4:50	3:20	3:50	4:30	5:10
31	3:00	3:40	4:00	4:50	3:15	3:50	4:20	5:20
32	2:50	3:10	3:35	4:35	3:10	3:40	3:50	4:40
33	3:25	3:50	4:15	4:50	3:40	4:00	4:35	5:10
34	2:45	3:20	3:30	4:00	2:55	3:30	3:45	4:20
35	3:10	3:50	4:10	5:00	3:25	4:00	4:30	5:30
36	3:00	3:40	4:00	5:00	3:15	4:00	4:20	5:20
37	3:05	3:50	4:05	5:00	3:20	4:00	4:25	5:30
38	2:10	2:30	2:10	2:30	2:10	2:30	2:10	2:30
39	1:00	1:30	1:00	1:30	1:00	2:00	1:05	2:00
40	3:15	3:50	4:30	5:20	3:25	4:10	4:45	5:40
41	3:20	3:50	4:20	5:10	3:30	4:10	4:40	5:40
47	3:00	3:10	3:45	4:00	3:05	3:20	3:50	4:10
48	4:20	5:00	5:50	7:10	4:30	5:10	6:05	7:30
49	3:45	4:00	4:20	4:40	3:45	4:00	4:25	5:00
50	3:05	3:10	3:20	3:30	3:05	3:10	3:35	3:40
51	4:25	5:20	5:55	7:20	4:30	5:30	6:10	7:40
Full EP:	4:25	5:20	6:25	7:20	4:40	5:30	6:15	7:40

TABLE 2 (cont.)
Evacuation Time Summary by ERPA -- All Conditions
Evacuation Time (hours:minutes)

ERPA	Winter Night				Summer Weekend - Holiday			
	Fair Weather		Adverse Weather		Fair Weather		Adverse Weather	
	90%	100%	90%	100%	90%	100%	90%	100%
1	2:55	3:20	3:05	3:30	2:55	3:20	3:05	3:30
2	3:05	3:30	3:20	4:30	3:15	4:50	3:35	5:20
3	2:45	2:50	2:55	3:00	2:50	3:00	2:50	3:00
4	3:05	3:30	3:30	4:30	3:25	4:50	4:05	5:20
5	3:45	4:00	4:25	4:50	3:55	4:30	4:25	5:50
6	4:00	4:50	5:25	6:40	4:55	5:30	5:50	6:40
7	3:00	3:30	3:15	4:00	2:50	3:20	2:55	3:40
8	3:15	3:40	4:25	6:50	3:15	5:10	3:55	6:10
9	3:30	3:50	4:05	4:40	3:35	4:10	4:00	4:30
10	4:25	5:20	6:00	7:10	4:30	5:30	5:25	6:30
11	3:25	5:20	4:25	7:10	3:25	5:30	4:05	6:40
12	3:25	5:00	4:10	6:50	3:25	5:40	3:55	6:50
13	3:35	5:00	4:25	6:50	3:45	5:40	4:20	6:50
14	3:55	5:20	5:05	7:10	3:55	5:30	4:45	6:40
15	2:45	4:10	3:05	5:00	2:45	4:20	3:00	4:50
16	3:05	3:40	3:20	4:10	2:50	3:30	3:05	3:40
17	3:05	3:40	3:15	4:10	2:55	3:40	3:10	3:50
18	2:55	3:40	3:30	5:10	3:00	3:40	3:30	4:40
19	3:45	5:20	5:00	7:10	3:45	5:30	4:30	6:40
20	3:30	5:20	4:35	7:10	3:35	5:30	4:15	6:40
21	3:55	5:00	5:00	7:00	4:20	5:40	5:15	6:50
22	2:45	5:00	5:25	7:00	4:30	5:40	5:30	6:50
23	2:30	3:50	3:00	4:20	2:50	3:40	3:00	3:50
24	2:00	2:50	4:15	5:10	2:30	2:50	2:50	3:30
25	2:00	2:40	3:25	5:10	2:00	2:40	2:00	2:50
26	2:30	2:50	4:15	4:50	2:30	2:50	3:00	3:20
27	2:35	3:00	3:15	5:20	2:40	3:30	2:55	4:00
28	2:40	3:00	4:45	5:20	3:05	3:30	3:50	4:00
29	2:05	2:30	2:05	2:30	1:55	2:30	1:55	2:30
30	2:55	3:30	3:55	4:30	3:35	4:00	4:10	4:40
31	2:45	3:20	3:45	4:30	3:30	4:10	4:05	4:50
32	2:45	3:10	3:20	4:10	3:10	3:50	3:30	4:20
33	3:25	3:50	4:05	4:30	3:40	4:00	4:15	4:50
34	2:45	3:20	3:20	3:50	2:50	3:30	3:20	4:00
35	3:05	3:40	4:00	4:50	3:20	4:10	3:55	4:30
36	2:55	3:20	3:45	4:40	3:45	5:00	4:15	5:40
37	3:00	3:40	3:55	4:50	3:30	4:20	4:05	5:00
38	2:15	2:30	2:15	2:30	2:00	2:30	1:55	2:30
39	1:00	1:30	1:00	1:30	1:35	1:50	1:50	2:10
40	3:10	3:40	4:25	5:20	4:50	5:40	5:30	6:40
41	3:15	3:40	4:05	5:00	5:10	5:40	6:05	6:40
47	2:55	3:10	3:35	3:50	3:10	3:30	3:35	3:50
48	3:55	4:50	5:25	6:30	4:45	5:30	5:25	6:40
49	3:40	3:50	4:20	4:40	3:45	4:10	4:10	4:30
50	3:05	3:10	3:20	3:20	3:05	3:10	3:10	3:20
51	4:05	5:00	5:25	7:00	4:30	5:40	5:25	6:50
Full EP:	4:25	5:20	6:00	7:10	5:10	5:40	6:05	6:50

