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DOC #	REV #	TITLE	INSTRUCTIONS

THE FOLLOWING PROCEDURE , DRAWING IS BEING REVISIED, PLEASE REMOVE YOUR CURRENT COPY AND REPLACE WITH UPDATED PROCEDURE:

IP-EP-120 ERV.13

IP-EP-210 REV.25

IP-EP AD13 REV. 20

IPEE EP-19-02 Rev.24

EFFECTIVE
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DATE

Procedure/Document Number:IP-EP-120	Revision:13
Equipment/Facility/Other: Indian Point Energy Center	
Title: Emergency Classification	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that have the potential to affect the emergency plan or have the potential to affect the implementation of the emergency plan):

See attached revision matrix.

Part II. Emergency Plan Sections Reviewed (List all emergency plan sections that were reviewed for this activity by number and title. IF THE ACTIVITY IN ITS ENTIRETY IS AN EMERGENCY PLAN CHANGE OR EAL OR EAL BASIS CHANGE, ENTER THE SCREENING PROCESS. NO 10 CFR 50.54(q)(2) DOCUMENTATION IS REQUIRED.

Section A – Assignments of Responsibility
Section B - Station Emergency Response
Section C - Emergency Response and Support
Section D - Emergency Classification System
Section E - Notification Methods
Section F - Emergency Communication
Section I - Accident Assessment
Appendix 1
Appendix 3

Part III. Ability to Maintain the Emergency Plan (Answer the following questions related to impact on the ability to maintain the emergency plan):

1. Do any elements of the activity change information contained in the emergency plan (procedure section 3.0[6])?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

2. Do any elements of the activity change an emergency classification Initiating Condition, Emergency Action Level (EAL), associated EAL note or associated EAL basis information or their underlying calculations or assumptions?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

3. Do any elements of the activity change the process or capability for alerting and notifying the public as described in the FEMA-approved Alert and Notification System design report?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

4. Do any elements of the activity change the Evacuation Time Estimate results or documentation?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

5. Do any elements of the activity change the Onshift Staffing Analysis results or documentation?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

Procedure/Document Number:IP-EP-120	Revision:13
Equipment/Facility/Other: Indian Point Energy Center	
Title: Emergency Classification	

Part IV. Maintaining the Emergency Plan Conclusion The questions in Part II do not represent the sum total of all conditions that may cause a change to or impact the ability to maintain the emergency plan. Originator and reviewer signatures in Part IV document that a review of all elements of the proposed change have been considered for their impact on the ability to maintain the emergency plan and their potential to change the emergency plan.

1. Provide a brief conclusion that describes how the conditions as described in the emergency plan are maintained with this activity.
2. Check the box below when the 10 CFR 50.54(q)(2) review completes all actions for all elements of the activity – no 10 CFR 50.54(q)(3) screening or evaluation is required for any element. Otherwise, leave the checkbox blank.

☒ I have completed a review of this activity in accordance with 10 CFR 50.54(q)(2) and determined that the effectiveness of the emergency plan is maintained. This activity does not make any changes to the emergency plan. No further actions are required to screen or evaluate this activity under 10 CFR 50.54(q)(3).

A review of this activity in accordance with 10 CFR 50.54(q)(2) has been completed and determined that the effectiveness of the emergency plan is maintained. This revision on the Emergency Classification procedure adds the definition of a release. This change does not impact any of the 16 Emergency Planning standards. The changes made to IP-EP-120 do not require a change to the Emergency Action Level scheme, On shift staffing study, or the IPEC Emergency Plan. No further actions are required to screen or evaluate this activity under 10 CFR 50.54(q)(3).

Part V. Signatures:

Preparer Name (Print) Craig Delamater	Preparer Signature	Date: 10/1/19
(Optional) Reviewer Name (Print)	Reviewer Signature	Date:
Reviewer Name (Print) Timothy F. Garvey Nuclear EP Project Manager	Reviewer Signature Tim Garvey	Date: 10/4/19
Reviewer Name (Print) Frank J. Mitchell Manager, Emergency Planning or designee	Reviewer Signature Rebecca R Martin for Frank Mitchell	Date: 10/4/19

per telecom

IP-EP-120, Emergency Classification
(Revision 13 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (12)	New Version (13)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
1.	Cover page	Revision 12	Revision 13	Yes	No- This is an editorial change to the Revision number and effective date. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
2.	Table of Contents	Sections 5 through 9 listed as pages 5 through 8	Sections 5 through 9 listed as pages 5 through 9	Yes	No- This is an editorial change on table of contents numbering. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-120, Emergency Classification
(Revision 13 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (12)	New Version (13)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
3.	Page 6 Section 5.1.2 C	There was no definition of a release captured.	A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "Release" is classified as one of the four (4) following descriptions: A.NO Release B.Release BELOW Federal Limits C.Release ABOVE Federal Limits D.Unmonitored Release Requiring Evaluation	No	No- The definition of a release being added to the procedure does not effect any of the planning standards. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

ATTACHMENT 10.2 **IPEC PROCEDURE REVIEW AND APPROVAL**

(Page 1 of 1)

Procedure Title: Emergency Classification

Procedure No. IP-EP-120 Existing Rev: 12 New Rev: 13 DRN/EC No: DRN-19-00969

Procedure Activity (MARK Applicable)	☐ Converted To IPEC, Replaces:	**Temporary Procedure Change (MARK Applicable)**
☐ NEW PROCEDURE ☐ GENERAL REVISION ☒ PARTIAL REVISION ☐ EDITORIAL REVISION ☐ VOID PROCEDURE ☐ SUPERSEDED	Unit 1 Procedure No. Unit 2 Procedure No: Unit 3 Procedure No:	☐ EDITORIAL Temporary Procedure Change ☐ ADVANCE Temporary Procedure Change ☐ CONDITIONAL Temporary Procedure Change Terminating Condition:
☐ RAPID REVISION	Document in Microsoft Word: ☐ Yes ☐ No	☐ VOID DRN/TPC No(s):

Revision Summary ☐ N/A – see Revision Summary Matrix. The only item added in this revision was the definition of a release

Implementation Requirements

Implementation Plan? ☐ Yes ☒ No Formal Training? ☐ Yes ☒No Special Handling? ☐ Yes ☒No

RPO Dept: Emergency Planning Writer: **(Print Name/Ext/Sign):** Craig Delamater/2619/ CD

Review and Approval (Per Attachment 10.1, IPEC Review And Approval Requirements)

1. ☒ Technical Reviewer: Michael York/ MY 10/2/19
   (Print Name/ Signature/ Date)
2. ☐ Cross-Disciplinary Reviewers:
   Dept: Reviewer:
   Print Name/ Signature/ Date)
   Dept: Reviewer:
   Print Name/ Signature/ Date)
3. ☒ RPO- Responsibilities/Checklist: Frank J Mitchell / F Mitchell 10-2-19
   (Print Name/ Signature/ Date)
   - ☐ PAD required and is complete (PAD Approver and Reviewer qualifications have been verified)
   - ☒ Previous exclusion from further LI-100 Review is still valid
   - ☐ PAD not required due to type of change as defined in 4.6
4. ☐ Non-Intent Determination Complete:
   (Print Name/ Signature/ Date)

   NO change of purpose or scope
   NO reduction in the level of nuclear safety
   NO voiding or canceling of a procedure, unless requirements are incorporated into another procedure or the need for the procedure was eliminated
   NO change to less restrictive acceptance criteria
   NO change to steps previously identified as commitment steps
   NO deviation from the Quality Assurance Program Manual
   NO change that may result in deviations from Technical Specifications, FSAR, plant design requirements,
5. ☐ On-Shift Shift Manager/CRS:
   (Print Name/ Signature/ Date)
6. ☐ User Validation: User:
7. ☐ Special Handling Requirements Understood:
   (Print Name/ Signature/ Date)

Attachment 9.1

Emergency Planning Document Change Checklist Form

(All sections must be completed, N/A or place a check on the line where applicable)

Section 1

Doc/Procedure Type:	Administrative☐ Implementing ☒ EPLAN ☐ N/A ☐
Doc/Procedure No:	IP-EP-120
Doc/Procedure Title:	Emergency Classification
New revision number:	13
Corrective Action:	Yes ☒ No ☐ N/A CR#IP2-2019-3544
Effective date:	10/8/19

Section 2

Change Description

1. Ensure the following are completed, or are not applicable and are so marked:
   - a. 50.54q ☒ N/A ☐
   - b. EN-FAP-OM-023 ☒ N/A ☐
   - c. IP-SMM- AD-102 ☒ N/A ☐
   - d. OSRC ☐ N/A ☒
   - e. NRC Transmittal (within 30 days) ☐ N/A ☒
2. List any other documents affected by this change: N/A
3. Transmittals are completed: ☐ N/A ☒ Date: 10/4/2019
4. Ensure the proper revision is active in eB Ref. Lib.: ☒ N/A ☐ 10/4/2019
5. Approved doc/procedure delivered to Doc. Control for distribution: ☐ N/A ☑ Date: 10/4/2019
6. Position Binders updated: ☐ N/A ☒ Date: 10/8/2019
7. Copy of EPDCC placed in EP file: ☐ N/A ☐ Date: ______
8. Supporting documentation is submitted as a general record in eB Ref. Lib.: ☐ N/A ☒ Date: 10/4/2019
9. Word files are moved from working drafts folder to current revision folder in the EP drive: ☐ N/A ☒ Date: 10/8/2019

CONTROLLED

Emergency Classification

Prepared by:	Craig Delamater	[signature]	10/2/19
	Print Name	Signature	Date
Approval:	Frank J. Mitchell	[signature]	10/2/19
	Print Name	Signature	Date

Effective Date: October 8, 2019

Table of Contents

Emergency Classification

1.0 PURPOSE

To describe the method for classification of emergencies at IPEC as a Notification of Unusual Event (NUE), Alert, Site Area Emergency (SAE) or General Emergency (GE). It also described actions to take regarding Out-of-Service instruments that are used to evaluate EAL's.

2.0 REFERENCES

2.1 Indian Point Energy Center Emergency Plan

2.2 NEI 99-01 Rev 5, Methodology for Development of Emergency Action Levels

2.3 IP-EP-AD13 IPEC Emergency Action Level Technical Bases

2.4 IP-EP-AD40 Equipment Important to Emergency Response

2.5 Hot Conditions EAL Chart

2.6 Cold Conditions EAL Chart

3.0 DEFINITIONS

Refer to Reference 2.3

4.0 RESPONSIBILITIES

4.1 The Shift Manager (Control Room Supervisor if the Shift Manager is unavailable or incapacitated) of the **affected unit** shall implement this procedure for the initial emergency classification. For classifiable events that potentially impact both units (security, natural or man-made events), the Shift Managers for each unit shall confer about the need to classify the event. If it is determined that emergency classification is warranted, the **Unit 2** Shift Manager shall declare the event in accordance with this procedure. Once an initial emergency classification has been made, the unit Shift Manager making the initial declaration shall be responsible for any subsequent emergency classifications, regardless of which unit is affected, until such time as relieved by the on-call Emergency Director.

4.2 The Shift Manager, upon initial emergency classification, shall assume the role of Emergency Director and shall act as the Emergency Director until relieved by the On-Call Emergency Director or other qualified Emergency Director (Plant Operations Manager).

4.3 The Emergency Director is responsible for overall command and control of the emergency response, including classifications; notifications, PARs and ensuring all resources are available to mitigate emergency conditions. The Emergency Director is the final authority for determining the emergency classification level (initial classification, upgrading, or terminating to recovery). This authority may not be delegated.

4.4 Initial and subsequent emergency classification shall be made within 15 minutes following the identification of a classifiable event to ensure that prompt notification, mobilization, protective and corrective actions are taken.

4.5 Upon becoming aware of any condition or event that they believe may warrant an upgrade in emergency classification, Emergency Response Organization members shall promptly inform the Emergency Director via their chain of command.

4.6 A broad spectrum of discretion in classifying events is provided under "Hazards" Sub-Category 6.0 "Judgement". In using the Sub-Category "Judgement" and in classifying emergencies under circumstances which are not a straight-forward use of the EALs, ERO members should be mindful than an approach is needed which is conservative with respect to public, plant, and personnel safety and with respect to ensuring the adequacy of personnel and technical support. Conservative decisions must be made if the Emergency Director has any doubt regarding the health and safety of the public.

5.0 DETAILS

5.1 Recognizing an Emergency

> **NOTE**
>
> All classifications are to be based upon VALID indications, reports or conditions. Indications, reports or conditions are considered VALID when they are verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

5.1.1 When indications of abnormal conditions or events are received, personnel will verify the symptoms/indications and then compare with the Emergency Action Levels (Attachment 9.1).

5.1.2 Identify the highest applicable emergency classification level (if multiple EALs are exceeded) for which an EAL has been met or exceeded considering the following:

(a) The plant condition existing at the time the abnormal condition exists:

- All Operating Modes 1, 2, 3, 4, 5,6, DEF
- Hot Condition Modes 1, 2, 3, 4
- Cold Condition Modes 5, 6, DEF

(b) **IF** conditions warrant the issuance of offsite Protective Action Recommendations (PARs), **THEN** the classification of General Emergency is required.

(c) **IF** plant conditions indicate a possible radiological release or a release is in progress or suspected, **THEN** evaluate the applicability of offsite dose-based EALs (IP-EP-310, Dose Assessment).

NOTE

The term 'Release' as it is used at IPEC for Emergency Planning is defined as "A release of radioactive materials due to the classified event" (per NYS Radiological Emergency Data Form, Part 1).

In accordance with the Part 1 form, "Release" is classified as one of the 4 following descriptions:

A. NO Release

B. Release BELOW Federal Limits

C. Release ABOVE Federal Limits

D. Unmonitored Release Requiring Evaluation

(d) **IF** a classification level was met or exceeded but the classifiable condition no longer exists (a lesser classification level may or may not still be appropriate), **THEN** refer to Section 5.4, Transitory Events, Spikes and Spurious Indications.

5.2 Initial Emergency Declaration from the Control Room

NOTE

IF the condition or event requiring initial classification potentially affects both units (security, natural or man-made events), **THEN** the Unit Shift Managers shall contact each other and confer on the need to declare. Upon concurrence, the **Unit 2** Shift Manager shall make the appropriate emergency classification and assume the role of Emergency Director.

5.2.1 The Shift Manager (Control Room Supervisor if the Shift Manager is unavailable or incapacitated) shall announce to the Control Room operating staff:

(a) That an emergency has been declared.

(b) The emergency classification level.

(c) That the (Unit 2 or Unit 3) Shift Manager (Control Room Supervisor if the Shift Manager is unavailable or incapacitated) has assumed the role of Emergency Director.

5.2.2 Implement procedure **IP-EP-210 "Central Control Room"**

5.3 While in a Classified Emergency

5.3.1 Emergency response personnel shall continuously review the Emergency Action Levels (Attachment 1).

5.3.2 If an Emergency Action Level threshold is exceeded for an emergency classification higher than currently declared, the Emergency Director shall re-classify the event to the appropriate level and initiate all required notifications.

5.4 Transitory Events, Spikes and Spurious Indications

5.4.1 Transitory events that result in exceeding the Emergency Action Level criteria for event declaration, but which are terminated before they are declared, should still be identified, documented and reported (10CFR50.72), but not declared to implement the Emergency Plan.

5.4.2 In the case of a "spike" in a plant indication or event which rapidly exceeds and then decreases below an Emergency Action Level threshold, entry into the Emergency Plan or escalation to a higher classification "in retrospect" is not appropriate unless the "spike" is indicative of continuing degrading conditions which will lead to an escalated emergency classification level. Examples include momentary steam generator level shrink following reactor trip or brief wind gusts in excess of classifiable levels.

5.4.3 Spurious alarms or parameters, which are known to be invalid indicators of actual plant conditions or of the emergency classification, should not be used to declare emergency classifications.

5.5 Compensatory Measures for Out-of-Service EAL Instruments.

5.5.1 IP-EP-AD40 provides guidance when planning to take an instrument OOS (Out of Service) that is used to determine an EAL condition or following an unplanned loss of the instrument.

6.0 INTERFACES

6.1 IP-EP-210, Central Control Room

6.2 EN-EP-610, Technical Support Center (TSC) Operations

6.3 IP-EP-310, Dose Assessment

6.4 IP-EP-410, Protective Action Recommendations

6.5 IP-EP-510, Meteorological, Radiological & Plant Data Acquisition System

6.6 IP-EP-340, Meteorological Information & Data Acquisition System (MIDAS)

6.7 IP-EP-AD40, Equipment Important to Emergency Response

7.0 RECORDS

Any logs or forms completed by members of the ERO during an actual declared emergency are permanent quality records.

8.0 REQUIREMENTS AND COMMITMENTS

NONE

9.0 ATTACHMENTS

9.1 Emergency Action Levels

9.1 - Emergency Action Levels

CATEGORY "A" Abnormal Rad Release / Rad Effluent

Sub-Category	General	Site Area	Alert	Unusual Event
1. Offsite Rad Conditions	**AG 1.1** 1 2 3 4 5 6 DEF Any valid radiation monitor reading > Table A-1 column "GE" for ≥ 15 min. (Note 1) **AG 1.2** 1 2 3 4 5 6 DEF Dose assessment using actual meteorology indicates doses > 1000 mRem TEDE or > 5000 mRem thyroid CDE at or beyond the site boundary. **AG 1.3** 1 2 3 4 5 6 DEF Field survey results indicate closed window dose rates > 1000 mRem/hr. expected to continue for ≥ 1 hr at or beyond the site boundary **OR** Anakyses of field survey samples indicate thyroid CDE of > 5000 mRem for 1 hr of inhalation at or beyond the site boundary	**AS 1.1** 1 2 3 4 5 6 DEF Any valid radiation monitor reading > Table A-1 column "SAE" for ≥ 15 min. (Note 1) **AS 1.2** 1 2 3 4 5 6 DEF Dose assessment using actual meteorology indicates doses > 100 mRem TEDE or > 500 mRem thyroid CDE at or beyond the site boundary **AS 1.3** 1 2 3 4 5 6 DEF Field survey indicates closed window dose rate > 100 mRem/hr. that is expected to continue for ≥ 1 hr at or beyond the site boundary **OR** Field survey sample analysis indicates thyroid CDE of > 500 mRem for 1 hr of inhalation at or beyond the site boundary	**AA 1.1** 1 2 3 4 5 6 DEF Any valid gaseous monitor reading > Table A-1 column "Alert" for ≥ 15 min. (Note 2) **AA 1.2** 1 2 3 4 5 6 DEF Any valid liquid monitor reading > Table A-1 column "Alert" for ≥ 15 min. (Note 2) **AA 1.3** 1 2 3 4 5 6 DEF Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x Technical Specification (ODCM) limits for ≥ 15 min. (NOTE 2)	**AU 1.1** 1 2 3 4 5 6 DEF Any valid gaseous monitor reading > Table A-1 column "UE" for ≥ 60 min. (Note 2) **AU 1.2** 1 2 3 4 5 6 DEF Any valid liquid monitor reading > Table A-1 column "UE" for ≥ 60 min. (Note2) **AU 1.3** 1 2 3 4 5 6 DEF Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x Technical Specifications (ODCM) limits for ≥ 60 min. (Note 2)

9.1 - Emergency Action Levels

CATEGORY "A" Abnormal Rad Release / Rad Effluent

Sub-Category	General	Site Area	Alert	Unusual Event
2. Onsite Rad Conditions & Irradiated Fuel Events			**AA 2.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Damage to irradiated fuel or loss of water level (uncovering irradiated fuel outside the Reactor Vessel) that causes a valid high alarm on **any** of the following radiation monitors: - R-2/R7 Vapor Containment Area Monitors - R-5 Fuel Storage Bldg. Area Monitors -R-42 [R-12] VC Gas Activity -R-25/R-26 Vapor Containment High Radiation Area Monitors **AA 2.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF A water level drop in the reactor cavity, SFP or fuel transfer canal that will result in irradiated fuel becoming uncovered	**AU 2.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Unplanned low water level or alarm indicating uncontrolled water level decrease in the refueling cavity, SFP or fuel transfer canal **AND** Valid area radiation monitor reading rise on **any** of the following: - R2/R7 Vapor Containment Area Monitors - R-5 Fuel Storage Bldg. Area Monitors - R25/R-26 Vapor Containment High Radiation Area Monitors **AU 2.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF Unplanned valid area radiation monitor reading or survey results increase by a factor of 1,000 over normal levels* * Normal levels can be considered as the highest reading in the past 24 hours excluding the current peak value

9.1 - Emergency Action Levels

CATEGORY "A" Abnormal Rad Release / Rad Effluent

Sub-Category	General	Site Area	Alert	Unusual Event
3 CR/CAS Radiation			**AA 3.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Dose rates > 15 mRem/hr in areas requiring continuous occupancy to maintain plant safety functions: Control Room [R-1] **OR** CAS	

9.1 - Emergency Action Levels

TABLE A-1 EFFLUENT MONITOR CLASSIFICATION THRESHOLDS

Monitor		General Emergency	Site Area Emergency	ALERT	Unusual Event
Gaseous	R-27	7.5 E+07 µCi/sec (2.3 E+00 µCi/cc)	7.5 E+06 µCi/sec (2.3 E-01 µCi/cc)	1.4 E+06 µCi/sec (4.2 E-02 µCi/cc)	2.6 E+05 µCi/sec (8.0 E-03 µCi/cc)
	R-44 [14]	N/A	N/A	4.2 E-02 µCi/cc	8.0 E-03 µCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 µCi/cc	2.5E-03 µCi/cc
	R-49 [19]	N/A	N/A	5.8E-02 µCi/cc	5.8E-04 µCi/cc

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
1 **Natural & Destructive Phenomena**			**HA 1.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Two or more annunciators are lit on the Peak Shock Annunciator panel, one of which is red **AND** Strong Motion Event Indicator is lit **AND** Earthquake confirmed by **any** of the following: - Earthquake felt in plant by a consensus of Control Room Operators - National Earthquake Information Center (Note 4) - Control Room indication of degraded performance of systems required for the safe shutdown of the plant **HA 1.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF Tornado striking or sustained high winds > 90 mph (40 m/sec) resulting in **EITHER:** Visible damage to **any** Table H-1 plant structures containing safety systems or components **OR**	**HU 1.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Seismic event indentified by **any two** of the following: - Earthquake felt in plant by consensus of Control Room Operators - Unit 3 "Seismic Event Occurred" alarm (Panel SDF) or **any** amber Peak Shock Annunciator light is lit - National Earthquake Information Center (Note 4) **HU 1.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF Tornado striking within Protected Area boundary **OR** Sustained high winds > 90 mph (40 m/sec)

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
1 **Natural & Destructive Phenomena (continued)**			**HA 1.2 (cont.)** Control Room indication of degraded performance of safety systems **HA 1.3** 1 | 2 | 3 | 4 | 5 | 6 | DEF Vehicle crash resulting in **Either:** Visible damage to **any** Table H-1 plant structures containing safety systems or components **OR** Control Room indication of degraded performance of safety systems **HA 1.4** 1 | 2 | 3 | 4 | 5 | 6 | DEF Turbine failure-generated projectiles resulting in **Either:** Visible damage to or penetration of **any** Table H-1 area containing safety systems or components **OR** Control Room indication of degraded performance of safety systems	**HU 1.3** 1 | 2 | 3 | 4 | 5 | 6 | DEF Turbine failure resulting in **EITHER:** Casing penetration **OR** Damage to turbine or generator seals **HU 1.4** 1 | 2 | 3 | 4 | 5 | 6 | DEF Flooding in any Table H-1 area that has the potential to affect safety-related equipment needed for the current operating mode

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
1 Natural & Destructive Phenomena			**HA 1.5** 1 | 2 | 3 | 4 | 5 | 6 | DEF Flooding in **any** Table H-1 area resulting in **Either:** An electrical shock hazard that precludes necessary access to operate or monitor safety equipment **OR** Control room indication of degraded performance of safety systems **HA 1.6** 1 | 2 | 3 | 4 | 5 | 6 | DEF River Water Level > 15 ft. (ØMSL) **OR** Low Service Water Bay (Intake Structure) level resulting in a loss of service water flow	**HU 1.5** 1 | 2 | 3 | 4 | 5 | 6 | DEF River Water Level > 14 ft. 6 in. (ØMSL) **OR** Service Water Bay (Intake Structure) water level < -4 ft. 5 in. (ØMSL)

9.1 - Emergency Action Levels

Table H-1 Safe Shutdown Areas

TABLE H-1 SAFE SHUTDOWN AREAS
- Control Building and associated Electrical Tunnels and Battery Rooms - Service Water Pump Structure and Valve Pits - Fuel Storage Building - Primary Auxiliary Building / Fan House - Vapor Containment Building - EDG Buildings - Auxiliary Feed Pump Building - Condensate Storage Tank - Refueling Water Storage Tank

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
2 Fire or Explosion			**HA 2.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Fire or explosion resulting in **EITHER:** Visible damage to any Table H-1 area containing safety systems or components **OR** Control Room Indication of degraded performance of safety systems	**HU 2.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Fire in **any** Table H-1 area not extinguished within 15 minutes (Note 3) of Control Room notification or verification of a control room fire alarm **HU 2.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF Explosion within Protected Area boundary
3 Hazardous Gas			**HA 3.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Access to **any** Table H-2 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safety shut down the reactor	**HU 3.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect normal plant operations **HU 3.2** 1 | 2 | 3 | 4 | 5 | 6 | DEF Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event

9.1 - Emergency Action Levels

Table H-2 Safe Shutdown Access Areas

TABLE H-2 SAFE SHUTDOWN ACCESS AREAS
- Control Building and associated Electrical Tunnels and Battery Rooms - Service Water Pump Structure and Valve Pits - Vapor Containment Building - Primary Auxiliary Building / Fan House - Auxiliary Feed Pump Building

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
4 Security	HG 4.1 1 | 2 | 3 | 4 | 5 | 6 | DEF A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions **OR** A hostile action has caused failure of Spent Fuel Cooling Systems and imminent damage is likely	HS 4.1 1 | 2 | 3 | 4 | 5 | 6 | DEF A hostile action is occurring or has occurred within the Protected Area as reported by the Security Shift Supervisor	HA 4.1 1 | 2 | 3 | 4 | 5 | 6 | DEF A hostile action is occurring or has occurred within the Owner Controlled Area as reported by the Security Shift Supervisor **OR** A validated notification from NRC of an airliner attach threat within 30 minutes of the site	HU 4.1 1 | 2 | 3 | 4 | 5 | 6 | DEF A security condition that does **not** involve a hostile action as reported by the Security Shift Supervisor **OR** A credible site-specific security threat notification **OR** A validated notification from NRC providing information of an aircraft threat
5 Control Room Evacuation		HS 5.1 1 | 2 | 3 | 4 | 5 | 6 | DEF Control Room evacuation has been initiated **AND** Control of the plant cannot be established within 15 minutes	HA 5.1 1 | 2 | 3 | 4 | 5 | 6 | DEF Control Room evacuation initiated	

9.1 - Emergency Action Levels

CATEGORY "H" HAZARDS

Sub-Category	General	Site Area	Alert	Unusual Event
6 **Judgment**	**HG 6.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER:** Actual or imminent substantial core degradation or melting with potential for loss of containment integrity **OR** Hostile action that results in an actual loss of physical control of the facility Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary	**HS 6.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER:** An actual or likely major failures of plant functions needed for protection of the public **OR** Hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public **ANY** releases are not expected to result in exposure levels which exceed EPA Protective Action Guidelines exposure levels (1Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary	**HA 6.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER:** An actual or potential substantial degradation of the level of safety of the plant **OR** A security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action **Any** releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels beyond the site boundary	**HU 6.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. **No** releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

9.1 Emergency Action Levels

CATEGORY "E" ISFSI

Sub-Category	General	Site Area	Alert	Unusual Event
1 ISFSI				**EU 1.1** 1 | 2 | 3 | 4 | 5 | 6 | DEF Damage to loaded cask confinement boundary

9.1 - Emergency Action Levels

CATEGORY "S" SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
1 **Loss of AC Power**	**SG 1.1** 1 2 3 4 Loss of **all** offsite and **all** onsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A,6A) **AND EITHER:** Restoration of at least one safeguards bus within 4 hours is **not** likely **OR** Actual or imminent conditions requiring entry into **ORANGE or RED** path on F-0.2, **"CORE COOLING"**	**SS 1.1** 1 2 3 4 Loss of **all** offsite and **all** onsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 minutes (Note 3)	**SA 1.1** 1 2 3 4 AC power capability to 480 V safeguards buses (5A, 2A/3A, 6A) reduced to a single power source (Table S-1) for ≥ 15 minutes (Note 3) such that **any** additional single failure would result in loss of **all** AC power to safeguard buses	**SU 1.1** 1 2 3 4 Loss of **all** offsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 minutes (Note 3)

9.1 - Emergency Action Levels

CATEGORY "S" SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
2 **ATWS Criticality**	**SG 2.1** 1 2 Failure of automatic and **all** manual trip signals to reduce power range < 5% **AND** Actual or imminent conditions requiring entry into **EITHER:** RED path in F-0.2, CORE COOLING **OR** RED path in F-0.3, HEAT SINK	**SS 2.1** 1 2 Failure of an automatic trip signal to reduce power range < 5% **AND** Manual trip actions taken at the reactor control console are not successful	**SA 2.1** 1 2 Failure of an automatic trip signal to reduce power range < 5% **AND** Manual trip actions taken at the reactor control console are successful	**SU 2.1** 3 4 Unplanned sustained positive startup rate observed on nuclear instrumentation
3 **Inability to Reach Shutdown Conditions**				**SU 3.1** 1 2 3 4 Plant is **not** brought to required operating mode within Technical Specifications LCO action statement time

9.1 - Emergency Action Levels

CATEGORY "S" SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
4 Inst. / Comm.		**SS 4.1** 1 2 3 4 Loss of > approximately 75% of Control Room Overhead annunciators or Control Room indicators Table S-3 associated with safety systems **AND** **Any** significant transient is in progress, (Table S-2) **AND** Compensatory indications are unavailable	**SA 4.1** 1 2 3 4 Unplanned loss of > approximately 75% of Control Room Overhead annunciators or Control Room indicators Table S-3 associated with safety systems for ≥ 15 minutes (Note 3) **AND EITHER** **Any** significant transient is in progress, (Table S-2) **OR** Compensatory indications are unavailable	**SU 4.1** 1 2 3 4 Unplanned loss of > approximately 75% of Control Room annunciators or Control Room indicators Table S-3 associated with safety systems for ≥ 15 minutes (Note 3) **SU 4.2** 1 2 3 4 Loss of **all** Table S-4 onsite (internal) communications capability affecting the ability to perform routine operations **OR** Loss of Table S-4 offsite (external) communications capability affecting the ability to perform offsite communications

9.1 - Emergency Action Levels

CATEGORY "S" SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
5 **Fuel Clad Degradation**				**SU 5.1** 1 | 2 | 3 | 4 [Unit 3]: 1(2) RM063A/B Gross Failed Fuel Detector High alarm (>50 μCi/ml) **SU 5.2** 1 | 2 | 3 | 4 **Coolant Sample Activity:** > 60 μCi/gm I-131 dose equivalent
6 **RCS Leakage**				**SU 6.1** Unidentified or pressure boundary leakage > 10 gpm **OR** Identified leakage > 25 gpm

9.1 - Emergency Action Levels

CATEGORY "S" SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
7 Loss of DC Power		**SS 7.1** 1 2 3 4 < 105 VDC bus voltage indications on **all** safety-related DC buses for ≥ 15 minutes (Note 3)		

9.1 - Emergency Action Levels
HOT CONDITIONS

Table S – 1 Safeguards Bus AC Power Sources

UNIT	ONSITE	OFFSITE
2	- 480 V EDG 21 - 480 V EDG 22 - 480 V EDG 23 - Appendix "R" Diesel	- Unit Auxiliary transformer* - Station Auxiliary transformer* - 13.8 KV gas turbine auto transformer*
3	- 480 V EDG 31 - 480 V EDG 32 - 480 V EDG 33 - Appendix "R" Diesel	- Unit Auxiliary transformer - Station Auxiliary transformer - 13W92 feeder - 13W93 feeder

* With86P or 86BU tripped all offsite power supplies must be considered as one power supply.

9.1 - Emergency Action Levels
HOT CONDITIONS

Table S – 2 Significant Transients

- Automatic turbine runback > 25% thermal reactor power
- Electrical load rejection > 25% full electrical load
- Reactor Trip
- Safety injection activation
- Thermal power oscillations of > 10%

9.1 - Emergency Action Levels
HOT CONDITIONS

Table S – 3 Safety System Indicators

- Reactivity Control
- RCS Inventory
- Reactor Trip
- Decay Heat Removal
- Fission Product Barriers

9.1 - Emergency Action Levels
HOT CONDITIONS

Table S – 4 Communications Systems

System	Onsite (internal)	Offsite (external)
Plant Telephone System	X	X
Plant Radio System	X	
Page / Party System	X	
Emergency Notification System		X

9.1 - Emergency Action Levels
HOT CONDITIONS

CATEGORY "F" FISSION PRODUCT BARRIERS

	General	Site Area	Alert	Unusual Event
1 **Fission Product Barrier**	**FG 1.1** 1 2 3 4 Loss of **any** two barriers **AND** Loss or potential loss of third barrier (Table F-1)	**FS 1.1** 1 2 3 4 Loss or potential loss of **any** two barriers (Table F-1)	**FA 1.1** 1 2 3 4 **Any** loss or **any** potential loss of either **Fuel Clad** or **RCS** (Table F-1)	**FU 1.1** 1 2 3 4 **Any** loss or **any** potential loss of **Containment** (Table F-1)

9.1 Emergency Action Levels

HOT CONDITIONS

TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	FUEL CLADDING BARRIER (FC)		REACTOR COLLANT SYSTEM BARRIER (RCS)		CONTAINMENT BARRIER (CNMT)	
	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS
A. CSFST	☐ 1. Core –Cooling **RED** entry conditions met	☐ 1. Core Cooling ORANGE entry conditions met **OR** Heat Sink – **RED** entry conditions met and heat sink is required	☐	☐ 1. Integrity – **RED** entry conditions met **OR** Heat Sink – **RED** entry conditions met and heat sink is required	☐	☐ 1. Containment – **RED** entry conditions met

9.1 Emergency Action Levels

HOT CONDITIONS

TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	Fuel Cladding Barrier (FC)		Reactor Coolant System (RCS)		Containment Barrier (CNMT)	
	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS
B. Core Exit TCs	☐ 2. Core exit TCs > 1,200° F	☐ 2. Core exit TCs **[Unit 2]** > 700° F **[Unit 3]** > 715° F	☐	☐	☐	☐2. Core exit TCs >1,200°F **AND** **Core exit TCs not lowering within 15** minutes after restoration procedure entry ☐3. Core exit TCs **[Unit 2]** > 700° F **[Unit 3]** > 715° F **AND** RVLIS **[Unit 2]** < 41% **[Unit 3]** < 33% w/no RCPs **AND** Core exit TCs **not** lowering or RVLIS **not** rising within 15 min. after restoration procedure entry.

9.1 Emergency Action Levels

HOT CONDITIONS

TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	Fuel Cladding Barrier (FC)		Reactor Coolant System (RCS)		Containment Barrier (CNMT)	
	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS
C. Radiation	☐ 3. Containment radiation monitor R-25 or R-26 > 17 R/hr		☐ 1. [Unit 2] R-41 > 1.2E-5 µCi/cc **or** R-42 > 1.02 E-2 µCi/cc [Unit 3] R-11 > 1.2E-5 µCi/cc **or** R-12 > 5.0E-2 µCi/cc			☐ 4. Containment radiation monitor R-25 or R-26 >68 Rhr

9.1 - Emergency Action Levels
HOT CONDITIONS
TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	Fuel Cladding Barrier (FC)		Reactor Coolant System (RCS)		Containment Barrier (CNMT)	
	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS
D. Inventory	☐	☐ 3. RVLIS [Unit 2] < 41% [Unit 3] < 33% With no RCPs running	☐ 2. RCS leak rate resulting in a loss of RCS sub-cooling (<Table F-2) ☐ 3. Ruptured SG results in an ECCS (SI) actuation	☐ 2. RCS leak rate indicated greater than 87 gpm	☐ 1. A Containment pressure rise followed by a rapid unexplained drop in Containment pressure ☐ 2. Containment pressure or sump level response not consistent with LOCA conditions ☐ 3. Ruptured SG faulted outside of Containment	☐5. Containment pressure > 47 psig and rising ☐ 6. Containment hydrogen concentration ≥ 4%

9.1 - Emergency Action Levels

HOT CONDITIONS

TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	Fuel Cladding Barrier (FC)		Reactor Coolant System (RCS)		Containment Barrier (CNMT)	
	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS	☐LOSS	☐POTENTIAL LOSS
D. Inventory (continued)					☐ 4. Primary-to-secondary leak rate > 10 gpm **AND** Un-isolable steam release from affected SG to the environment	☐ 7. Containment pressure > Phase B isolation signal set-point following LOCA **AND** Less than Table F-3 depressurization equipment operating as designed

9.1 - Emergency Action Levels

HOT CONDITIONS

TABLE "F-1" FISSION PRODUCT BARRIER MATRIX

	Fuel Cladding Barrier (FC)		**Reactor Coolant System (RCS)**		**Containment Barrier (CNMT)**	
	☐**LOSS**	☐**POTENTIAL LOSS**	☐**LOSS**	☐**POTENTIAL LOSS**	☐**LOSS**	☐**POTENTIAL LOSS**
E. Other	☐ 4. Primary coolant activity > 300 µCi/gm I-131 dose equivalent				☐ 5. Inability to isolate all valves in any one line **AND** Direct downstream pathway to the environment exists after Containment isolation signal	
F. Judgment	☐ 5. **ANY** condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	☐ 4. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	☐ 4. **ANY** condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	☐ 3. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	☐ 6. **ANY** condition in the opinion of the Emergency Director that indicates loss of the Containment barrier	☐ 8. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the Containment barrier

9.1 – Emergency Action Levels
HOT CONDITIONS
Table "F-2" RCS Sub-cooling

UNIT	RCS Pressure (PSIG)	Sub-cooling (°F)	
		Non-Adverse Containment	Adverse Containment
2	0 – 400	52	83
	401 – 800	36	49
	801 – 1200	23	30
	1201 - 2500	19	26
3	< 1000	40	112
	1000 – 1900	40	78
	> 1900	40	63

9.1 - Emergency Action Levels
HOT CONDITIONS

Table "F-3" Minimum Containment Cooling Systems

FCUs	Spray Pumps
< 3	2
3	1
5	0

9.1 - Emergency Action Levels

NOTES HOT CONDITIONS:

NOTE 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EAL AS1.2/AG1.2) Do not delay declaration awaiting dose assessment results.

NOTE 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

NOTE 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

NOTE 4: The National Earthquake Information Center (NEIC) can be contacted by calling (303) 273- 8500 to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: **41° 15' 55" north latitude, 73° 57' 08" west longitude.**
Alternatively go to the USGS NEIC website: http://earthquake.usgs.gov

NOTE 5: Not applicable to this chart.