Table 3

Evacuation Time Summary by Evacuation Area

Winter Weekday - School in Session Early Dismissal

Evacuation Area				Evacuation Time (hours:minutes)			
Downwind				Fair Weather		Adverse Weather	
Downwind	Direction	Sectors	Ring	90%	100%	90%	100%
A			2 - Mile	3:00	4:10	3:35	5:40
B			ERPA 1,3,4	3:10	4:10	3:50	5:40
C	NNE	1,2,3	2-mile + 5-mile	3:40	5:10	5:00	6:50
D	NNE	1,2,3	5-mile + 10-mile	3:35	5:20	4:50	7:20
E	NE	2,3,4	2-mile + 5-mile	3:40	5:10	5:00	6:50
F	NE	2,3,4	5-mile + 10-mile	3:40	5:20	4:50	7:20
G	ENE	3,4,5	2-mile + 5-mile	3:30	5:10	4:35	6:50
H	ENE	3,4,5	5-mile + 10-mile	3:40	5:20	4:55	7:20
I	E	4,5,6	2-mile + 5-mile	4:05	5:10	5:35	6:50
J	E	4,5,6	5-mile + 10-mile	3:25	5:20	4:40	7:20
K	ESE	5,6,7	2-mile + 5-mile	3:55	5:00	5:20	7:10
L	ESE	5,6,7	5-mile + 10-mile	4:05	5:20	5:30	7:20
M	SE	6,7,8	2-mile + 5-mile	3:55	5:00	5:20	7:10
N	SE	6,7,8	5-mile + 10-mile	3:50	5:20	5:00	7:20
O	SSE	7,8,9	2-mile + 5-mile	3:00	5:00	3:45	7:10
P	SSE	7,8,9	5-mile + 10-mile	3:40	5:20	4:50	7:20
Q	S	8,9,10	2-mile + 5-mile	3:25	5:00	4:40	7:10
R	S	8,9,10	5-mile + 10-mile	3:40	5:20	4:50	7:20
S	SSW	9,10,11	2-mile + 5-mile	3:00	4:10	3:45	5:40
T	SSW	9,10,11	5-mile + 10-mile	3:30	5:10	4:35	7:10
U	SW	10,11,12	2-mile + 5-mile	3:00	4:10	3:55	5:40
V	SW	10,11,12	5-mile + 10-mile	3:25	5:10	4:30	7:10
W	WSW	11,12,13	2-mile + 5-mile	3:00	4:10	3:55	5:40
X	WSW	11,12,13	5-mile + 10-mile	3:30	5:10	4:40	5:40
Y	S	12,13,14	2-mile + 5-mile	3:05	4:10	3:55	5:40
Z	S	12,13,14	5-mile + 10-mile	3:40	5:10	4:45	7:10
AA	WNW	13,14,15	2-mile + 5-mile	3:00	4:10	3:40	5:40
BB	WNW	13,14,15	5-mile + 10-mile	3:40	5:10	4:45	7:10
CC	NW	14,15,16	2-mile + 5-mile	3:05	4:10	4:00	5:40
DD	NW	14,15,16	5-mile + 10-mile	3:40	5:10	4:45	7:10
EE	NNW	15,16,1	2-mile + 5-mile	3:15	5:10	4:35	6:50
FF	NNW	15,16,1	5-mile + 10-mile	3:35	5:10	4:40	7:10
GG	N	16,1,2	2-mile + 5-mile	3:15	5:10	4:20	6:50
HH	N	16,1,2	5-mile + 10-mile	3:40	5:20	4:55	7:20
II		Up River	2-mile + 10-mile	3:25	5:20	4:35	7:20
JJ		Down River	2-mile + 10-mile	3:40	5:20	4:50	7:20
KK			5 - Mile	3:35	5:10	4:45	7:10
LL			Full EPZ	4:05	5:20	5:35	7:20