9.1 - Emergency Action Levels

CATEGORY "C" COLD SHUT DOWN/REFUEL SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
1 Loss of AC Power			**CA 1.1** 5 | 6 | DEF Loss of **all** offsite and **all** onsite AC power (Table C-4) to 480V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 minutes. (Note 3)	**CU 1.1** 5 | 6 AC power capability to 480V safeguards buses (5A, 2A/3A, 6A) reduced to a single power source (Table C-4) for ≥ 15 minutes such that any additional single failure would result in loss of **all** AC power to safeguard buses (Note 3)

9.1 - Emergency Action Levels

CATEGORY "C" COLD SHUT DOWN/REFUEL SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
2 **RPV Level**	**CG 2.1** 5 6 Reactor vessel level < top of active fuel (57' 9.6" elev.- 56% on RVLIS) for ≥ 30 minutes (Note 3) **AND** **Any** Containment Challenge indication, (Table C-5) **CG 2.2** 5 6 Reactor vessel level cannot be monitored for ≥ 30 minutes with core uncovery indicated by **ANY** of the following (Note 3) - Containment High Range Radiation Monitor reading upscale - Unexplained rise in **any** Table C-1 sump/tank level - Erratic Source Range Monitor indication **AND** Any Containment Challenge indication, Table C-5	**CS 2.1** 5 6 With Containment Closure (Note 5) **not** established, reactor vessel level < 6" below the bottom of the RCS hot leg (59' 10.8" elev. - RVLIS 60.8%) **CS 2.2** 5 6 With Containment Closure (Note 5) established, reactor vessel level < top of active fuel (57' 9.6" elev. 56 % on RVLIS) **CS 2.3** 5 6 Reactor vessel level **cannot** be monitored for ≥ 30 minutes (Note 3) with a loss of inventory as indicated by **any** of the following: - Containment High Range Radiation Monitor reading upscale - Unexplained rise in **any** Table C1 sump/tank level - Erratic Source Range Monitor indication	**CA 2.1** 5 6 Reactor vessel level < bottom of the RCS hot leg (60' 4.8" elev. - RVLIS 62%) **OR** Reactor vessel level **cannot** be monitored for ≥ 15 minutes (Note 3) with unexplained rise in **any** Table C-1 sump/tank level	**CU 2.1** 5 Inability to restore or maintain pressurizer level > 18% or RCS target level band due to RCS leakage for ≥ 15 minutes (Note 3) **CU 2.2** 6 Unplanned reactor vessel level drop below vessel flange (69' elev.- RVLIS 83%) (or RCS target level band if the RCS level was procedurally being controlled below the vessel flange) for ≥ 15 minutes (Note 3) **CU 2.3** 6 Reactor vessel level cannot be monitored with unexplained rise in **any** Table C-1 sump/tank level

9.1 - Emergency Action Levels

CATEGORY "C" COLD SHUT DOWN/ REFUEL SYSEMT MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
3 **RCS Temperature**			**CA 3.1** 5 6 **ANY** unplanned event resulting in RCS temperature > 200° F for > Table C-3 duration **OR** RCS pressure increase > 10 psig due to a loss of RCS cooling (not applicable to solid plant operations)	**CU 3.1** 5 6 **Any** unplanned event resulting in RCS temperature > 200° F due to loss of decay heat removal capability **CU 3.2** 5 6 Loss of **all** RCS temperature and reactor vessel level indication for ≥ 15 minutes (Note 3)
4 **Communications**				**CU 4.1** 5 6 DEF Loss of **all** Table C-2 onsite (internal) communications capability affecting the ability to perform routine operations **OR** Loss of **all** Table C-2 offsite (external) communications capability affecting the ability to perform offsite notifications

9.1 - Emergency Action Levels

CATEGORY "C" COLD SHUT DOWN/REFUEL SYSTEM MALFUNCTION

Sub-Category	General	Site Area	Alert	Unusual Event
5 **Inadvertent Criticality**				**CU 5.1** 5 6 Unplanned sustained positive startup rate observed on nuclear instrumentation
6 **Loss of DC Power**				**CU 6.1** 5 6 < 105 VDC bus voltage indications on **all** Technical Specification required 125 VDC buses for ≥ 15 minutes (Note 3)

9.1 - Emergency Action Levels
COLD CONDITIONS

Table C-1 Sumps/Tanks
• Containment sumps • CCW surge tank • PRT • RCDT

9.1 - Emergency Action Levels
COLD CONDITIONS

Table C-2 Communications Systems

System	Onsite (Internal)	Offsite (External)
Plant Telephone System	X	
Plant Radio System	X	
Page/Party System	X	
Emergency Notification System		X

9.1 - Emergency Action Levels
COLD CONDITIONS

Table C-3 RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact and not Reduced Inventory	N/A	60 Minutes*
Not intact **OR** Reduced Inventory	Established	20 Minutes*
	Not Established	0 Minutes

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is **not** applicable

9.1 - Emergency Action Levels
COLD CONDITIONS

Table C-4 Safeguards Bus AC Power Sources

UNIT	Onsite	Offsite
2	• 480 V EDG 21 • 480 V EDG 22 • 480 V EDG 23 • Appendix "R" Diesel	• Unit Auxiliary Transformer* • Station Auxiliary Transformer* • 13.8 KV Gas Turbine Auto Transformer*
3	• 480 V EDG 31 • 480 V EDG 32 • 480 V EDG 33 • Appendix "R" Diesel	• Unit Auxiliary Transformer • Station Auxiliary Transformer • 13W92 Feeder • 13W93 Feeder

* With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.

9.1 - Emergency Action Levels
COLD CONDITIONS

Table C-5 Containment Challenge Indications
• Containment Closure (Note 4) not established • Containment hydrogen concentration ≥ 4% • Unplanned rise in containment pressure

9.1 - Emergency Action Levels

NOTES COLD CONDITIONS:

Note 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EAL AS1.2/AG1.2) Do not delay declaration awaiting dose assessment results.

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time, in the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Note 4: The National Earthquake Information Center (NEIC) can be contacted by calling (303) 273-8500 to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: 41° 15' 55" north latitude, 73° 57' 08" west longitude. Alternatively go to the USGS NEIC website: http://earthquake.usgs.gov

Note 5: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met (all un-isolated flow paths are promptly closes and at least one door in each air lock is closed following an evacuation of containment).

Procedure/Document Number:IP-EP-210	Revision:25
Equipment/Facility/Other: Indian Point Energy Center	
Title: Central Control Room	

Part I. Description of Activity Being Reviewed (event or action, or series of actions that have the potential to affect the emergency plan or have the potential to affect the implementation of the emergency plan):

See attached revision matrix.

Part II. Emergency Plan Sections Reviewed (List all emergency plan sections that were reviewed for this activity by number and title. IF THE ACTIVITY IN ITS ENTIRETY IS AN EMERGENCY PLAN CHANGE OR EAL OR EAL BASIS CHANGE, ENTER THE SCREENING PROCESS. NO 10 CFR 50.54(q)(2) DOCUMENTATION IS REQUIRED.

Section A – Assignments of Responsibility
Section B - Station Emergency Response
Section C - Emergency Response and Support
Section E - Notification Methods
Section F - Emergency Communication
Section I - Accident Assessment
Appendix 1
Appendix 3

Part III. Ability to Maintain the Emergency Plan (Answer the following questions related to impact on the ability to maintain the emergency plan):

1. Do any elements of the activity change information contained in the emergency plan (procedure section 3.0[6])?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**
2. Do any elements of the activity change an emergency classification Initiating Condition, Emergency Action Level (EAL), associated EAL note or associated EAL basis information or their underlying calculations or assumptions?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**
3. Do any elements of the activity change the process or capability for alerting and notifying the public as described in the FEMA-approved Alert and Notification System design report?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**
4. Do any elements of the activity change the Evacuation Time Estimate results or documentation?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**
5. Do any elements of the activity change the Onshift Staffing Analysis results or documentation?
   YES ☐ NO ☒ **IF YES, enter screening process for that element**

Procedure/Document Number:IP-EP-210	Revision:25
Equipment/Facility/Other: Indian Point Energy Center	
Title: Central Control Room	

Part IV. Maintaining the Emergency Plan Conclusion The questions in Part II do not represent the sum total of all conditions that may cause a change to or impact the ability to maintain the emergency plan. Originator and reviewer signatures in Part IV document that a review of all elements of the proposed change have been considered for their impact on the ability to maintain the emergency plan and their potential to change the emergency plan.

1. Provide a brief conclusion that describes how the conditions as described in the emergency plan are maintained with this activity.
2. Check the box below when the 10 CFR 50.54(q)(2) review completes all actions for all elements of the activity – no 10 CFR 50.54(q)(3) screening or evaluation is required for any element. Otherwise, leave the checkbox blank.

☒ I have completed a review of this activity in accordance with 10 CFR 50.54(q)(2) and determined that the effectiveness of the emergency plan is maintained. This activity does not make any changes to the emergency plan. No further actions are required to screen or evaluate this activity under 10 CFR 50.54(q)(3).

A review of this activity in accordance with 10 CFR 50.54(q)(2) has been completed and determined that the effectiveness of the emergency plan is maintained. This revision on the Central Control Room procedure updates the format, clarifies information, and adds clarification for the operation in the Control Room. Specifically, the timing associated with completion of notifications is clarified. And a definition of "release" has been added, which is the same definition as on the Part 1 notification form. None of the changes affect the activation and operation of the Central Control Room or the responsibility or requirements associated with classification, notification, dose assessment and protective action recommendations. The changes made to IP-EP-210 do not require a change to the Emergency Action Level scheme, On shift staffing study, or the IPEC Emergency Plan. No further actions are required to screen or evaluate this activity under 10 CFR 50.54(q)(3).

Part V. Signatures:

Preparer Name (Print) Craig Delamater	Preparer Signature [signature]	Date: 9/26/19
(Optional) Reviewer Name (Print)	Reviewer Signature	Date:
Reviewer Name (Print) Timothy F. Garvey Nuclear EP Project Manager	Reviewer Signature Tim Garvey	Date: 10/4/19
Reviewer Name (Print) Frank J. Mitchell Manager, Emergency Planning or designee	Reviewer Signature Rebecca A Martin for Frank Mitchell per telecon	Date: 10/4/19

IP-EP-210, Central Control Room
(Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
1.	Cover Page	Rev 24	Rev 25	Yes	No- This is an editorial change to the Revision number and effective date. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
2.	Page 3 Section 2.3	IN-EP-610, Recovery from a Declared Emergency	EN-EP-610, Recovery from a Declared Emergency	Yes	No- Changed the letters from IN to EN. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room
(Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
3.	Page 9 Section 1.0 Note	THE 15 - MINUTE CLOCK FOR INITIATION OF NOTIFICATION TO STATE AND LOCAL AUTHORITIES STARTS AT THIS POINT. The 15 – minute notification is met upon first ROLL CALL RESPONSE on RECS call	THE 15 - MINUTE CLOCK FOR COMPLETION OF NOTIFICATION TO STATE AND LOCAL AUTHORITIES STARTS AT THIS POINT.	No	Changed the word "initiation" to "completion" and removed the last statement in the note. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
4.	Page 10 Section 1.0 Note	•Notification of State and local authorities SHALL be initiated within 15 minutes of emergency declaration. The 15 - minute notification is met upon FIRST ROLL CALL RESPONSE on RECS call. •Notification of initial and upgrade SHALL be made to the NRC within 1 hour of the emergency declaration.	•Notification of State and local authorities SHALL be completed within 15 minutes of emergency declaration.	No	Removed the second bullet and changed the last bullet to state "Notification of State and local authorities **SHALL** be completed within 15 minutes of emergency declaration." The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room
(Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
5.	Page 10 Section 1.1	There was no definition of a release	A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "Release" is classified as one of the four (4) following descriptions: A.NO Release B.Release BELOW Federal Limits C.Release ABOVE Federal Limits D.Unmonitored Release Requiring Evaluation	No	Added a note with the definition of a release. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
6.	Page 14 Section 2.3 Note	There was no definition of a release	A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "Release" is classified as one of the four (4) following descriptions: A.NO Release B.Release BELOW Federal Limits C.Release ABOVE Federal Limits D.Unmonitored Release Requiring Evaluation	No	Added a note with the definition of a release. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room
(Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
7.	Page 22 Section 1.1.B.2	Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with affected Unit CCR) and make the following announcement, (3) times, over the public address system.	Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with affected Unit CCR) and make the following announcement, (2) times, over the public address system.	No	Changed the plant page from three times to two times. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
8.	Page 23 Section C.2	Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with other Unit CCR) and make the following announcement (3) times over the public address system:	Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with affected Unit CCR) and make the following announcement, (2) times, over the public address system:	No	Changed the plant page from three times to two times. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room
(Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
9.	Page 24 Section D	There was no definition of a release	A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "Release" is classified as one of the four (4) following descriptions: A.NO Release B.Release BELOW Federal Limits C.Release ABOVE Federal Limits D.Unmonitored Release Requiring Evaluation	No	Added a note with the definition of a release. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
10.	Page 26 Section 1.1 Note	Notification of State and local authorities SHALL be initiated within 15 minutes of emergency declaration. The 15 – minute notification is met upon the first ROLL CALL RESPONSE on RECS call. Notification to NRC SHALL be initiated within 1 hour of the emergency declaration.	Notification of State and local authorities SHALL be completed within 15 minutes of emergency declaration. Notification to NRC SHALL be initiated within 1 hour of the emergency declaration.	No	In bullet one, changed the word "initiated" to "completed" and removed the last statement. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room (Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
11.	Page 27 Section 1.2. A	Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is completed, including Shift Manager (Emergency Director) signature.	Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is complete and accurate, including Shift Manager (Emergency Director) signature.	No	Added the words complete and accurate. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
12.	Page 27 Section 1.2.C	Using, "Control Room NUE Notification Checklist" (Form EP-3N) start the initial roll call to State and counties within 15 minutes of the declaration of the Unusual Event. The 15 – minute notification is met upon the first ROLL CALL RESPONSE on RECS call. Confirm notification to each location.	Using, "Control Room NUE Notification Checklist" (Form EP-3N) complete the initial roll call to State and counties within 15 minutes of the declaration of the Unusual Event. Confirm notification to each location.	No	Changed the word from "start" to "complete" and removed the last sentence in the bullet. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room (Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
13.	Page 28 Section 1.4. A	Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is completed, including Shift Manager (Emergency Director) signature.	Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is complete and accurate, including Shift Manager (Emergency Director) signature.	No	Added the words complete and accurate. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
14.	Page 28 Section 1.4. D	Using "Control Room Notification Checklist Alert/SAE/GE (Form EP-3A, EP-3S or EP-3G as applicable), start the initial roll call to State and Counties within 15 minutes of the declaration of the Alert, SAE or GE. The 15 – minute notification is met upon the first ROLL CALL RESPONSE on RECS call. Confirm notification to each location.	Using "Control Room Notification Checklist Alert/SAE/GE (Form EP-3A, EP-3S or EP-3G as applicable), complete the initial roll call to State and Counties within 15 minutes of the declaration of the Alert, SAE or GE. Confirm notification to each location.	No	Changed the word from "start" to "complete" and removed the last sentence in the bullet. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

IP-EP-210, Central Control Room (Revision 25 in eB) Revision Matrix

Change No.	Page/Section	Previous Version (24)	New Version (25)	Editorial Change	Effect on 10 CFR 50.47(b) Planning Standards or NUREG-0654 program elements? Justify if NO.
15.	Page 29 Section 2.1. A	Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review the form to ensure all required information is completed, including Emergency Director's signature.	Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review the form to ensure all required information is complete and accurate, including Emergency Director's signature	No	Added the words complete and accurate. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.
16.	Page 30 Section 2.2 A	Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) (Part II if a radiological release has occurred or is in progress) from the Emergency Director. Review form to ensure all required information is completed, including Emergency Director's signature.	Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) (Part II if a radiological release has occurred or is in progress) from the Emergency Director. Review form to ensure all required information is complete and accurate, including Emergency Director's signature.	No	Added the words complete and accurate. The meaning or intent of description in the emergency plan, facilities or equipment described in the Emergency Plan or a process described in the Emergency Plan are not affected by this change. No further evaluation is required for this change.

ATTACHMENT 10.2 **IPEC PROCEDURE REVIEW AND APPROVAL**

(Page 1 of 1)

Procedure Title: Central Control Room

Procedure No. IP-EP-210 Existing Rev: 24 New Rev: 25 DRN/EC No: DRN-19-00970

Procedure Activity (MARK Applicable)	☐ Converted To IPEC, Replaces:	**Temporary Procedure Change (MARK Applicable)**
☐ NEW PROCEDURE ☐ GENERAL REVISION ☒ PARTIAL REVISION ☐ EDITORIAL REVISION ☐ VOID PROCEDURE ☐ SUPERSEDED	Unit 1 Procedure No. Unit 2 Procedure No: Unit 3 Procedure No:	☐ EDITORIAL Temporary Procedure Change ☐ ADVANCE Temporary Procedure Change ☐ CONDITIONAL Temporary Procedure Change Terminating Condition:
☐ RAPID REVISION	Document in Microsoft Word: ☐ Yes ☐ No	☐ VOID DRN/TPC No(s):

Revision Summary × N/A – see Revision Summary Matrix.

Implementation Requirements

Implementation Plan? ☐ Yes ☒ No Formal Training? ☐ Yes ☒No Special Handling? ☐ Yes ☒No

RPO Dept: Emergency Planning Writer: **(Print Name/Ext/Sign):** Craig Delamater/2619/ [signature]

Review and Approval (Per Attachment 10.1, IPEC Review And Approval Requirements)

1. ☒ Technical Reviewer: Michael York/ [signature] 10/2/19
(Print Name/ Signature/ Date)

2. ☐ Cross-Disciplinary Reviewers:
Dept: ______ Reviewer: ______
Print Name/ Signature/ Date)
Dept: ______ Reviewer: ______
Print Name/ Signature/ Date)

3. ☒ RPO- Responsibilities/Checklist: Frank J Mitchell / [signature] 10-2-19
(Print Name/ Signature/ Date)
☐ PAD required and is complete (PAD Approver and Reviewer qualifications have been verified)
☒ Previous exclusion from further LI-100 Review is still valid
☐ PAD not required due to type of change as defined in 4.6

4. ☐ Non-Intent Determination Complete: ______
(Print Name/ Signature/ Date)

NO change of purpose or scope
NO reduction in the level of nuclear safety
NO voiding or canceling of a procedure, unless requirements are incorporated into another procedure or the need for the procedure was eliminated
NO change to less restrictive acceptance criteria
NO change to steps previously identified as commitment steps
NO deviation from the Quality Assurance Program Manual
NO change that may result in deviations from Technical Specifications, FSAR, plant design requirements,

5. ☐ On-Shift Shift Manager/CRS: ______
(Print Name/ Signature/ Date)

6. ☐ User Validation: User: ______ ______

7. ☐ Special Handling Requirements Understood: ______
(Print Name/ Signature/ Date)

Attachment 9.1

Emergency Planning Document Change Checklist Form

(All sections must be completed, N/A or place a check on the line where applicable)

Section 1

Doc/Procedure Type:	Administrative ☐ Implementing ☒ EPLAN ☐ N/A ☐
Doc/Procedure No:	IP-EP-210
Doc/Procedure Title:	Central Control Room
New revision number:	25
Corrective Action:	Yes ☒ No ☐ N/A CR#IP2-2019-3544
Effective date:	10/8/19

Section 2

Change Description

1. Ensure the following are completed, or are not applicable and are so marked:
   a. 50.54q ☒ N/A ☐
   b. EN-FAP-OM-023 ☒ N/A ☐
   c. IP-SMM- AD-102 ☒ N/A ☐
   d. OSRC ☐ N/A ☒
   e. NRC Transmittal (within 30 days) ☐ N/A ☒
2. List any other documents affected by this change: N/A
3. Transmittals are completed: ☐ N/A ☒ Date: 10/7/2019
4. Ensure the proper revision is active in eB Ref. Lib.: ☒ N/A ☐
5. Approved doc/procedure delivered to Doc. Control for distribution: ☒ N/A ☐ Date: 10/7/2019
6. Position Binders updated: ☐ N/A ☒ Date: 10/8/2019
7. Copy of EPDCC placed in EP file: ☐ N/A ☐ Date: _____
8. Supporting documentation is submitted as a general record in eB Ref. Lib.: ☐ N/A ☒ Date: 10/7/2019
9. Word files are moved from working drafts folder to current revision folder in the EP drive: ☐ N/A ☐ Date: 10/8/2019

CONTROLLED

Central Control Room

Prepared by:	Craig Delamater Print Name	Signature	10/2/19 Date
Approval:	Frank J. Mitchell Print Name	Signature	10/2/19 Date

Effective Date: October 8, 2019

Table of Contents

CENTRAL CONTROL ROOM

1.0 PURPOSE

1.1 To describe emergency response activities and operations of the Central Control Room (CCR)

1.2 To provide guidance for the response to emergencies declared at Unit 2 and Unit 3

2.0 REFERENCES

2.1 Indian Point Energy Center Emergency Plan
2.2 IP-EP-430, Site Assembly, Accountability and Relocation of Personnel Offsite
2.3 EN-EP-610, Recovery from a Declared Emergency
2.4 IP-EP-340, Meteorological Information and Dose Assessment System (MIDAS)

3.0 DEFINITIONS

None

4.0 RESPONSIBILITIES

4.1 The Emergency Director has the sole authority and responsibility for the classification and declaration of any emergency, approving offsite notifications and the making of protective action recommendations for the general public. These responsibilities may not be delegated. The Shift Manager in the role of Emergency Director makes the initial emergency classification; however the SM shall verify an independent review of the EAL selected.

4.2 Following initial declaration of an emergency, the Shift Manager (SM) shall designate a Control Room Communicator. An on-shift Nuclear Plant Operator (NPO) normally performs this function for both Units. Any other Operations staff member may be assigned to perform this function as a backup.

4.3 The Shift Manager **SHALL**, upon assuming the role of Emergency Director, continue to perform the duties of Emergency Director until properly relieved by either the on-call Emergency Director in the (A)EOF or by another qualified Emergency Director such as the Plant Operations Manager (POM).

4.4 The Shift Managers **SHALL** confer with each other for any event or condition which may affect both Units such as security, or natural events. **IF** it is agreed that both Units are affected, **THEN** the Unit 2 Shift Manager SHALL classify and declare the emergency and assume the role of site Emergency Director in accordance with this procedure, IP-EP-210, Central Control Room.

4.5 The Shift Manager **SHALL** ensure, the notifications of offsite authorities are initiated within 15 minutes of declaration of any emergency classification, classification upgrade or protective action recommendation being formulated.

4.6 The Shift Manager **SHALL** ensure independent verification of the information on the Part I and Part II forms prior to being issued to the Offsite Agencies.

4.7 The Shift Manager **SHALL** request the opposite unit to activate mobilization of the IPEC Emergency Response Organization (ERO) and activation of the emergency response facilities (TSC, OSC, EOF and JIC) upon declaration of an Alert or higher classification.

4.8 For events classified as Unusual Events, the Shift Manager, acting as Emergency Director has the ability to activate, or request the opposite unit to active, ERO callout for support as needed.

4.9 The Shift Manager is responsible for the performance of Dose Assessment calculations until such time as the (A)EOF is activated.

4.10 The Shift Manager/Plant Operations Manager (POM) **SHALL** establish and maintain accountability of all Operating Shift staff under the Shift Manager's control upon declaration of a Site Area Emergency or higher classification.

4.11 Until such time as the (A)EOF is activated, the Shift Manager/Plant Operations Manager **SHALL** assess the offsite consequences of any radiological release and, if appropriate, formulates offsite protective action recommendations. In all cases should a General Emergency be declared, protective action recommendations **SHALL** be formulated, approved and communicated to offsite authorities in accordance with implementing procedures.

4.12 For events classified as Unusual Events, the Shift Manager, acting as Emergency Director **SHALL** terminate the emergency and enter into recovery in accordance with implementing procedures. For all emergencies classified at the Alert level or higher, emergency termination and entry into the recovery phase **SHALL** be at the discretion of the On-Call Emergency Director in the (A)EOF.

4.13 The On-shift Radiation Protection Technician is responsible for monitoring Control Room habitability and establishment of Control Room contamination controls.

4.14 The Control Room Communicator **SHALL** perform duties in the Control Room (or alternate CCR if uninhabitable) under the Shift Manager's direction. These duties **SHALL** entail notifying the off-site authorities of an event at IPEC by utilizing the notification checklists (Forms EP-3N, 3A, 3S or 3G). Duties will also include use of RECS, radio, telephones and other communication equipment to provide directions and recommendations as appropriate from the Shift Manager. The CCR Communicator shall also remain ready to supply updates to the off-site authorities and support the Shift Manager (Emergency Director) with any other notifications or communications, as needed.

4.15 The Control Room Communicator is responsible for providing clear and concise communications between the CCR and other emergency response facilities.

4.16 The Control Room Support Staff person is responsible for assisting in the performance of CCR setup, second shift scheduling and faxing/record keeping.

4.17 The Facility Communicator is responsible to maintain communication with other facilities for the transfer of accurate and timely data and information.

5.0 DETAILS

5.1 The Shift Manager (SM)/Plant Operations Manager (POM) **SHALL** follow the instructions outlined in Attachment 9.1, Shift Manager/POM (Emergency Director) Checklist.

5.2 For an emergency at the other Unit, the Shift Manager (SM) **SHALL** follow the instructions outlined in Attachment 9.2, Shift Manager's Response to an Emergency at the Other Unit Checklist.

5.3 The Control Room Communicator **SHALL** follow the instructions outlined in Attachment 9.3, Control Room Communicator Checklist.

5.4 The Facility Communicator **SHALL** follow the instructions outlined in Attachment 9.4, Facility Communicator Checklist.

5.5 The On-Shift Radiation Protection Technician **SHALL** follow the instructions outlined in Attachment 9.5, On-Shift Radiation Protection Technician Checklist.

5.6 The On-Shift Chemistry Technician **SHALL** follow the instructions outlined in Attachment 9.6, On-Shift Chemistry Technician Checklist.

5.7 The Support Staff person **SHALL** follow the instructions outlined in Attachment 9.7, Support Staff Checklist.

6.0 INTERFACES

6.1 IP-EP-115, Emergency Plan Forms

6.2 IP-EP-120, Emergency Classification

6.3 IP-EP-310, Dose Assessment

6.4 IP-EP-410, Protective Action Recommendations

6.5 IP-EP-430, Site Assembly, Accountability and Relocation of Personnel Offsite

6.6 EN-EP-610, Recovery from a Declared Emergency

6.7 IP-EP-340, Meteorological Information and Dose Assessment System (MIDAS)

6.8 0-FSG-100, BDBEE/ELAP Emergency Response

6.9 EN-EP-900, Emergency Preparedness Forms

7.0 RECORDS

All Logs, Completed Forms and other records generated during an actual emergency **SHALL** be considered Quality Records and maintained for the life of the plant.

8.0 REQUIREMENTS AND COMMITMENT CROSS-REFERENCE

None

9.0 ATTACHMENTS

9.1 Shift Manager/POM (Emergency Director) Checklist

9.2 Shift Manager's Response to an Emergency at the Other Unit Checklist

9.3 Control Room Communicator Checklist

9.4 Facility Communicator Checklist

9.5 On-Shift Radiation Protection Technician Checklist

9.6 On-Shift Chemistry Technician Checklist

9.7 Support Staff Checklist

9.8 CCR Dose Assessor

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 1 of 13

NOTE:

- This Attachment should not be entered by the Shift Manager if a natural or man-made catastrophic event has occurred and there is a loss of one of the Central Control Rooms. Procedure, 0-AOP-SEC-4 should be entered to support decision making by the SM.
- **The expectation for all ERO positions is to use WebEOC for log-keeping purposes. Reference to traditional paper forms remains in this checklist for the situation in which WebEOC is unavailable, such as a power or computer failure.**

1.0 Initial Responsibility/Activity **Notes**

A. **IF** at any time during the implementation of this procedure the SM is relieved by the POM or the ED in the (A)EOF, **THEN** turnover **SHALL** be completed in accordance with step 2.5

NOTE:

- Authority to classify and declare an emergency is reserved solely for the Emergency Director and may not be delegated; however, the SM shall and verify an independent review of the EAL selected. The SM in the role of Emergency Director makes the initial emergency classification.
- The Unit 2 & Unit 3 Shift Managers **SHALL** confer with each other for any event or condition which may affect both Units such as security or natural events. **IF** it is agreed, both units are affected, **THEN** the Unit 2 Shift Manager SHALL classify and declare the emergency and assume the role of Site Emergency Director in accordance with this procedure IP-EP-210, Central Control Room.

Attachment 9.1

Shift Manager/POM (Emergency Director) Checklist
Sheet 2 of 13

1.0 Initial Responsibility/Activity (cont.)

Notes

1.1 Classification of the Emergency

NOTE:

The assessment, classification, and declaration of an emergency condition is expected to be completed within 15 min after the availability of indications (i.e. plant instrumentation, plant alarms, computer displays, or incoming verbal reports) to plant operators that an EAL has been exceeded.

- The 15 min criterion is not to be construed as a grace period to restore plant conditions to avoid declaring the event.
- The emergency declaration SHOULD be made promptly without waiting for the 15 min period to elapse once the EAL is recognized as being exceeded.
- For EALs that specify duration of the off normal condition, such as fire lasting 15 min, loss of power for 15 min etc.:
  - ➢ The ED **SHALL** make the declaration at the first available opportunity when the time has elapsed (NOT after an additional 15 minutes).
  - ➢ The ED **SHOULD** not wait **until** the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

NOTE:

VERIFY events affecting both units are classified as dual unit events ("BOTH UNITS" selected on NYS Part I form in MIDAS). The category that is automatically a dual unit event is Security. For events such as weather or loss of power, both units are affected as long as they are at the same level of classification (i.e. NUE). If one unit enters a higher classification at the initiating event (i.e. LOOP with one unit's EDGs all running and the other unit without EDGs running) or has to escalate then it becomes the only unit affected.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 3 of 13

1.0 Initial Responsibility/Activity (cont.)

Notes

B. **Classify** the emergency condition in accordance with IP-EP-120 "Emergency Classification" **AND** ensure independent verification of the EAL selected.

C. **Declare** the emergency, announce classification of the event to the Control Room **AND** document time of emergency declaration. Attachment 9.1.

> **NOTE:**
>
> THE 15 - MINUTE CLOCK FOR COMPLETION OF NOTIFICATION TO STATE AND LOCAL AUTHORITIES STARTS AT THIS POINT.

D. IF a Beyond Design Basis External Event (BDBEE) occurs, resulting in an Extended Loss of AC Power (ELAP) to either unit, THEN entry into 0-FSG-100, BDBEE/ELAP Emergency Response, is required.

> **NOTE:**
>
> - Security and Operations will take steps as directed by Safeguard Instructions to protect the safety of site employees and the integrity of plant equipment
> - Site access and egress will be controlled per Security procedures

E. **Obtain AND complete** steps in the applicable Emergency Notification Checklist:

1. IF **Notice of Unusual Event** is declared, THEN use NUE checklist, Form **EP-3N**.
2. IF **ALERT** is declared, THEN use ALERT checklist, Form **EP-3A**.
3. IF **Site Area Emergency** is declared, THEN use SAE checklist, Form **EP-3S**.
4. IF **General Emergency** is declared, THEN use GE checklist, Form **EP-3G**.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 4 of 13

1.0 Initial Responsibility/Activity (cont.) **Notes**

F. IF a General Emergency is declared,
THEN protective action recommendations must be made in accordance with IP-EP-410, **Protective Action Recommendations.**

NOTE:

- IP-EP-430 **Site Assembly, Accountability and Relocation of Personnel Offsite** provides guidance for the suspension of personnel assembly and accountability under certain conditions.
- Notification of State and local authorities **SHALL** be completed within 15 minutes of emergency declaration.

1.1 Assess Any Radiological Release

NOTE:
A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "release" is classified as one of the four (4) following descriptions:

A. No Release

B. Release BELOW Federal Limits

C. Release ABOVE Federal Limits

D. Unmonitored Release Requiring Evaluation

A. IF any indications exist of abnormal radiological release as a result of the emergency, THEN assess offsite consequences in accordance with IP-EP-310, Dose Assessment.

B. IF dose assessment results indicate offsite consequences in excess of the EPA Protective Action Guidelines,
THEN evaluate the need to modify the General Emergency PARs per IP-EP-410, **Protective Action Recommendations.**

Attachment 9
Shift Manager/POM (Emergency Director) Checklist
Sheet 5 of 13

1.0 Initial Responsibility/Activity (cont.) **Notes**

1.2 Emergency Response Data Systems (ERDS)

A. **VERIFY** ERDS is activated. ERDS must be activated within 1 hour of ALERT declaration **OR** higher.

B. Click Start – Programs – Nuclear Corporate Applications (ESM) – ERDS Activation – Site Activation Display.

C. A "**Warning**" display screen will appear. Click on Continue.

D. A Pass Code entry screen will appear. Click on "Enter View Only Mode".

E. A "Select Reactor" message box will appear. Select the affected unit to verify and click "OK".

F. **VERIFY** ERDS Status is "**Transmitting Data**".

G. **IF** ERDS Status is "disconnected", **THEN** exit ERDS Activation Display. **ACTIVATE OR** request unaffected unit to activate ERDS within 1 hour.

H. **IF** TSC has been activated, **THEN** TSC IT Specialist **OR** TSC Manager may be requested to activate ERDS as a backup to the CCR.

I. Click Start – Programs – Nuclear Corporate Applications (ESM) – ERDS Activation – Site Activation Display.

J. A "**WARNING**" display screen will appear. Click on Continue

K. A Pass Code entry screen will appear. Obtain Pass Code from ERDS envelope in SM/POM position binder. Enter the appropriate pass code and press the "Submit" button. Pass Code is **NOT** case sensitive.

L. A "Select Reactor" message box will appear. Select the affected unit to activate.

M. **IF** emergency affects BOTH units, **THEN** an icon can be selected again to activate ERDS for other unit.

N. "Site ERDS Activation Display" will appear. Click "Connect" to activate ERDS.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 6 of 13

1.0 Initial Responsibility/Activity (cont.)

Notes

O. **IF ERDS is NOT functional,**
THEN obtain additional resources from the unaffected Unit to complete Forms 31 A, B, C or 42 A, B, C.

- These forms are EP-57, 58, 59 and EP-53, 54 and 55 respectively. Once completed, this information is to be given to the TSC to be faxed to the NRC within 60 minutes.

2.0 Interim Responsibility/Activity

> **NOTE:**
>
> **IF** while performing the Interim Responsibility/Activity steps as Emergency Director, you are relieved of Emergency Director Duties by the On-Call ED, **THEN** exit this section and enter the Continuous Responsibility/Activity (Shift Manager/POM) section at step 3.0.

2.1 Re-Classify the Emergency if Necessary

A. **IF** plant conditions change **OR** other events occur which may warrant upgrade of the emergency classification,
THEN re-classify the emergency condition in accordance with IP-EP-120, **Emergency Classification.**

B. Declare the emergency and announce the upgrade classification to Control Room personnel.

C. **IF ALERT** is declared, use ALERT checklist, Form **EP-3A.**

D. **IF Site Area Emergency** is declared, use SAE checklist, Form **EP-3S.**

E. **IF General Emergency** is declared,
THEN use GE checklist, Form **EP-3G.**

F. **IF** a General Emergency is declared,
THEN protective action recommendations must be made in accordance with IP-EP-410, **Protective Action Recommendations.**

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 7 of 13

2.0 Interim Responsibility/Activity (cont.) **Notes**

2.2 Establish Radiological Controls and Maintain Onsite Personnel Safety

A. Keep Security informed of emergency classification, plant status and any radioactive release which may affect Security Personnel.

B. Once established, maintain personnel accountability.

C. **IF** the potential for abnormal radiological conditions in-plant or onsite exists, **THEN**:

1) Direct the On-Shift Radiation Protection Technician to establish radiological controls for the Control Room and initiate habitability monitoring for the Control Room. Verify radiological controls have been established as necessary.

2) Evaluate the need to relocate personnel offsite per IP-EP-430, **Site Assembly, Accountability and Relocation of Personnel Offsite**.

3) Authorize emergency exposure, if necessary, using Emergency Exposures Authorization Form (Form EP-4-ALL).

4) **IF** Emergency Response Facilities are not operational, authorize issuance of Potassium Iodide (KI) to onsite personnel for any projected or actual Thyroid Exposure > 5 Rem CDE **OR** following declaration of a General Emergency IAW IP-EP-420, Use of Potassium Iodide by Indian Point Personnel During an Emergency.

5) **IF** issuance of Potassium Iodine (KI) is authorized by the EPM, **THEN** advise the On-Shift Radiological Protection Technician to conduct applicable radiological and/or KI briefings **AND** to distribute KI.

6) **IF** authorization of issuance of Potassium Iodide (KI) is required **AND** On-Shift Radiological Protection Technician is not available (such as during a Hostile Action Based Event), **THEN** Shift Manager/POM **SHALL** conduct applicable radiological and/or KI briefings **AND** request the opposite unit Shift Manager/POM to conduct applicable radiological and/or KI briefings.

   a. Utilize Form EP-8-All to document date, time and name of personnel ingesting KI.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 8 of 13

2.0 Interim Responsibility/Activity (cont.) **Notes**

2.3 Perform Periodic Update Notifications

A. Periodic update notifications to offsite authorities should be made approximately every 30 minutes or more frequently when plant conditions change. Time interval may be lengthened with concurrence of offsite agencies. For each update notification, complete (or have completed) and sign a "NYS Radiological Emergency Data Form, Part I" (Form EP-1).

B. FAX, then Email completed Part I Form to Offsite Authorities.

C. IF there has been a radiological release to the environment, **THEN** complete (or have completed) and sign a "NYS Radiological Data Form Part II (Form EP-2). Ensure independent verification of information prior to sending to Offsite Agencies.

NOTE:

NOTE:

A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "release" is classified as one of the four (4) following descriptions:

A. No Release

B. Release BELOW Federal Limits

C. Release ABOVE Federal Limits

D. Unmonitored Release Requiring Evaluation

D. For periodic update notifications during Unusual Event, direct the CCR Communicator to confirm receipt of update notifications using "Control Room NUE Notification Checklist" (Form EP-3N).

E. For periodic update notifications during an Alert or higher classification, direct the CCR Communicator to confirm receipt of update notifications using "Control Room Alert/SAE/GE Notification Checklist (Form EP-3A, 3S or 3G as applicable).

2.4 Terminate the Emergency (Unusual Event ONLY)

A. When conditions warrant termination of the Unusual Event, enter IP-EP-610, **Recovery from a Declared Emergency** and terminate the emergency per section 5.2 "Transition to Recovery.

B. Exit this section after termination of the emergency and enter the Closeout Responsibility/Activity section at step 4.0.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 9 of 13

2.0 Interim Responsibility/Activity (cont.)

Notes

2.5 Turnover Emergency Director Responsibilities

> **NOTE:**
> For Unusual Events, the Shift Manager will normally maintain the Emergency Director responsibilities until the classification is terminated per IP-EP-610, **Emergency Termination & Recovery.** For Alert and higher classifications, the Plant Operations Manager (POM) will relieve the Shift Manager of Emergency Director Duties in the Control Room. The On-Call Emergency Director in the (A)EOF at his discretion may assume Emergency Director Duties directly from the Shift Manager via telephone turnover.