Table 3 (cont.)

Evacuation Time Summary by Evacuation Area

Winter Weekday - School in Session - Direct Evacuation

Evacuation Area				Evacuation Time (hours:minutes)			
Downwind				Fair Weather		Adverse Weather	
Downwind	Direction	Sectors	Ring	90%	100%	90%	100%
A			2 - Mile	3:10	4:40	3:50	6:50
B			ERPA 1,3,4	3:15	4:30	3:15	6:00
C	NNE	1,2,3	2-mile + 5-mile	4:00	5:20	5:30	7:20
D	NNE	1,2,3	5-mile + 10-mile	3:45	5:30	5:05	7:40
E	NE	2,3,4	2-mile + 5-mile	4:00	5:20	5:25	7:20
F	NE	2,3,4	5-mile + 10-mile	3:45	5:30	5:05	7:40
G	ENE	3,4,5	2-mile + 5-mile	3:45	5:20	4:55	7:10
H	ENE	3,4,5	5-mile + 10-mile	3:50	5:30	5:10	7:40
I	E	4,5,6	2-mile + 5-mile	4:25	5:20	6:00	7:30
J	E	4,5,6	5-mile + 10-mile	3:40	5:30	5:00	7:40
K	ESE	5,6,7	2-mile + 5-mile	4:10	5:20	5:40	7:30
L	ESE	5,6,7	5-mile + 10-mile	4:10	5:30	5:40	7:40
M	SE	6,7,8	2-mile + 5-mile	4:10	5:20	5:40	7:30
N	SE	6,7,8	5-mile + 10-mile	3:55	5:30	5:15	7:40
O	SSE	7,8,9	2-mile + 5-mile	3:10	5:20	4:10	7:30
P	SSE	7,8,9	5-mile + 10-mile	3:50	5:30	5:00	7:40
Q	S	8,9,10	2-mile + 5-mile	3:40	5:20	5:00	7:30
R	S	8,9,10	5-mile + 10-mile	3:50	5:30	5:00	7:40
S	SSW	9,10,11	2-mile + 5-mile	3:10	4:40	4:10	6:20
T	SSW	9,10,11	5-mile + 10-mile	3:40	5:20	4:50	7:30
U	SW	10,11,12	2-mile + 5-mile	3:10	4:40	4:15	6:20
V	SW	10,11,12	5-mile + 10-mile	3:35	5:20	4:50	7:30
W	WSW	11,12,13	2-mile + 5-mile	3:10	4:40	4:15	6:20
X	WSW	11,12,13	5-mile + 10-mile	3:40	5:20	4:55	7:30
Y	S	12,13,14	2-mile + 5-mile	3:15	4:40	4:20	6:20
Z	S	12,13,14	5-mile + 10-mile	3:45	5:20	5:00	7:30
AA	WNW	13,14,15	2-mile + 5-mile	3:10	4:40	4:00	6:20
BB	WNW	13,14,15	5-mile + 10-mile	3:50	5:20	5:00	7:30
CC	NW	14,15,16	2-mile + 5-mile	3:10	4:40	4:25	6:20
DD	NW	14,15,16	5-mile + 10-mile	3:50	5:20	5:00	7:30
EE	NNW	15,16,1	2-mile + 5-mile	3:30	5:20	4:55	7:10
FF	NNW	15,16,1	5-mile + 10-mile	3:40	5:20	4:55	7:30
GG	N	16,1,2	2-mile + 5-mile	3:25	5:20	4:40	7:20
HH	N	16,1,2	5-mile + 10-mile	3:50	5:30	5:10	7:40
II		Up River	2-mile + 10-mile	3:40	5:30	4:50	7:40
JJ		Down River	2-mile + 10-mile	3:50	5:30	5:05	7:40
KK			5 - Mile	3:40	5:20	5:00	7:30
LL			Full EPZ	4:25	5:30	6:00	7:40