A. Provide a status briefing to the POM upon his arrival in the Control Room. The POM will request status on all of the information specified on an Essential Information Checklist. (Form EP-2-ALL).

B. Provide copies of all completed NYS Radiological Emergency Data forms to the POM.

C. Resume duties as Shift Manager and proceed to step 3.0 in the Continuous Responsibility/Activity (Shift Manager/POM) section.

2.6 Turnover Emergency Director Responsibility's

A. **IF** the POM is relieving the SM of ED responsibilities, **THEN** the POM **SHALL** continue those responsibilities where the SM left off, **AND** the SM shall resume Shift Manager Responsibilities.

B. **IF** the ED in (A)EOF is relieving the POM of ED responsibilities, **THEN** after turnover, the POM **SHALL** proceed to or continue in Section 3.0 of this procedure.

C. **IF** the ED in (A)EOF is relieving the SM of ED responsibilities, **THEN** after turnover, the SM **SHALL** proceed to or continue in Section 3.0 of this procedure.

D. After turnover to the EOF, the SM **SHALL** resume Shift Manager Responsibilities and the POM **SHALL** proceed to or continue in Section 3.0 of this procedure.

E. Due to unforeseen circumstances (illness, etc.) it may become necessary to transfer ED responsibilities back to the POM or SM.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 10 of 13

3.0 Continuous Responsibility/Activity

Notes

3.1 Emergency Classification Upgrade or Radiological Release

A. **IF** at any time an Upgrade from the previously announced Emergency Classification is declared or if a Radiological release has occurred, **THEN:**

1) Announce the information to the Control Room.

> **NOTE:**
>
> No plant pages are to be made during a security condition when security procedures are in effect until determined safe to do so.

2) Direct Control Room personnel to sound the site assembly alarm and make appropriate Plant Pages per Form EP-3A, 3S or 3G if required, for the new Emergency Classification **OR** if a radiological release has occurred, without an Emergency Classification upgrade, then make appropriate Plant Pages without sounding the site assembly alarm.

3) Contact or direct Control Room personnel to contact, the unaffected Unit's Control Room to inform them of the upgrade in Emergency Classification or Radiological Release and the need to refer to IP-EP-210, Attachment 9.2, "Shift Manager Response to an Emergency at the Other Unit Checklist".

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 11 of 13

Continuous Responsibility/Activity **Notes**

3.2 Provide Backup Plant Data to the TSC

A. **IF** the MRP-DAS is out-of-service **THEN** request the TSC to send an individual to the CCR to record plant data on Forms EP-57, 58 and 59 for Unit 3 and Forms EP-53, 54, and 55 for Unit 2 as needed, and to fax the forms to the TSC on a periodic basis or as plant status and conditions change.

3.3 Direct Entry Into Severe Accident Management

A. **IF** plant conditions warrant the transition to Severe Accident Management Guidelines (SAMG),
THEN inform Emergency Plant Manager to have the SAMG Evaluator ready to take over Severe Accident Management.

3.4 Evaluate Emergency Action Levels

A. Continue to evaluate current plant condition and events relative to the emergency action levels as specified in IP-EP-120, **Emergency Classification.**

B. Make recommendations to the Emergency Director for upgrading of the emergency classification as appropriate.

3.5 Maintain Communications with the Emergency Director

A. Keep the Emergency Director informed of current plant status and planned operations.

B. Discuss tasks and procedures the Control Room is currently performing and review priorities on a regular basis.

C. **IMMEDIATELY** inform the Emergency Director of any plant condition or event that has the potential to change the emergency classification or affect radiological release status.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 12 of 13

Continuous Responsibility/Activity **Notes**

3.6 Coordinate In-Plant team activities with Operations Support Position/OSC Manager

> **NOTE:**
>
> Once the OSC is activated, the dispatch of personnel (with the exception of NPOs into the field for emergency operations) is controlled from the OSC.
>
> At an NUE OR an Alert, NPOs will report to and be dispatched from the Control Room.
>
> At an SAE OR GE, NPOs **SHALL** be dispatched out of the OSC. Communications and directions can be provided to the teams from the Control Room; however, the OSC must retain team control for personnel safety and continuous accountability.

A. Once the OSC is activated, coordinate the dispatch and control of NPOs assigned to perform in plant operations with the Operations Support Position located in the OSC. The telephone number is located in Emergency Telephone Directory (ETD). Utilize the Facility Communicator to coordinate this activity (Use Form EP-56).

1) CCR should request two NPO teams, one for nuclear side tasking and one for conventional side tasking. Ensure the OSC OPS Support is updated as to their tasking and status.

B. For operations teams already dispatched and in the field prior to the OSC being activated, coordinate the transfer of team control to the OSC with the Operations Support Position.

C. Direct requests for in-plant operational support **IMMEDIATELY** to the Operations Support Position in the OSC to facilitate prompt response to Control Room needs.

D. Re-enforce Control Room priorities and needs with the OSC Manager if in-plant team support is not being provided in a timely and effective manner.

Attachment 9.1
Shift Manager/POM (Emergency Director) Checklist
Sheet 13 of 13

Continuous Responsibility/Activity **Notes**

3.7 Request Technical Support as Needed to Mitigate the Emergency.

A. Request the TSC Manager to provide forward-looking technical support as needed to assist the Control Room staff in responding to the emergency.

B. Provide the TSC Manager with periodic briefs on current mitigation strategies and emergency procedures currently being implemented.

C. **IF** EOF is operational **AND** turnover with the Emergency Director at the EOF is completed, release unaffected unit's on shift Chemistry Technician/CCR Dose Assessor to return to the unaffected unit CCR.

3.8 Exit to Recovery Phase

Upon notification from the Emergency Director that the emergency has been terminated, exit this section and enter the Closeout Responsibility/Activity section at step 4.0 Attachment 9.1

4.0 Closeout Responsibility/Activity

4.1 Direct the Control Room staff to return all equipment utilized in the response to proper storage locations.

4.2 Review all documentation the Control Room staff generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Ensure all temporary procedures used and/or developed are properly documented for use by the Recovery Organization so that necessary actions can be taken for long-term restoration.

C. Collect all computer printouts and strip charts.

4.3 Provide all logs and records to the Recovery Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.2
Shift Manager Response to an Emergency at Other Unit Checklist
(Sheet 1 of 5)

Notes

NOTE:

- This Attachment should not be entered by the Shift Manager if a natural or man-made catastrophic event has occurred and there is a loss of one of the Central Control Rooms. Procedure, 0-AOP-SEC-4 should be entered to support decision making by the SM.
- The expectation for all ERO positions is to use WebEOC for log keeping purposes. Reference to traditional paper forms remains in this checklist for the situation in which WebEOC is unavailable, such as a power or computer failure.

1.0 Initial Responsibility/Activity

1.1 Notification of the Emergency

NOTE:

Shift Managers (SM) **SHALL** confer with each other for any event or condition which may affect both Units such as security or natural events. **IF** it is agreed that both units are affected, **THEN** the Unit 2 SM **SHALL** classify and declare the emergency and assume the role of site Emergency Director in accordance with this procedure, IP-EP-210, **Central Control Room.**

A. Upon notification from the other Unit's Control Room that an event has been declared, announce the information to Control Room personnel.

Attachment 9.2

Shift Manager Response to an Emergency at Other Unit Checklist

(Sheet 2 of 5)

1.0 Initial Responsibility/Activity (cont.)

Notes

NOTE:

No plant pages are to be made during a security condition when security procedures are in effect **until** determined safe to do so.

1.1 Emergency Classifications

A. **UNUSUAL EVENT**

1. Upon request from the affected unit, Notify OR Mobilize ERO using ERO Notification Envelope.

2. Make a PA announcement providing information regarding the event and any additional information as required restricting access to areas affected by the emergency.

B. **ALERT**

1. IF not already completed, upon request from the affected unit, Mobilize ERO using **ERO Notification Envelope.**

2. Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with affected Unit CCR) and make the following announcement, (2) times, over the public address system.

   - *"Attention all personnel, Attention all personnel, an ALERT has been declared at ______. All Emergency Response Organization personnel report to your assigned Emergency Response Facility. All other non-essential personnel are released from the site."*

3. Upon request from the Emergency Director, provide an On-Shift RP Technician OR On-Shift Chemistry Technician to support response.

4. IF requested by other Unit's SM/ED, **THEN** verify ERDS is transmitting OR activate ERDS per Section 1.3 of Attachment 9.1 within 1 hour of declaration.

Attachment 9.2
Shift Manager Response to an Emergency at Other Unit Checklist
(Sheet 3 of 5)

Initial Responsibility/Activity (cont.) **Notes**

C. **SITE AREA EMERGENCY / GENERAL EMERGENCY**

1. **IF** not already completed, upon request from the affected unit, Mobilize ERO using **ERO Notification Envelope**.

2. Sound the Site Assembly Alarm for (10) seconds (coordinate sounding of the assembly alarm with other Unit CCR) and make the following announcement (2) times over the public address system:

   ➢ *"Attention all personnel, Attention all personnel, an SAE/GE has been declared at ______. All Emergency Response Organization personnel report to your assigned Emergency Response Facility. All other non-essential personnel are released from the site."*

3. **IF** a Radiological Release has occurred,
   THEN direct the On-Shift Radiation Protection Technician to take proper Radiological Controls and perform Habitability surveys as required or if necessary.

4. **IF** the affected plant Control Room has been evacuated AND dose assessment results indicate offsite consequences in excess of the EPA Protective Action Guidelines,
   THEN evaluate the need to modify the General Emergency PARs per IP-EP-410, Protective Action Recommendations.

5. Upon request from the Emergency Director, provide a Shift RP Technician OR On-Shift Chemistry Technician to support response.

6. **IF** requested by other Unit's SM/ED,
   THEN verify ERDS is transmitting OR activate ERDS per Section 1.83 of Attachment 9.1 within 1 hour of declaration.

Attachment 9.2

Shift Manager Response to an Emergency at Other Unit Checklist

(Sheet 4 of 5)

Initial Responsibility/Activity (cont.) **Notes**

D. **Radiological Release**

NOTE:

The term 'Release' as it is used at IPEC for Emergency Planning is defined as "A release of radioactive materials due to the classified event" (per NYS Radiological Emergency Data Form, Part 1).

NOTE:

A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "release" is classified as one of the four (4) following descriptions:

A. No Release

B. Release BELOW Federal Limits

C. Release ABOVE Federal Limits

D. Unmonitored Release Requiring Evaluation

1. Announce the information to the Control Room.
2. Direct Control Room personnel to make appropriate Plant Pages.
3. **IF** opposite Unit has a Radiological Release, **THEN** place CCR ventilation in Recirculation Mode.
4. Contact the On-Shift Radiation Protection Technician to take proper Radiological Controls and perform Habitability surveys as required or if necessary.
5. Direct On-Shift Chemistry Technician to provide dose assessment support, as required.

Attachment 9.2
Shift Manager Response to an Emergency at Other Unit Checklist
(Sheet 5 of 5)

2.0 <u>Continuous Responsibility/Activity</u> **<u>Notes</u>**

2.1 Provide Support to Opposing Unit as Requested

A. Upon request from the Emergency Director, provide personnel, equipment and resources available to you.

2.2 Provide updates to personnel with information provided by the Emergency Director

A. When information is provided to you, use the public address system to disseminate that information to the personnel on Site.

2.3 Evaluate Emergency Action Levels

A. Continue to evaluate current plant condition and events relative to the Emergency Action Levels as specified in IP-EP-120, **Emergency Classification** and make recommendations for upgrade, if appropriate, to the Emergency Director.

3.0 <u>Closeout Responsibility/Activity</u>

3.1 Direct the Control Room staff to return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation the Control Room staff generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Ensure all temporary procedures used and/or developed are properly documented for use by the Recovery Organization so that necessary actions can be taken for long-term restoration.

C. Collect all computer printouts and strip charts.

3.3 Provide all logs and records to the Recovery Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.3
Control Room Communicator Checklist
Sheet 1 of 6

Notes

NOTE:

The expectation for all ERO positions is to use WebEOC for log-keeping purposes. Reference to traditional paper forms remains in this checklist for the situation in which WebEOC is unavailable, such as a power or computer failure.

1.0 Initial Responsibility/Activity

1.1 Assume the Duties of Control Room Communicator

NOTE:

1) Notification of State and local authorities SHALL be completed within 15 minutes of emergency declaration.

2) Notification to NRC SHALL be initiated within 1 hour of the emergency declaration.

A. Upon being notified to fulfill the Control Room Communicator role, **IMMEDIATELY** report to the affected Unit's Control Room.
B. Inform the Shift Manager (Emergency Director) AND the Control Room staff, you have assumed the duties of Control Room Communicator.
C. IF making the initial notification for a Notification of Unusual Event classification, THEN, proceed to step 1.2.
D. IF making the initial notification for an Alert or higher classification, THEN, proceed to step 1.4.
E. IF making a periodic update of the NUE, THEN proceed to step 2.1
F. IF making a periodic update of the Alert/SAE/GE, THEN proceed to step 2.2
G. IF making an upgrade classification, THEN proceed to step 2.3.

Attachment 9.3
Control Room Communicator Checklist
Sheet 2 of 6

Initial Responsibility/Activity (cont.) **Notes**

1.2 Perform Confirmation of Receipt of Initial UNUSUAL EVENT Notifications (Use Form EP-3N)

A. Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is complete and accurate, including Shift Manager (Emergency Director) signature.

B. Verify SM has sent electronic Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.

C. Using, "Control Room NUE Notification Checklist" (Form EP-3N) complete the initial roll call to State and counties within 15 minutes of the declaration of the Unusual Event. Confirm notification to each location.

D. **IF** time challenged to meet the 15 minute requirement, **THEN immediately** initiate the RECS call. Following roll call, inform State and counties that FAX and email of Part 1 Form will follow.

E. IF plant condition/emergency classification changes prior to initiating notification:

a. Disregard previous classification and continue notification with highest current classification.

b. Follow-up notification SHALL include details of all conditions/emergency classifications.

F. **IF** plant condition/emergency classification changes while performing notification, **THEN** continue notification and state at the end the following "Changes in plant conditions indicate a potential for escalating the Emergency Classification. State and local authorities **SHALL** be notified within 15 minutes."

1.3 Support Shift Manager (Emergency Director) with other notifications.

A. Complete the remaining notifications as specified on the Control Room NUE Notification Checklist (Form EP-3N).

Attachment 9.3
Control Room Communicator Checklist
Sheet 3 of 6

Initial Responsibility/Activity (cont.) **Notes**

1.4 Perform confirmation of receipt of Initial ALERT/SAE/GE Notifications (Use Form EP-3A, 3S or 3G as applicable)

A. Obtain the completed and signed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review form to ensure all required information is complete and accurate, including Shift Manager (Emergency Director) signature.

B. Verify the SM has sent Fax and E-mail of the NYS Radiological Data Form Part I to State/Counties/EOF.

C. IF time challenged to meet the 15 minute requirement, **THEN immediately** initiate the RECS call. Following roll call, inform State and counties that FAX and email of Part 1 Form will follow.

D. Using "Control Room Notification Checklist Alert/SAE/GE (Form EP-3A, EP-3S or EP-3G as applicable), complete the initial roll call to State and Counties within 15 minutes of the declaration of the Alert, SAE or GE. Confirm notification to each location.

E. Complete the remaining notifications as specified on the Forms (EP-3A, EP-3S or EP-3G as applicable).

F. IF plant condition/emergency classification changes prior to initiating notification:

   a. Disregard previous classification and continue notification with highest current classification.

   b. Follow-up notification SHALL include details of all conditions/emergency classifications.

G. IF plant condition/emergency classification changes while performing notification, THEN continue notification and state at the end the following "Changes in plant conditions indicate a potential for escalating the Emergency Classification. A completed Part I will be transmitted within 15 minutes.

Attachment 9.3
Control Room Communicator Checklist
Sheet 4 of 6

Initial Responsibility/Activity (cont.) **Notes**

1.5 Support Shift Manager (Emergency Director) with other notifications

A. Determine if personnel assembly is being suspended from the Emergency Director.

B. Request direction from Shift Manager (Emergency Director) AND initiate notification of personnel located in the Protected Area if requested.

C. Complete the remaining notifications as specified on the Form (EP-3A, EP-3S or EP-3G Checklist as applicable).

2.0 Continuous Responsibility/Activity

2.1 Perform Periodic Update Notifications – UNUSUAL EVENT (Use Form EP-3)

> **NOTE:**
> Periodic Update Notifications to offsite authorities shall be made approximately every 30 minutes or whenever conditions change. Time interval may be lengthened with concurrence of offsite agencies.

A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Shift Manager. Review the form to ensure all required information is complete and accurate, including Emergency Director's signature.

B. Verify Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.

C. Using Control Room NUE Notification Checklist (Form EP-3N) perform notifications as needed, to make the periodic update notifications. Confirm notification to each location.

D. Fax, or have Support Staff Fax, copies of the NYS Radiological Data Form Part 1 to State/Counties/EOF.

Attachment 9.3
Control Room Communicator Checklist
Sheet 5 of 6

Continuous Responsibility/Activity (cont.) **Notes**

2.2 Perform Periodic Update Notifications – Alert/SAE/GE (Use Form EP-3A, 3S or 3G as applicable)

NOTE:

Periodic Update Notifications to offsite authorities SHALL be made approximately every 30 minutes or whenever conditions change. Time interval may be lengthened with concurrence of offsite agencies.

A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) (Part II if a radiological release has occurred or is in progress) from the Emergency Director. Review form to ensure all required information is complete and accurate, including Emergency Director's signature.

B. Verify the SM has sent Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.

C. Using an Alert/SAE/GE Checklist (Form EP-3A, 3S or 3G as applicable) start the roll call to State and Counties. Confirm notification to each location.

D. Complete the remaining notifications as specified on the Form (EP-3A, 3S or 3G as applicable) Checklist.

2.3 IF the Emergency Classification is Upgraded, THEN Perform Upgrade Notifications (using Form EP-3A, 3S or 3G as applicable)

A. Obtain the completed NYS Radiological Emergency Data Form Part I (Form EP-1) from the Emergency Director. Review form to ensure all required information is completed, including Emergency Director's signature.

B. Verify the SM has sent Fax and email of the NYS Radiological Data Form Part I to State/Counties/EOF.

C. Using an Alert/SAE/GE Checklist (Form EP-3A, 3S or 3G as applicable) start the roll call to State and Counties within 15 minutes of upgrade of the emergency classification.

Attachment 9.3
Control Room Communicator Checklist
Sheet 6 of 6

Continuous Responsibility/Activity (cont.) **Notes**

D. Fax, or have Support Staff fax, copies of the NYS Radiological Data Form Part 1 to the State/Counties/EOF, **If** required. Confirm notification to each location.

E. Support Shift Manager, as needed, with the remaining notifications as specified on the Checklist.

3.0 Closeout Responsibility/Activity

3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation the Control Room Communicators generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Collect all forms, logs and other documentation.

3.3 Provide all logs and records to the Recovery Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.4

Facility Communicator Checklist

Sheet 1 of 2

NOTE:

The expectation for all ERO positions is to use WebEOC for log-keeping purposes. Reference to traditional paper forms remains in this checklist for the situation in which WebEOC is unavailable, such as a power or computer failure.

1.0 Initial Responsibility/Activity

Notes

1.1 Assume the Duties of Facility Communicator

A. Upon being notified to fulfill the Facility Communicator role, **IMMEDIATELY** report to the Control Room.

B. Inform the Shift Manager and the Control Room staff that you are assuming the duties of Facility Communicator.

C. **IF** not already established,
THEN establish an open line of communications over the Direct Line:

1. TSC
2. EOF
3. AEOF (**if** activated)

D. Inform the Shift Manager that you have established communications with the TSC/OSC and (A)EOF.

Attachment 9.4
Facility Communicator Checklist
Sheet 2 of 2

2.0 Continuous Responsibility/Activity

Notes

2.1 Maintain Communications with the TSC, OSC and (A)EOF

> **NOTE:**
> The primary responsibility of the Facility Communicator is to provide an open line of communication between the CCR and TSC; however, the Technical Advisor to the Emergency Director in the EOF will periodically monitor the communications line or will request information from the CCR and TSC.

A. Transmit information as requested by the TSC, OSC and EOF.

B. Notify the OSC Operations Support Position of teams (NPO's, Chemists etc.) that have been dispatched from the CCR AND log this information into WebEOC.

C. Support Shift Manager (ED) or POM if in place, with coordination of dispatching and controlling of NPOs assigned to perform in-plant operations with the Operations Support position located in the OSC.

D. Use an ERO Log Sheet (Form EP-3-ALL) to maintain a log.

1. Log the time when you assumed the duties of Facility Communicator.
2. Log significant communications pertaining to plant operations and emergency events.

3.0 Closeout Responsibility/Activity

3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation that was generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Collect all forms, logs and other documentation.

3.3 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.5
On-Shift Radiation Protection Technician Checklist
(Sheet 1 of 4)

1.0 Initial Responsibility/Activity **Notes**

1.1 Assume the Duties of CR Radiation Protection Technician

A. **IF** the declared emergency is an Alert or higher, **THEN** first contact the Control Point and obtain a list of personnel still in RCA.

B. **IMMEDIATELY** provide list of individuals still in the RCA to the Shift Manager.

C. Inform the Shift Manager and the Control Room staff that you are assuming the duties of the On-Shift Radiation Protection Technician.

1.2 Establish Initial CCR Radiological Protection

A. Evaluate the need and make a recommendation to establish radiological access control for the Control Room.

1. Ask the Shift Manager if there is potential for abnormal radiological conditions outside of the RCA.
2. Evaluate PRM-ARM instrumentation.

B. Place a DLR and dosimeter on the computer terminal by the RO's desk.

C. Issue DLR and dosimeters to persons who are dispatched from the CCR, if necessary.

Attachment 9.5
On-Shift Radiation Protection Technician Checklist
Sheet 2 of 4

Initial Responsibility/Activity (cont.) **Notes**

D. **IF** conditions warrant, or the Shift Manager directs the Control Room radiological controls be established, **THEN**:

1. Set up step off pad (SOP) requiring shoe check and frisker at the CR entrance.
2. Post rear door with "NO ENTRY/EXIT" signs.
3. Place SOPs in a position that does not preclude opening the door while standing on the SOP.
4. Set up Frisker and perform periodic contamination surveys on both sides of the SOP.
5. Perform periodic (hourly or as directed) airborne contamination checks with HD-28B or equivalent.
6. Record results on applicable forms and survey maps.
7. Advise the Shift Manger that radiological controls have been established as required and continue to monitor for habitability.

2.0 Continuous Responsibility/Activity

2.1 Provide Radiological Protection.

NOTE:
The actions and responsibilities listed in this procedure are intended to assist the CCR Radiation Protection Technician in the performance of his/her duties. While some items are performed once, others are repeated over the duration of the event.

A. Provide radiological support, such as issuance of dosimetry, determination of respiratory and protective clothing requirements, and performance of radiological surveys for the following activities, as directed by the Shift Manager:

1. Search and rescue
2. Repair and corrective actions

Attachment 9.5
On-Shift Radiation Protection Technician Checklist
Sheet 3 of 4

Continuous Responsibility/Activity (cont.) **Notes**

3. Response to fires by Fire Brigade (includes survey /decontamination of Fire Department personnel and equipment).

4. Personnel and equipment decontamination.

5. As requested by the Shift Manager.

B. Conduct outside surveys as requested by the Shift Manager.

C. Provide Radiological Support for Personnel Medical Emergencies.

1. Upon notification, a personnel medical emergency has occurred onsite, report to the scene with survey instrument(s).

2. Support Medical response as necessary.

D. **IF** radiological conditions warrant **AND** requested by the Shift Manager/ED, issue KI to control room personnel.

1. Conduct applicable radiological and/or KI briefings to CCR personnel.

2. Utilize Form EP-8-ALL to document date, time and name of personnel ingesting KI.

E. Notify the Shift Manger that Potassium Iodine (KI) has been distributed and documented.

2.2 Use ERO Log Sheet(s) (Form EP-3-ALL) to maintain a log.

A. Log the time when you assumed the duties of CCR Radiation Protection Technician.

B. Log significant communications pertaining to personnel radiological conditions and actions.

C. Log any other significant information pertaining to actions taken as duty of Radiation Protection Technician (i.e., surveys completed dosimetry issuance, A/S results, etc.).

Attachment 9.5

On-Shift Radiation Protection Technician Checklist

Sheet 4 of 4

3.0 Closeout Responsibility/Activity — Notes

3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation that was generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Collect all forms, logs and other documentation.

2.2 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.6

On-Shift Chemistry Technician Checklist

(Sheet 1 of 2)

1.0 Initial Responsibility/Activity **Notes**

1.1 Assume the Duties of On-Shift Chemistry Technician.

A. Upon being notified to fulfill the On-Shift Chemistry Technician role, **IMMEDIATELY** report to the Control Room.

B. Inform the Shift Manager and the Control Room staff that you are assuming the duties of On-Shift Chemistry Technician.

1.2 Assist the Shift Manager/Plant Operations Manager with Emergency Planning duties as requested.

2.0 Continuous Responsibility/Activity

2.1 Use ERO Log Sheet(s) (Form EP-3-ALL) to maintain a log.

A. Log the time when you assumed the duties of On-Shift Chemistry Technician.

B. Log significant communications pertaining to radiological releases and emergency events.

Attachment 9.6
On-Shift Chemistry Technician Checklist
(Sheet 2 of 2)

3.0 Closeout Responsibility/Activity **Notes**

3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Collect all forms, logs and other documentation.

3.3 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.7

Support Staff Checklist

(Sheet 1 of 4)

1.0 Initial Responsibility/Activity **Notes**

1.1 Assume the Duties of Support Staff

A. Upon being notified to fulfill the Support Staff role, **IMMEDIATELY** report to the Control Room.

B. Inform the Shift Manager and the Control Room staff, you are assuming the duties of Support Staff.

1.2 Assist the Plant Operations Manager (POM) with CCR set-up.

A. Distribute Position Specific Binders to the following:

1. SM/POM
2. CCR Communicator
3. Facility Communicator
4. On-Shift Radiation Protection Technician
5. On-Shift Chemistry Technician
6. Support Staff

B. Plug in phones and headsets, if needed.

C. Verify the IPEC 10-mile Wind Sector Map in-place.

D. Verify appropriate emergency classification signs in place (NUE, Alert, SAE, and GE).

E. Set up and test fax machines.

F. Notify SM/POM (ED) that CCR setup is complete.

Attachment 9.7
Support Staff Checklist
(Sheet 2 of 4)

1.0 Initial Responsibility/Activity (cont.) **Notes**

> **NOTE:**
> Personnel who enter the CCR using the card readers are automatically accounted for in the accountability report generated by the LAO

1.3 Assist with Accountability

A. **IF** the Accountability Card Readers become inactive, **THEN** use (Form EP-47), Accountability Roster, to generate a list of individuals, in your facility and their badge numbers.

B. Using (Form EP-47), Accountability Roster, record the names, badge numbers and locations of any watch personnel located in the field and forward roster to the Lead Accountability Officer (LAO).

2.0 Continuous Responsibility/Activity

2.1 Provide Radiological Protection.

A. Using (Form EP-47), Accountability Roster, generate a list and record the names, badge numbers and locations of any individuals as they enter/exit the control room.

2.2 Assist POM in scheduling second shift

A. Rosters of trained personnel are located in the Emergency Telephone Directory.

B. Call office extensions, beepers and home numbers as necessary to identify and schedule second shift relief. Complete CCR staffing using Form EP-43 AND forward to Admin & Logistics Coordinator in EOF.

Attachment 9.7
Support Staff Checklist
(Sheet 3 of 4)

2.0 Continuous Responsibility/Activity (cont.) **Notes**

2.3 **IF** CCR MIDAS is not available to FAX NYS forms,
THEN Fax forms, when completed, to off-site agencies and emergency facilities:

> **NOTE:**
>
> 1) WHEN NYS and County EOCs are activated,
> THEN discontinue faxing Part I forms to Warning Points.
>
> 2) When the EOF assumes responsibility for offsite notifications,
> THEN discontinue faxing Part I and Part II forms to offsite agencies.

A. "NYS Radiological Emergency Data Form" Part I "General Information Instructions" (Form EP-1):

1. NYS/County Warning Points
2. NYS/County EOCs
3. EOF/AEOF
4. JIC

B. "NYS Radiological Emergency Data Form" Part II "Radiological Assessment Data" (Form EP-2)

1. NYS/County EOCs
2. EOF/AEOF
3. JIC

C. When the (A)EOF assumes responsibility for offsite notifications, discontinue faxing Part I and Part II forms to offsite agencies.

1. **IF** MRP-DAS is not operational **THEN** fax the following completed forms to the TSC and (A)EOF:

   - For Unit 2 – Form EP-53, Form EP-54, and Form EP-55.
   - For Unit 3 - Form EP-57, Form EP-58, and Form EP-59.

Attachment 9.7
Support Staff Checklist
(Sheet 4 of 4)

2.0 Continuous Responsibility/Activity (cont.) **Notes**

2.4 Receive faxes from the EOF/AEOF, when activated

A. Form EP-1 "NYS Radiological Emergency Data Form" Part I "General Information Instructions" (Form EP-1).

B. Form EP-2 "NYS Radiological Emergency Data Form" Part II "Radiological Assessment Data" (Form EP-2).

3.0 Closeout Responsibility/Activity

3.0 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.1 Review all documentation generated during the emergency:

C. Ensure all logs, forms and other documentation is complete.

D. Collect all forms, logs and other documentation.

3.2 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase.

Attachment 9.8
CCR Dose Assessor Checklist
(Sheet 1 of 2)

NOTE:
This position is normally staffed by the unaffected unit's on-shift Chemistry Technician.

1.0 Initial Responsibility/Activity

Notes

1.1 Assume the Duties of a CCR Dose Assessor

A. Upon being notified of a Declared Emergency **IMMEDIATELY** report to the normally assigned Control Room.

B. Inform the Shift Manager that you are available to perform the duties of the CCR Dose Assessor.

2.0 Continuous Responsibility/Activity

2.1 Assist the Shift Manager/Plant Operations Manager with Emergency Planning duties as requested.

Attachment 9.8

CCR Dose Assessor Checklist

(Sheet 2 of 2)

Continuous Responsibility/Activity **Notes**

> **NOTE:**
>
> - IP-EP-340 Attachment 9.4, 9.5, and 9.11 may be used for CCR Plant Vent Quick Dose, CCR S/G Tube Rupture Quick Dose, and CCR Multiple Accident Calculations respectively.
> - A NYS Part 2 Form SHALL be completed as soon as possible after it has been determined that a release above Federal Limits exists, a significant change in the radiation release, and updated approximately 30 minutes.

A. Perform Dose Assessment using IP-EP-340

B. Produce a NYS Part 2 Form

C. Get NYS Part 2 Form approved by the Shift Manager

D. Transmit NYS Part 2 Form

2.2 Determine need for a subsequent dose assessment and Part 2, (Perform if necessary).

2.3 When directed by the Shift Manager, turn over Dose Assessment responsibilities to the Dose Assessor in the EOF.

3.0 Closeout Responsibility/Activity

3.1 When directed by the Shift Manager, return all equipment utilized in the response to proper storage locations.

3.2 Review all documentation generated during the emergency:

A. Ensure all logs, forms and other documentation is complete.

B. Collect all forms, logs and other documentation.

3.3 Provide all logs and records to the Shift Manager upon termination of the emergency and entry into the Recovery Phase

CONTROLLED

IPEC
Emergency Action Level Technical Bases

Prepared by:	Craig Delamater	CD	10/1/19
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This procedure excluded from further EN-LI-100 review

Effective Date: October 8, 2019

Table of Contents

Emergency Action Level Technical Bases

1.0 PURPOSE

This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the EAL Upgrade Project for Indian Point Energy Center (IPEC). It should be used to facilitate review of the IPEC EALs and provide historical documentation for future reference. Decision-makers responsible for implementation of EP-IP-120, Emergency Classification, may use this document as a technical reference in support of EAL interpretation. This information may assist the Emergency Director in making classifications, particularly those involving judgment or multiple events. The basis information may also be useful in training, for explaining event classifications to off-site officials, and would facilitate regulatory review and approval of the classification scheme.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. Use of this document for assistance is not intended to delay the emergency classification.

2.0 DISCUSSION

2.1 Background

EALs are the plant-specific indications, conditions or instrument readings that are utilized to classify emergency conditions defined in the Entergy IPEC Emergency Plan.

In 1992, the NRC endorsed NUMARC/NESP-007 "Methodology for Development of Emergency Action Levels" as an alternative to NUREG-0654 EAL guidance.

NEI 99-01 (NUMARC/NESP-007) Revision 5 represents the most recently formally endorsed methodology. Enhancements over earlier revisions included:

- Consolidating the system malfunction initiating conditions and example emergency action levels which address conditions that may be postulated to occur during plant shutdown conditions.
- Initiating conditions and example emergency action levels that fully address conditions that may be postulated to occur at permanently Defueled Stations and Independent Spent Fuel Storage Installations (ISFSIs).
- Simplifying the fission product barrier EAL threshold for a Site Area Emergency.
- Incorporates resolutions to numerous implementation issues including the NRC EAL FAQs.

Using NEI 99-01 Rev. 5, IPEC conducted an EAL implementation upgrade project that produced the EALs discussed herein.

2.2 Fission Product Barriers

Many of the EALs derived from the NEI methodology are fission product barrier based. That is, the conditions that define the EALs are based upon loss or potential loss of one or more of the three fission product barriers. “Loss” and “Potential Loss” signify the relative damage and threat of damage to the barrier. “Loss” means the barrier no longer assures containment of radioactive materials; “potential loss” infers an increased probability of barrier loss and decreased certainty of maintaining the barrier.

The primary fission product barriers are:

A. Fuel Clad (FC): Zirconium tubes which house the ceramic uranium oxide pellets along with the end plugs which are welded into each end of the fuel rods comprise the FC barrier.

B. Reactor Coolant System (RCS): The RCS is comprised of the reactor vessel shell, vessel head, vessel nozzles and penetrations and all primary systems directly connected to the reactor vessel up to the first containment isolation valve.

C. Containment (CNMT): The containment is comprised of the vapor containment structure and all isolation valves required to maintain containment integrity under accident conditions.

2.3 Emergency Classification Based on Fission Product Barrier Degradation

The following criteria are the bases for event classification related to fission product barrier loss or potential loss:

Unusual Event:

Any loss or any potential loss of Containment

Alert:

Any loss or any potential loss of either Fuel Clad or RCS

Site Area Emergency:

Loss or potential loss of any two barriers

General Emergency:

Loss of any two barriers and loss or potential loss of third barrier

2.4 EAL Relationship to EOPs

Where possible, the EALs have been made consistent with and utilize the conditions defined in the IPEC Critical Safety Function Status Trees (CSFSTs). While the symptoms that drive operator actions specified in the CSFSTs are not indicative of all possible conditions which warrant emergency classification, they do define the symptoms, independent of initiating events, for which reactor plant safety and/or fission product barrier integrity are threatened. Where these symptoms are clearly representative of one of the NEI Initiating Conditions, they have been utilized as an EAL. This permits rapid classification of emergency situations based on plant conditions without the need for additional evaluation or event diagnosis. Although some of the EALs presented here are based on conditions defined in the CSFSTs, classification of emergencies using these EALs is not dependent upon Emergency Operating Procedures (EOPs) entry or execution. The EALs can be utilized independently or in conjunction with the EOPs.

2.5 Symptom-Based vs. Event-Based Approach

To the extent possible, the EALs are symptom-based. That is, the action level threshold is defined by values of key plant operating parameters that identify emergency or potential emergency conditions. This approach is appropriate because it allows the full scope of variations in the types of events to be classified as emergencies. However, a purely symptom-based approach is not sufficient to address all events for which emergency classification is appropriate. Particular events to which no predetermined symptoms can be ascribed have also been utilized as EALs since they may be indicative of potentially more serious conditions not yet fully realized.

2.6 EAL Organization

The IPEC EAL scheme includes the following features:

- Division of the EAL set into three broad groups:
    - EALs applicable under <u>all</u> plant operating modes – This group would be reviewed by the EAL-user any time emergency classification is considered.
    - EALs applicable only under <u>hot</u> operating modes – This group would only be reviewed by the EAL-user when the plant is in Hot Shutdown, Startup/Hot Standby, or Power Operations mode.
    - EALs applicable only under <u>cold</u> operating modes – This group would only be reviewed by the EAL-user when the plant is in Cold Shutdown, Refuel or Defueled mode.

  The purpose of the groups is to avoid review of hot condition EALs when the plant is in a cold condition and avoid review of cold condition EALs when the plant is in a hot condition. This approach significantly minimizes the total number of EALs that must be reviewed by the EAL-user for a given plant condition, reduces EAL-user reading burden and, thereby, speeds identification of the EAL that applies to the emergency.

- Within each of the above three groups, assignment of EALs to categories/subcategories – Category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user. Subcategories are used as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The proposed IPEC EAL categories/subcategories and their relationship to NEI Recognition Categories are listed below.

EAL Groups, Categories and Subcategories

EAL Group/Category	EAL Subcategory
Any Operating Mode:	
A – Abnormal Rad Release / Rad Effluent	1 – Offsite Rad Conditions 2 – Onsite Rad Conditions 3 – CR/CAS Radiation
H – Hazards	1 – Natural & Destructive Phenomena 2 – Fire or Explosion 3 – Hazardous Gas 4 – Security 5 – Control Room Evacuation 6 – Judgment
E – Independent Spent Fuel Storage Installation (ISFSI)	None
Hot Conditions:	
S – System Malfunction	1 – Loss of AC Power 2 – ATWS / Criticality 3 – Inability to Reach Shutdown Conditions 4 – Instrumentation / Communications 5 – Fuel Clad Degradation 6 – RCS Leakage 7 – Loss of DC Power
F – Fission Product Barrier Degradation	None
Cold Conditions:	
C – Cold Shutdown / Refuel System Malfunction	1 – Loss of AC Power 2 – RPV Level 3 – RCS Temperature 4 – Communications 5 – Inadvertent Criticality 6 – Loss of DC Power

The primary tool for determining the emergency classification level is the EAL classification matrix. The user of the EAL classification matrix may (but is not required to) consult the EAL Technical Bases in order to obtain additional information concerning the EALs under classification consideration. The user should consult Sections 2.7 and 2.8, and Attachments 1 and 2 of this document for such information.

2.7 Technical Bases Information

EAL technical bases are provided in Attachment 1 for each EAL according to EAL group (Any, Hot, Cold), EAL category (A, C, H, S, E and F) and EAL subcategory. A summary explanation of each category and subcategory is given at the beginning of the technical bases discussions of the EALs included in the category. For each EAL, the following information is provided:

<u>Category Letter & Title</u>

<u>Subcategory Number & Title</u>

<u>Initiating Condition (IC)</u>

Site-specific description of the generic IC given in NEI 99-01

<u>EAL Identifier (enclosed in rectangle)</u>

Each EAL is assigned a unique identifier to support accurate communication of the emergency classification to onsite and offsite personnel. Four characters define each EAL identifier:

1. First character (letter): Corresponds to the EAL category as described above (A, C, H, S, E or F)
2. Second character (letter): The emergency classification (G, S, A or U)
3. Third character (number): Initiating Condition (subcategory) number within the given category. Initiating Conditions (subcategories) are sequentially numbered beginning with the number one (1). If a category does not have a subcategory, this character is assigned the number one (1).