Table 4

Evacuation Time Summary by Evacuation Area

Winter Night

Evacuation Area				Evacuation Time (hours:minutes)			
Downwind				Fair Weather		Adverse Weather	
Downwind	Direction	Sectors	Ring	90%	100%	90%	100%
A			2 - Mile	3:00	3:30	3:20	4:30
B			ERPA 1,3,4	3:05	3:30	3:30	4:30
C	NNE	1,2,3	2-mile + 5-mile	3:20	3:50	4:15	6:50
D	NNE	1,2,3	5-mile + 10-mile	3:20	5:20	4:30	7:10
E	NE	2,3,4	2-mile + 5-mile	3:20	3:50	4:15	6:50
F	NE	2,3,4	5-mile + 10-mile	3:25	5:20	4:30	7:10
G	ENE	3,4,5	2-mile + 5-mile	3:20	5:10	4:05	6:50
H	ENE	3,4,5	5-mile + 10-mile	3:30	5:20	4:35	7:10
I	E	4,5,6	2-mile + 5-mile	3:40	5:10	5:00	6:30
J	E	4,5,6	5-mile + 10-mile	3:10	5:20	4:20	7:10
K	ESE	5,6,7	2-mile + 5-mile	3:40	4:50	4:45	6:40
L	ESE	5,6,7	5-mile + 10-mile	3:45	5:20	3:45	7:10
M	SE	6,7,8	2-mile + 5-mile	3:40	4:50	4:45	6:40
N	SE	6,7,8	5-mile + 10-mile	3:30	5:10	4:40	7:00
O	SSE	7,8,9	2-mile + 5-mile	2:50	4:50	3:30	6:40
P	SSE	7,8,9	5-mile + 10-mile	3:30	5:10	4:30	7:00
Q	S	8,9,10	2-mile + 5-mile	3:10	4:50	4:10	6:40
R	S	8,9,10	5-mile + 10-mile	3:30	5:10	4:30	7:00
S	SSW	9,10,11	2-mile + 5-mile	2:55	3:30	3:30	4:30
T	SSW	9,10,11	5-mile + 10-mile	3:20	5:10	4:20	6:50
U	SW	10,11,12	2-mile + 5-mile	2:55	3:40	3:40	5:20
V	SW	10,11,12	5-mile + 10-mile	3:15	5:10	4:15	6:50
W	WSW	11,12,13	2-mile + 5-mile	2:55	3:40	3:40	5:20
X	WSW	11,12,13	5-mile + 10-mile	3:20	5:10	4:20	6:50
Y	S	12,13,14	2-mile + 5-mile	3:00	3:40	3:40	5:20
Z	S	12,13,14	5-mile + 10-mile	3:20	5:10	4:25	6:50
AA	WNW	13,14,15	2-mile + 5-mile	3:00	3:40	3:30	5:20
BB	WNW	13,14,15	5-mile + 10-mile	3:20	5:10	4:20	6:50
CC	NW	14,15,16	2-mile + 5-mile	3:00	3:40	3:45	5:20
DD	NW	14,15,16	5-mile + 10-mile	3:20	5:10	4:20	6:50
EE	NNW	15,16,1	2-mile + 5-mile	3:05	5:10	4:10	5:20
FF	NNW	15,16,1	5-mile + 10-mile	3:20	5:10	4:20	6:50
GG	N	16,1,2	2-mile + 5-mile	3:05	5:10	4:00	6:50
HH	N	16,1,2	5-mile + 10-mile	3:25	5:20	4:30	7:10
II		Up River	2-mile + 10-mile	3:20	5:20	4:20	7:10
JJ		Down River	2-mile + 10-mile	3:30	5:00	4:30	7:00
KK			5 - Mile	3:20	5:10	4:25	6:50
LL			Full EPZ	3:45	5:20	5:00	7:10