4. Fourth character (number): The numerical sequence of the EAL within the EAL subcategory. If the subcategory has only one EAL, it is given the number one (1).

Classification (enclosed in rectangle):

Unusual Event (U), Alert (A), Site Area Emergency (S) or General Emergency (G)

EAL (enclosed in rectangle)

Exact wording of the EAL as it appears in the EAL classification matrix

Mode Applicability

One or more of the following plant operating conditions comprise the mode to which each EAL is applicable: 1 - Power Operation, 2 - Startup, 3 - Hot Standby, 4 - Hot Shutdown, 5 - Cold Shutdown, 6 - Refuel, Defueled, All or N/A - Not Applicable. (See Section 2.8 for operating mode definitions.)

NEI 99-01 Basis:

The basis discussion applicable to the EAL taken from NEI 99-01

IPEC Basis:

Description of the site-specific rationale for the EAL

IPEC Basis Reference(s):

Site-specific source documentation from which the EAL is derived

2.8 Operating Mode Applicability

MODE	TITLE	REACTIVITY CONDITION (k_{eff})	% RATED THERMAL POWER(a)	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	≥ 0.99	> 5	NA
2	Startup	≥ 0.99	≤ 5	NA
3	Hot Standby	< 0.99	NA	≥ 350
4	Hot Shutdown(b)	< 0.99	NA	$350 > T_{avg} > 200$
5	Cold Shutdown(b)	< 0.99	NA	≤ 200
6	Refueling(c)	NA	NA	NA
	Defueled	Reactor vessel contains no irradiated fuel (full core off load during refueling or extended outage)		

(a) Excluding decay heat.
(b) All reactor vessel head closure bolts fully tensioned.
(c) One or more reactor vessel head closure bolts less than fully tensioned.

The plant operating mode that exists at the time that the event occurs (prior to any protective system or operator action is initiated in response to the condition) should be compared to the mode applicability of the EALs. If a lower or higher plant operating mode is reached before the emergency classification is made, the declaration shall be based on the mode that existed at the time the event occurred.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that have Cold Shutdown or Refueling for mode applicability, even if Hot Shutdown (or a higher mode) is entered during any subsequent heat-up. In particular, the fission product barrier EALs are applicable only to events that initiate in Hot Shutdown or higher.

2.9 Unit Specific Data

The EALs described herein are applicable to both Indian Point Unit 2 and Unit 3 unless specifically stated. Indian Point Unit 2 has been designated the lead plant. In those instances where specific information is different between the two units, the first value shown applies to Unit 2 and the value in parentheses is applicable to Unit 3.

2.10 Validation of Indications, Reports and Conditions

All emergency classifications shall be based upon valid indications, reports or conditions. An indication, report, or condition, is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

2.11 Planned vs. Unplanned Events

Planned evolutions involve preplanning to address the limitations imposed by the condition, the performance of required surveillance testing, and the implementation of specific controls prior to knowingly entering the condition in accordance with the specific requirements of the site's Technical Specifications. Activities which cause the site to operate beyond that allowed by the site's Technical Specifications, planned or unplanned, may result in an EAL threshold being met or exceeded. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned and is within the operational limitations imposed by the specific operating license. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72.

2.12 Classifying Transient Events

For some events, the condition may be corrected before a declaration has been made. The key consideration in this situation is to determine whether or not further plant damage occurred while the corrective actions were being taken. In some situations, this can be readily determined, in other situations, further analyses (e.g., coolant radiochemistry sampling) may be necessary. Classify the event as indicated and terminate the emergency once assessment shows that there were no consequences from the event and other termination criteria are met.

Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when EAL declaration criteria may be met momentarily during the normal expected response of the plant, declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared.

Reporting requirements of 10 CFR 50.72 are applicable and the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, should be applied.

2.13 Imminent EAL Thresholds

Although the majority of the EALs provide very specific thresholds, the Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is imminent. If, in the judgment of the Emergency Director, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded. While this is particularly prudent at the higher emergency classes (the early classification may permit more effective implementation of protective measures), it is nonetheless applicable to all emergency classes.

2.14 Treatment Of Multiple Events

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. Or, an Alert and a Site Area Emergency is a Site Area Emergency.

2.15 Emergency Classification Downgrading and Termination

Another important aspect of usable EAL guidance is the consideration of what to do when the risk posed by an emergency is clearly decreasing. While event downgrading to lower emergency classification levels may have merit under certain circumstances it is the policy at IPEC that emergency classifications be directly terminated rather than downgraded and transitioned into the recovery phase per implementing procedure guidance.

3.0 REFERENCES

3.1 Developmental

3.1.1 NEI 99-01 Revision 5, Methodology for Development of Emergency Action Levels, February 2008 (ADAMS Accession Number ML080450149)

3.1.2 NRC Regulatory Issue Summary (RIS) 2003-18, Supplement 2, Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels Revision 4, Dated January 2003 (December 12, 2005)

3.2 Implementing

3.2.1 EP-IP-120 Emergency Classification

3.2.2 EAL Comparison Matrix

3.2.3 EAL Classification Matrix

3.3 Commitments

None

4.0 DEFINITIONS & ACRONYMS

Definitions

Affecting Safe Shutdown

Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable hot or cold shutdown condition. Plant condition applicability is determined by Technical Specification LCOs in effect.

Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in hot shutdown. Hot shutdown is achievable, but cold shutdown is not. This event is not "affecting safe shutdown."

Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in cold shutdown. Hot shutdown is achievable, but cold shutdown is not. This event is "affecting safe shutdown."

Bomb

Refers to an explosive device suspected of having sufficient force to damage plant systems or structures.

Civil Disturbance

A group of people violently protesting station operations or activities at the site

Confinement Boundary

Is the barrier(s) between areas containing radioactive substances and the environment

Containment Closure

The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met.

Explosion

Is a rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.

Extortion

Is an attempt to cause an action at the station by threat of force.

Faulted

In a steam generator, the existence of secondary side leakage that results in an uncontrolled drop in steam generator pressure or the steam generator being completely depressurized

Fire

Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

Hostage

Person(s) held as leverage against the station to ensure that demands will be met by the station.

Hostile Action

An act toward IPEC or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included.

Hostile Action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on IPEC. Non-terrorism-based EALs should be used to address such activities, (e.g., violent acts between individuals in the owner controlled area).

Hostile Force

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

Imminent

Mitigation actions have been ineffective, additional actions are not expected to be successful, and trended information indicates that the event or condition will occur. Where imminent timeframes are specified, they shall apply.

Inoperable

Not able to perform its intended function

Intruder

Person(s) present in a specified area without authorization.

Intrusion

The act of entering without authorization Discovery of a bomb in a specified area is indication of intrusion into that area by a hostile force.

Independent Spent Fuel Storage Installation (ISFSI)

A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

Normal Plant Operations

Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from Normal Plant Operations.

Projectile

An object directed toward a NPP that could cause concern for its continued operability, reliability, or personnel safety.

Protected Area

An area which normally encompasses all controlled areas within the security protected area fence as depicted in Drawing 931-F-15343 Plot Plan Unit 1, 2 & 3.

Release

A release of radioactive materials due to the classified event (per NYS Radiological Emergency Data Form, Part 1). In accordance with the Part 1 form, "Release" is classified as one of the four (4) following descriptions:

A. NO Release
B. Release BELOW Federal Limits
C. Release ABOVE Federal Limits
D. Unmonitored Release Requiring Evaluation

Ruptured

In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection

Sabotage

Deliberate damage, misalignment, or miss-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of Sabotage until this determination is made by security supervision.

Security Condition

Any security event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the plant. A security condition does not involve a hostile action.

Significant Transient

An unplanned event involving any of the following:

- Runback > 25% thermal power
- Electrical load rejection > 25% full electrical load

- Reactor scram
- ECCS injection
- Thermal power oscillations > 10%

Strike Action

Work stoppage within the Protected Area by a body of workers to enforce compliance with demands made on IPEC. The strike action must threaten to interrupt Normal Plant Operations.

Unisolable

A breach or leak that cannot be promptly isolated.

Unplanned

A parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.

Valid

An indication, report, or condition, is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Visible Damage

Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

<u>Acronyms</u>

AC........Alternating Current
APRM........Average Power Range Meter
ATWS........Anticipated Transient Without Scram
BWR........Boiling Water Reactor
CAS........Central Alarm Station
CDE........Committed Dose Equivalent
CFR........Code of Federal Regulations
DC........Direct Current
EAL........Emergency Action Level
ECCS........Emergency Core Cooling System

ECL.......... Emergency Classification Level
EDG.......... Emergency Diesel Generator
ELEV. .... Elevation
ENS.......... Emergency Notification System
EOF .... Emergency Operations Facility
EOP .... Emergency Operating Procedure
EPA .... Environmental Protection Agency
EPG .... Emergency Procedure Guideline
EPIP .... Emergency Plan Implementing Procedure
ESF.......... Engineered Safety Feature
FAA.......... Federal Aviation Administration
FBI .... Federal Bureau of Investigation
FEMA.......... Federal Emergency Management Agency
FSAR .... Final Safety Analysis Report
GE .... General Emergency
IC .... Initiating Condition
IDLH .... Immediately Dangerous to Life and Health
IPEC .... Indian Point Energy Center
IPEEE .... Individual Plant Examination of External Events (Generic Letter 88-20)
ISFSI.......... Independent Spent Fuel Storage Installation
Keff .... Effective Neutron Multiplication Factor
LCO .... Limiting Condition of Operation
LER.......... Licensee Event Report
LOCA.......... Loss of Coolant Accident
LWR.......... Light Water Reactor
MSIV.......... Main Steam Isolation Valve
MSL .... Main Steam Line
mR .... milliRoentgen
MW .... Megawatt
NEI.......... Nuclear Energy Institute
NESP.......... National Environmental Studies Project
NPP .... Nuclear Power Plant
NRC.......... Nuclear Regulatory Commission
NSSS.......... Nuclear Steam Supply System
NORAD.......... North American Aerospace Defense Command

OBE .... Operating Basis Earthquake
OCA .... Owner Controlled Area
ODCM .... Off-site Dose Calculation Manual
PRA/PSA .... Probabilistic Risk Assessment / Probabilistic Safety Assessment
PWR .... Pressurized Water Reactor
PSIG .... Pounds per Square Inch Gauge
R .... Roentgen
RCP .... Reactor Coolant Pump
RCS .... Reactor Coolant System
rem .... Roentgen Equivalent Man
RPS .... Reactor Protection System
RPV .... Reactor Pressure Vessel
SAE .... Site Area Emergency
SBO .... Station Blackout
SFP .... Spent Fuel Pit
SPDS .... Safety Parameter Display System
SRO .... Senior Reactor Operator
TEDE .... Total Effective Dose Equivalent
TAF .... Top of Active Fuel
TC .... Thermocouple
TSC .... Technical Support Center
UE .... Unusual Event

5.0 RESPONSIBILITIES

5.1 Emergency Planning Manager

The Emergency Planning Manager shall periodically evaluate the need to update and revise the EAL technical bases due to:

A. Revisions to EALs

B. Changes in plant configuration or design

B. Changes in system set-points or values reference in the EALs

C. Operating experience and interpretation clarifications

Any revision to the wording of one or more EALs shall require a revision to this procedure and shall be reviewed and approved as part of the EAL change.

5.2. EAL End-Users

Emergency Response Organization members responsible for the evaluation of EALs and/or emergency classification shall become familiar with the contents of this document. This document may be used to assist personnel responsible for emergency classification in interpreting the intent of EALs.

6.0 IPEC-TO-NEI 99-01 EAL/PAGE CROSSREFERENCE

This cross-reference is provided to facilitate association and location of an IPEC EAL within the NEI 99-01 IC/EAL identification scheme with page number. Further information regarding the development of the IPEC EALs based on the NEI guidance can be found in the EAL Comparison Matrix.

IPEC	NEI 99-01		
EAL	**IC**	**Example EAL**	**PAGE #**
AU1.1	AU1	1	30
AU1.2	AU1	1	33
AU1.3	AU1	3	36
AU2.1	AU2	1	57
AU2.2	AU2	2	60
AA1.1	AA1	1	38
AA1.2	AA1	1	40
AA1.3	AA1	3	43
AA2.1	AA2	1	62
AA2.2	AA2	2	64
AA3.1	AA3	1	66
AS1.1	AS1	1	45
AS1.2	AS1	2	47
AS1.3	AS1	4	49
AG1.1	AG1	1	51
AG1.2	AG1	2	53
AG1.3	AG1	4	55

IPEC	NEI 99-01		
EAL	IC	Example EAL	PAGE #
CU1.1	CU3	1	70
CU2.1	CU1	1, 2	75
CU2.2	CU2	1	77
CU2.3	CU2	2	81
CU3.1	CU4	1	117
CU3.2	CU4	2	119
CU4.1	CU6	1, 2	127
CU5.1	CU8	1	130
CU6.1	CU7	1	131
CA1.1	CA3	1	73
CA2.1	CA1	1, 2	85
CA3.1	CA4	1, 2, 3	123
CS2.1	CS1	1	89
CS2.2	CS1	2	92
CS2.3	CS1	3	95
CG2.1	CG1	1	102
CG2.2	CG1	2	108
FU1.1	FU1	1	250
FA1.1	FA1	1	251
FS1.1	FS1	1	252
FG1.1	FG1	1	254
HU1.1	HU1	1	135

IPEC	NEI 99-01		
EAL	IC	Example EAL	PAGE #
HU1.2	HU1	2	137
HU1.3	HU1	4	139
HU1.4	HU1	3	141
HU1.5	HU1	5	143
HU2.1	HU2	1	158
HU2.2	HU2	2	160
HU3.1	HU3	1	164
HU3.2	HU3	2	166
HU4.1	HU4	1, 2, 3	170
HU6.1	HU5	1	183
HA1.1	HA1	1	145
HA1.2	HA1	2	147
HA1.3	HA1	5	149
HA1.4	HA1	4	151
HA1.5	HA1	3	153
HA1.6	HA1	6	155
HA2.1	HA2	1	162
HA3.1	HA3	1	168
HA4.1	HA4	1, 2	173
HA5.1	HA5	1	180
HA6.1	HA6	1	185
HS4.1	HS4	1	176

IPEC	NEI 99-01		
EAL	IC	Example EAL	PAGE #
HS5.1	HS2	1	181
HS6.1	HS3	1	187
HG6.1	HG2	1	189
SU1.1	SU1	1	194
SU2.1	SU8	2	211
SU3.1	SU2	1	221
SU4.1	SU3	1	223
SU4.2	SU6	1, 2	225
SU5.1	SU4	2	235
SU5.2			237
SU6.1	SU5	1, 2	239
SA1.1	SA5	1	198
SA2.1	SA2	1	212
SA4.1	SA4	1	228
SS1.1	SS1	1	201
SS2.1	SS2	1	215
SS4.1	SS6	1	232
SS7.1	SS3	1	241
SG1.1	SG1	1	205
SG2.1	SG2	1	218
EU1.1	E-HU1	1	244

7.0 ATTACHMENTS

7.1 Attachment 1, EAL Bases

7.2 Attachment 2, Fission Product Barrier Loss / Potential Loss Matrix and Basis

Category A – Abnormal Rad Release / Rad Effluent

EAL Group: ANY (EALs in this category are applicable to any plant condition, hot or cold.)

Many EALs are based on actual or potential degradation of fission product barriers because of the elevated potential for offsite radioactivity release. Degradation of fission product barriers though is not always apparent via non-radiological symptoms. Therefore, direct indication of elevated radiological effluents or area radiation levels are appropriate symptoms for emergency classification.

At lower levels, abnormal radioactivity releases may be indicative of a failure of containment systems or precursors to more significant releases. At higher release rates, offsite radiological conditions may result which require offsite protective actions. Elevated area radiation levels in plant may also be indicative of the failure of containment systems or preclude access to plant vital equipment necessary to ensure plant safety.

Events of this category pertain to the following subcategories:

1. Offsite Rad Conditions

Direct indication of effluent radiation monitoring systems provides a rapid assessment mechanism to determine releases in excess of classifiable limits. Projected offsite doses, actual offsite field measurements or measured release rates via sampling indicate doses or dose rates above classifiable limits.

2. Onsite Rad Conditions & Irradiated Fuel Events

Sustained general area radiation levels in excess of those indicating loss of control of radioactive materials or those levels which may preclude access to vital plant areas also warrant emergency classification.

3. CR/CAS Radiation

Sustained general area radiation levels in excess of 15 mR/hr. may preclude access to areas requiring continuous occupancy also warrant emergency classification.

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for ≥ 60 min.

EAL:

AU1.1 Unusual Event

Any valid gaseous monitor reading > Table A-1 column "UE" for ≥ 60 min. (Note 2)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The release rate multiples are specified in EALs AU1.1 and AA1.1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

IPEC Basis:

Gaseous releases in excess of two times the site ODCM (ref. 1) instantaneous limits that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes.

The values shown for each monitor represents two times the calculated ODCM release rates (ref. 2).

IPEC Basis Reference(s):

1. IPEC Offsite Dose Calculation Manual
2. EP-EALCALC-IPEC-1001, Revision 2, Radiological Gaseous Effluent EAL Values

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for ≥ 60 min.

EAL:

AU1.2 Unusual Event

Any valid liquid monitor reading > Table A-1 column "UE" for ≥ 60 min. (Note 2)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The release rate multiples are specified in EALs AU1.2 and AA1.2 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

IPEC Basis:

Liquid releases in excess of two times the site ODCM (ref. 1) instantaneous limits that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes.

The values shown for each monitor represents two times the calculated monitor alarm set-points which are set in accordance with the ODCM (ref. 2).

IPEC Basis Reference(s):

1. IPEC Offsite Dose Calculation Manual
2. Letter from S. Sandike to L. Glander dated Nov.15, 2010

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for ≥ 60 min.

EAL:

AU1.3	**Unusual Event**
Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x ODCM limits for ≥ 60 min. (Note 2)	

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses a potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The ODCM multiples are specified in AU1.3 and AA1.3 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged. For example, a release exceeding 4x ODCM for 30 minutes does not meet the threshold.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set-points, etc.) on the applicable permit.

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

IPEC Basis

Confirmed sample analyses in excess of two times the site Offsite Dose Calculation Manual (ODCM) (ref. 1) instantaneous limits that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes.

IPEC Basis Reference(s):

1. IPEC, Offsite Dose Calculation Manual

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment that exceeds significant multiples of the Offsite Dose Calculation Manual (ODCM) limits for 15 minutes or longer

EAL:

AA1.1 Alert

Any valid gaseous monitor reading > Table A-1 column "Alert" for ≥ 15 min. (Note 2)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The release rate multiples are specified in AU1.1 and AA1.1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set-points, etc.) on the applicable permit.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

IPEC Basis:

The selected threshold value for the Plant Vent radiation monitors represents the geometric mean between the calculated UE threshold and SAE threshold values (ref. 2). This is due to the differences in the assumptions used to determine the ODCM (ref. 1) based alarm set-points and the dose assessment methodology used to calculate the SAE and GE thresholds for this release path. Selecting an average between the UE and SAE threshold values provides a realistic near-linear escalation path between the UE and SAE classification levels.