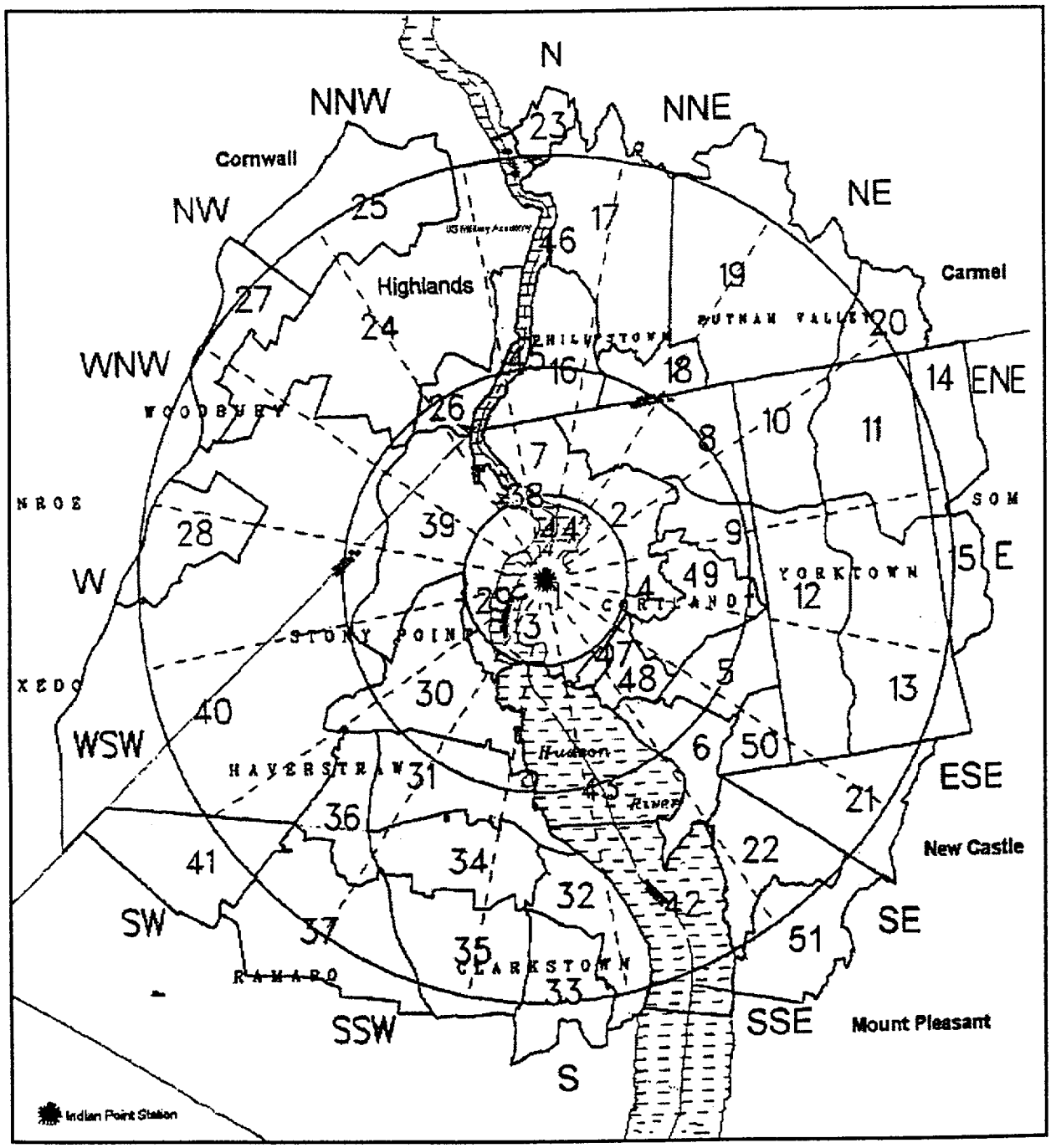
Table 5

Evacuation Time Summary by Evacuation Area

Summer Weekend - Holiday

Evacuation Area				Evacuation Time (hours:minutes)			
Downwind				Fair Weather		Adverse Weather	
Direction	Sectors	Ring	Downwind	90%	100%	90%	100%
A			2 - Mile	3:11	4:50	3:30	5:20
B			ERPA 1,3,4	3:25	4:50	3:25	5:20
C	NNE	1,2,3	2-mile + 5-mile	3:25	5:10	3:55	6:10
D	NNE	1,2,3	5-mile + 10-mile	4:10	5:40	4:50	6:40
E	NE	2,3,4	2-mile + 5-mile	3:20	5:10	3:55	6:10
F	NE	2,3,4	5-mile + 10-mile	4:05	5:40	4:50	6:50
G	ENE	3,4,5	2-mile + 5-mile	3:10	5:10	3:40	6:10
H	ENE	3,4,5	5-mile + 10-mile	4:10	5:40	4:55	6:50
I	E	4,5,6	2-mile + 5-mile	3:55	5:30	4:30	6:40
J	E	4,5,6	5-mile + 10-mile	4:20	5:40	5:00	6:50
K	ESE	5,6,7	2-mile + 5-mile	4:10	5:30	5:00	6:40
L	ESE	5,6,7	5-mile + 10-mile	4:15	5:40	5:00	6:50
M	SE	6,7,8	2-mile + 5-mile	5:00	5:30	5:00	6:40
N	SE	6,7,8	5-mile + 10-mile	4:10	5:40	4:50	6:50
O	SSE	7,8,9	2-mile + 5-mile	4:55	5:30	4:55	6:40
P	SSE	7,8,9	5-mile + 10-mile	4:00	5:40	4:40	6:50
Q	S	8,9,10	2-mile + 5-mile	3:50	5:30	4:30	6:40
R	S	8,9,10	5-mile + 10-mile	4:00	5:40	4:40	6:50
S	SSW	9,10,11	2-mile + 5-mile	3:20	4:50	3:50	5:20
T	SSW	9,10,11	5-mile + 10-mile	4:00	5:40	4:40	6:40
U	SW	10,11,12	2-mile + 5-mile	4:45	5:40	4:50	6:40
V	SW	10,11,12	5-mile + 10-mile	3:55	5:40	4:35	6:40
W	WSW	11,12,13	2-mile + 5-mile	4:45	5:40	4:50	6:40
X	WSW	11,12,13	5-mile + 10-mile	4:05	5:40	4:50	6:40
Y	S	12,13,14	2-mile + 5-mile	4:55	5:40	5:00	6:40
Z	S	12,13,14	5-mile + 10-mile	4:20	5:40	5:05	6:40
AA	WNW	13,14,15	2-mile + 5-mile	4:55	5:40	5:00	6:40
BB	WNW	13,14,15	5-mile + 10-mile	4:25	5:40	5:10	6:40
CC	NW	14,15,16	2-mile + 5-mile	4:05	5:40	4:40	6:40
DD	NW	14,15,16	5-mile + 10-mile	4:25	5:40	5:10	6:40
EE	NNW	15,16,1	2-mile + 5-mile	4:10	5:40	4:45	6:40
FF	NNW	15,16,1	5-mile + 10-mile	4:15	5:40	5:00	6:40
GG	N	16,1,2	2-mile + 5-mile	3:10	4:50	3:40	6:10
HH	N	16,1,2	5-mile + 10-mile	4:15	5:40	5:05	6:40
II		Up River	2-mile + 10-mile	3:25	5:30	4:00	6:40
JJ		Down River	2-mile + 10-mile	3:55	5:40	4:40	6:50
KK			5 - Mile	4:20	5:40	5:05	6:40
LL			Full EPZ	5:00	5:40	5:10	6:50

Figure 1
Emergency Response Planning Areas



Evacuation Travel Time Estimate Notes

1. The evacuation cases represent a range of conditions. In using the Evacuation Travel Time Tables, choose the case which most closely matches the actual condition.
2. Evacuation Travel Times are from the time of decision and include: notification time (15 minutes), preparation time (15 minutes) and a range of mobilization (0-120 minutes).
3. Evacuation Travel Times are for the first wave only. See multiple wave evacuation times by ERPA for only those special facilities and/or transit-dependent populations requiring multiple wave transportation resources. These are indicated by shading. If resources are available to include them in the first wave, use the first wave evacuation travel times.
4. Adverse weather reduces roadway capacity by 20% for the summer and by 30% in the winter. These times can also be used for a reduced state of preparedness.
5. For the development of evacuation times, traffic control was only assumed on Bleakley Avenue at New York and Albany Post Roads in Buchanan. In all other cases, normal traffic control devices and lane utilization is assumed.
6. Evacuation Travel Times represent the time required to evacuate the designated evacuation areas except of the individual ERPA times where it is the time to clear the individual ERPA including vehicles traveling through the ERPA.
7. The Winter Weekday-School in Session Early Dismissal case can be used for the previous case of School not in Session.
8. Since the evacuation times assume a simultaneous evacuation of the entire EP:, evacuation areas can be combined. Choose the evacuation areas which contain all of the ERPAs to be included in the evacuation and use the highest time of the different cases. This also can be applied between evacuation areas and individual ERPA times.
9. The Winter Weekday-School in Session Early Dismissal evacuation travel times assume that school children are at home prior to an evacuation (except for Peekskill City School District and colleges which do not follow the early dismissal plan).
10. West Point U.S. Military Academy football games/graduation increase the evacuation times by 1 hour and 25 minutes.