IPEC Basis Reference(s):

1. IPEC Offsite Dose Calculation Manual
2. EP-EALCALC-IPEC-1001, Revision 2, Radiological Gaseous Effluent EAL Values

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment that exceeds significant multiples of the radiological effluent Offsite Dose Calculation Manual (ODCM) limits for 15 minutes or longer

EAL:

AA1.2 Alert

Any valid liquid monitor reading > Table A-1 column "Alert" for ≥ 15 min. (Note 2)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The release rate multiples are specified in AU1.2 and AA1.2 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set-points, etc.) on the applicable permit.

This EAL is intended for sites that have established effluent monitoring on non-routine release pathways for which a discharge permit would not normally be prepared.

IPEC Basis:

This event escalates from the Unusual Event by escalating the magnitude of the release by:

- R-49 [19] by a factor of 100
- R-54 [18] release rate at the upper range of the monitor (>4.0E-02 µCi/cc) (ref. 2).

Liquid releases in excess of the limits shown that continue for 15 minutes or longer represent an significant uncontrolled situation and hence, a potential substantial degradation in the level of safety. The final integrated dose (which is very low in the Alert emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 15 minutes.

IPEC Basis Reference(s):

1. IPEC Offsite Dose Calculation Manual
2. Letter from S. Sandike to L. Glander dated Nov.15, 2010

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: **Any** release of gaseous or liquid radioactivity to the environment that exceeds significant multiples of the radiological effluent Offsite Dose Calculation Manual (ODCM) limits for 15 minutes or longer

EAL:

AA1.3 Alert

Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x ODCM limits for ≥ 15 min. (Note 2)

Note 2: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.

Mode Applicability:

All

NEI 99-01 Basis:

The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

This EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The release rate multiples are specified in AU1.3 and AA1.3 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm set-points, etc.) on the applicable permit.

This EAL addresses uncontrolled releases that are detected by sample analyses, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.

IPEC Basis:

Confirmed sample analyses in excess of two hundred times the site Offsite Dose Calculation Manual (ODCM) limits (ref. 1) that continue for 15 minutes or longer represent an uncontrolled situation and hence, a potential substantial degradation in the level of safety. This event escalates from the Unusual Event by raising the magnitude of the release by a factor of 100 over the Unusual Event level (i.e., 200 times ODCM).

The required release duration was reduced to 15 minutes in recognition of the raised severity.

IPEC Basis Reference(s):

1. IPEC, Offsite Dose Calculation Manual

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release

EAL:

AS1.1 Site Area Emergency

Any valid radiation monitor reading that exceeds Table A-1 column "SAE" for ≥ 15 min. (Note 1)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EA AS2.1.AG1.2) Do not delay declaration awaiting dose assessment results.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors.

The TEDE dose is set at 10% of the EPA PAG, while the 500 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

The site specific monitor list includes effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading EAL is not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EAL.

IPEC Basis:

None

IPEC Basis Reference(s):

1. EP-EALCALC-IPEC-1001, Revision 2, Radiological Gaseous Effluent EAL Values

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release

EAL:

AS1.2 Site Area Emergency

Dose assessment using actual meteorology indicates doses > 100 mRem TEDE or > 500 mRem thyroid CDE at or beyond the site boundary

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "…sum of EDE and CEDE…." The EPA PAG guidance provides for the use adult thyroid dose conversion factors.

The TEDE dose is set at 10% of the EPA PAG, while the 500 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Since dose assessment is based on actual meteorology, whereas the monitor reading EAL is not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EAL.

IPEC Basis:

The dose assessment (ref. 1) EALs are based on a Site Boundary dose rate of 100 mRem/hr. TEDE or 500 mRem/hr. CDE thyroid, whichever is more limiting. Actual meteorology is specifically identified since it gives the most accurate dose assessment. Actual meteorology (including forecasts) should be used whenever possible.

IPEC Basis Reference(s):

1. IP-EP-310, "Dose Assessment"

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release

EAL:

AS1.3 Site Area Emergency

Field survey indicates closed window dose rate > 100 mRem/hr. that is expected to continue for ≥ 1 hr. at or beyond the site boundary

OR

Field survey sample analysis indicates thyroid CDE of > 500 mRem for 1 hr. of inhalation at or beyond the site boundary

(Note 1)

Note 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EAL AS1.2/AG1.2) Do not delay declaration awaiting dose assessment results.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed 10% of the EPA Protective Action Guides (PAGs). Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors.

The TEDE dose is set at 10% of the EPA PAG, while the 500 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

IPEC Basis:

The 500 mRem integrated CDE thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for TEDE and thyroid exposure. In establishing the field survey emergency action levels, a duration of one hour is assumed (ref. 1, 2). Therefore, the dose rate EALs are based on a Site Boundary dose rate of 100 mRem/hr. TEDE or 500 mRem for 1 hour of inhalation CDE thyroid, whichever is more limiting.

IPEC Basis Reference(s):

1. IP-EP-320 "Radiological Field Monitoring"
2. IP-EP-310 "Dose Assessment"

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

AG1.1 General Emergency

Any valid radiation monitor reading > Table A-1 column "GE" for ≥ 15 min. (Note 1)

Table A-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	Alert	UE
Gaseous	R-27	7.5 E+07 μCi/sec (2.3 E+00 μCi/cc)	7.5 E+06 μCi/sec (2.3 E-01 μCi/cc)	1.4 E+06 μCi/sec (4.2 E-02 μCi/cc)	2.6 E+05 μCi/sec (8.0 E-03 μCi/cc)
Gaseous	R-44 [14]	N/A	N/A	4.2 E-02 μCi/cc	8.0 E-03 μCi/cc
Liquid	R-54 [18]	N/A	N/A	4.0E-02 μCi/cc	2.5E-03 μCi/cc
Liquid	R-49 [19]	N/A	N/A	5.8E-02 μCi/cc	5.8E-04 μCi/cc

Note 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EAL AS1.2/AG1.2) Do not delay declaration awaiting dose assessment results.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, NYS has decided to calculate child thyroid CDE. Utility IC/EALs are consistent with those of the states involved in the facilities emergency planning zone.

The TEDE dose is set at the EPA PAG, while the 5000 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

The monitor list includes effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading EAL is not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EAL.

IPEC Basis:

The General Emergency effluent monitor threshold is one decade greater than the Site Area Emergency value (ref. 1).

IPEC Basis Reference(s):

1. EP-EALCALC-IPEC-1001, Revision 2, Radiological Gaseous Effluent EAL Values

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

AG1.2	**General Emergency**
Dose assessment using actual meteorology indicates doses > 1,000 mRem TEDE or > 5,000 mRem thyroid CDE at or beyond the site boundary	

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, NYS has decided to calculate child thyroid CDE. Utility IC/EALs are consistent with those of the states involved in the facilities emergency planning zone.

The TEDE dose is set at the EPA PAG, while the 5000 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

The site specific monitor list includes effluent monitors on all potential release pathways.

Since dose assessment is based on actual meteorology, whereas the monitor reading EAL is not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EAL.

IPEC Basis:

The General Emergency dose assessment (ref. 1) values are based on the boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 1,000 mRem TEDE or 5,000 mRem CDE thyroid for the actual or projected duration of the release. Actual meteorology is specifically identified since it gives the most accurate dose assessment. Actual meteorology should be used whenever possible.

IPEC Basis Reference(s):

1. IP-EP-310, "Dose Assessment"

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 1 – Offsite Rad Conditions

Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

AG1.3 General Emergency

Field survey results indicate closed window dose rates > 1,000 mRem/hr. expected to continue for ≥ 1 hr. at or beyond the site boundary

OR

Analyses of field survey samples indicate thyroid CDE of > 5,000 mRem for 1 hr. of inhalation at or beyond the site boundary

(Note 1)

Note 1: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. **IF** dose assessment results are available, **THEN** declaration should be based on dose assessment instead of radiation monitor values. (See EAL AS1.2/AG1.2) Do not delay declaration awaiting dose assessment results.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage.

While these failures are addressed by other EALs, this EAL provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone. It is important to note that for the more severe accidents the release may be unmonitored or there may be large uncertainties associated with the source term and/or meteorology.

The EPA PAGs are expressed in terms of the sum of the effective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid committed dose equivalent (CDE). For the purpose of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "…sum of EDE and CEDE…." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, NYS has decided to calculate child thyroid CDE. Utility IC/EALs are consistent with those of the states involved in the facilities emergency planning zone.

The TEDE dose is set at the EPA PAG, while the 5000 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

IPEC Basis:

The 5,000 mRem integrated CDE thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for TEDE and thyroid exposure. In establishing the dose rate emergency action levels, a duration of one hour is assumed (ref. 1, 2). Therefore, the dose rate EALs are based on a Site Boundary dose rate of 1000 mRem/hr. TEDE or 5000 mRem for 1 hour of inhalation CDE thyroid, whichever is more limiting.

IPEC Basis Reference(s):

1. IP-EP-320 "Radiological Field Monitoring"
2. IP-EP-310 "Dose Assessment"

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 2 – Onsite Rad Conditions & Irradiated Fuel Events

Initiating Condition: Unplanned rise in plant radiation levels

EAL:

AU2.1 Unusual Event

Unplanned low water level or alarm indicating uncontrolled water level decrease in the refueling cavity, SFP or fuel transfer canal

AND

Valid area radiation monitor reading rise on **any** of the following:

- R-2/R-7 Vapor Containment Area Monitors
- R-5 Fuel Storage Building Area Monitor
- R-25/R-26 Vapor Containment High Radiation Area Monitors

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in unplanned increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate or decrease in water storage tank level.

In light of Reactor Cavity Seal failure incidents at two different PWRs and loss of water in the Spent Fuel Pit/Fuel Transfer Canal at a BWR, explicit coverage of these types of events via this threshold is appropriate given their potential for increased doses to plant staff.

The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to combined with another indicator (or personnel report) of water loss.

For refueling events where the water level drops below the RPV flange classification would be via CU2.1. This event escalates to an Alert per AA2.1 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Table for events in operating modes 1-3.

IPEC Basis:

Loss of inventory from the refueling cavity, SFP or fuel transfer canal may reduce water shielding above spent fuel and cause unexpected increases in plant radiation. Classification as an Unusual Event is warranted as a precursor to a more serious event.

On Unit 2, the SFP Technical Specification minimum water level is 92' 2". The SFP low water level alarm set-point is 93' 3". Water level restoration instructions for loss of refueling cavity water level during refueling are performed in accordance with 2-AOP-FH-1.

On Unit 3, the SFP low water level alarm set-point is actuated by LC-650. Water level restoration instructions for loss of refueling cavity water level during refueling are performed in accordance with 3-AOP-FH-1.

When the fuel transfer canal is directly connected to the SFP and reactor cavity, there could exist the possibility of uncovering irradiated fuel in the fuel transfer canal. Therefore, this EAL is applicable for conditions in which irradiated fuel is being transferred to and from the RPV and SFP.

The listed radiation monitors are those likely to be affected by the loss of inventory from the reactor cavity, SFP and fuel transfer canal.

This event escalates to an Alert if irradiated fuel outside the reactor vessel is uncovered or damaged. For events involving irradiated fuel in the reactor vessel, escalation would be via the fission product barrier matrix

IPEC Basis Reference(s):

1. 2-AOP-FH-1, "Fuel Damage or Loss of SFP/Refueling Cavity Level"
2. 3-AOP-FH-1, "Fuel Damage or Loss of SFP/Refueling Cavity Level

Attachment 1 – Emergency Action Level Bases

Category: A – Radioactivity Release / Area Radiation

Subcategory: 2 – Onsite Rad Conditions & Irradiated Fuel Events

Initiating Condition: Unplanned rise in plant radiation levels

EAL:

AU2.2 Unusual Event

Unplanned valid area radiation monitor reading or survey results increase by a factor of 1,000 over normal levels*

* Normal levels can be considered as the highest reading in the past 24 hours excluding the current peak value

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in unplanned increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant.

This EAL addresses increases in plant radiation levels that represent a loss of control of radioactive material resulting in a potential degradation in the level of safety of the plant.

This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area.

IPEC Basis:

The ARMs monitor the gamma radiation levels in units of mR/hr. at selected areas throughout the station. If radiation levels exceed a preset limit in any channel, the Control Room annunciator and local alarms will be energized to warn of abnormal or significantly changing radiological conditions. The alarm limit is normally set at approximately 10 times normal background for each channel. (ref. 1, 2)

Routine and work specific surveys are conducted throughout the station at frequencies specified by the RP Superintendent. Routine surveys are scheduled per the RP Department Surveillance Schedule. Work specific surveys are conducted in accordance with the Radiation Work Permit (RWP).

IPEC Basis Reference(s):

1. 2-SOP-12.3.3 Radiation Monitor Set-point Control
2. 3-SOP-RM-010 Radiation Monitor Set-point Control

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 2 – Onsite Rad Conditions & Irradiated Fuel Events

Initiating Condition: Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

EAL:

AA2.1 Alert

Damage to irradiated fuel or loss of water level (uncovering irradiated fuel outside the Reactor Vessel) that causes a valid high alarm on **any** of the following radiation monitors:

- R-2/R-7 Vapor Containment Area Monitors
- R-5 Fuel Storage Building Area Monitor
- R-42[R-12] VC Gas Activity
- R-25/R-26 Vapor Containment High Radiation Area Monitors

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2.1 in that fuel activity has been released, or is anticipated due to fuel heat up. This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

This EAL addresses radiation monitor indications of fuel uncovery and/or fuel damage.

Increased ventilation monitor readings may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Increased background at the ventilation monitor due to water level decrease may mask increased ventilation exhaust airborne activity and needs to be considered.

While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.

For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel pool or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to combined with another indicator (or personnel report) of water loss.

Escalation of this emergency classification level, if appropriate, would be based on AS1.1 or AG1.1.

IPEC Basis:

When considering classification, information may come from:

- Radiation monitor readings
- Sampling and surveys
- Dose projections/calculations
- Reports from the scene regarding the extent of damage (e.g., refueling crew, radiation protection technicians)

This EAL is defined by the specific areas where irradiated fuel is located, such as the refueling cavity or Spent Fuel Pit (SFP). The listed radiation monitors are those likely to be affected by the loss of inventory and/or damaged spent fuel located in the reactor cavity, SFP and fuel transfer canal.

IPEC Basis Reference(s):

1. 2-AOP-FH-1, "Fuel Damage or Loss of SFP/Refueling Cavity Level"
2. 3-AOP-FH-1, "Fuel Damage or Loss of SFP/Refueling Cavity Level
3. 2-SOP-12.3.3 Radiation Monitor Set-point Control
4. 3-SOP-RM-010 Radiation Monitor Set-point Control

Attachment 1 – Emergency Action Level Bases

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 2 – Onsite Rad Conditions & Irradiated Fuel Events

Initiating Condition: Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

EAL:

AA2.2 Alert

A water level drop in the reactor cavity, SFP or fuel transfer canal that will result in irradiated fuel becoming uncovered

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses increases in radiation dose rates within plant buildings, and may be a precursor to a radioactivity release to the environment. These events represent a loss of control over radioactive material and represent an actual or substantial potential degradation in the level of safety of the plant.

These events escalate from AU2.1 in that fuel activity has been released, or is anticipated due to fuel heat up. This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

Indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate or decrease in water storage tank level.

Escalation of this emergency classification level, if appropriate, would be based on AS1.1 or AG1.1.

IPEC Basis:

When considering classification, information may come from:

- Radiation monitor readings
- Sampling and surveys
- Dose projections/calculations
- Reports from the scene regarding the extent of damage (e.g., refueling crew, radiation protection technicians)

If available, video cameras may allow remote observation. Depending on available level indication, the declared threshold may need to be based on indications of makeup rate or decrease in refueling water storage tank level.

IPEC Basis Reference(s):

1. 2[3]-AOP-FH-1, "Fuel Damage or Loss of SFP/Refueling Cavity Level"

Category: A – Abnormal Rad Release / Rad Effluent

Subcategory: 3 – CR/CAS Radiation

Initiating Condition: Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions

EAL:

AA3.1 Alert

Dose rates > 15 mR/hr. in areas requiring continuous occupancy to maintain plant safety functions:

Control Room (R-1)

OR

CAS

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses increased radiation levels that: impact continued operation in areas requiring continuous occupancy to maintain safe operation or to perform a safe shutdown.

The cause and/or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other IC may be involved.

This EAL is not meant to apply to increases in the containment radiation monitors as these are events which are addressed in the fission product barrier table.

The value of 15mR/hr. is derived from the GDC 19 value of 5 rem in 30 days with adjustment for expected occupancy times. Although Section III.D.3 of NUREG-0737, "Clarification of TMI Action Plan Requirements", provides that the 15 mR/hr. value can be averaged over the 30 days, the value is used here without averaging, as a 30 day duration implies an event potentially more significant than an Alert.

Areas requiring continuous occupancy include the control room and any other control stations that are staffed continuously, such as the security alarm station.

IPEC Basis:

Areas that meet this threshold include the Control Room and the Central Alarm Station (CAS). The security access point is included in this EAL because of its importance to permitting access to areas required to assure safe plant operations.

There are no permanently installed CAS area radiation monitors that may be used to assess this EAL threshold. Therefore these thresholds must be assessed via local radiation survey for the CAS.

IPEC Basis Reference(s):

Category C – Cold Shutdown / Refueling System Malfunction

EAL Group: Cold Conditions (RCS temperature ≤ 200ºF); EALs in this category are applicable only in one or more cold operating modes.

Category C EALs are directly associated with cold shutdown or refueling system safety functions. Given the variability of plant configurations (e.g., systems out-of-service for maintenance, containment open, reduced AC power redundancy, time since shutdown) during these periods, the consequences of any given initiating event can vary greatly. For example, a loss of decay heat removal capability that occurs at the end of an extended outage has less significance than a similar loss occurring during the first week after shutdown. Compounding these events is the likelihood that instrumentation necessary for assessment may also be inoperable. The cold shutdown and refueling system malfunction EALs are based on performance capability to the extent possible with consideration given to RCS integrity, Containment Closure, and fuel clad integrity for the applicable operating modes (4 - Cold Shutdown, 5 - Refuel, D – Defueled).

The events of this category pertain to the following subcategories:

1. Loss of AC Power

Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of onsite and offsite sources for 480 VAC safeguards buses.

2. RPV Level

RPV water level is a measure of inventory available to ensure adequate core cooling and, therefore, maintain fuel clad integrity. The RPV provides a volume for the coolant that covers the reactor core. The RPV and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel clad integrity fail.

3. RCS Temperature

Uncontrolled or inadvertent temperature or pressure increases are indicative of a potential loss of safety functions.

4. Communications

Certain events that degrade plant operator ability to effectively communicate with essential personnel within or external to the plant warrant emergency classification.

5. Inadvertent Criticality

Inadvertent criticalities pose potential personnel safety hazards as well being indicative of losses of reactivity control.

6. Loss of DC Power

Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of vital 125-Volt DC power sources.

Attachment 1 – Emergency Action Level Bases

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – Loss of AC Power

Initiating Condition: AC power capability to safeguards buses reduced to a single power source for 15 minutes or longer such that **any** additional single failure would result in loss of **all** AC power to safeguards buses

EAL:

CU1.1 Unusual Event

AC power capability to 480 V safeguards buses (5A, 2A/3A, 6A) reduced to a single power source (Table C-4) for ≥ 15 min. such that **any** additional single failure would result in loss of **all** AC power to safeguard buses (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-4 Safeguard Bus AC Power Sources

	Onsite	Offsite
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

5 - Cold Shutdown, 6 – Refuel

NEI 99-01 Basis:

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a station blackout. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. The subsequent loss of this single power source would escalate the event to an Alert in accordance with CA1.1.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

IPEC Basis:

The condition indicated by this EAL would include the degradation of the offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency bus. Another related condition could be the loss of all offsite power and loss of onsite emergency diesels with only one train of emergency buses being fed from the unit main generator, or the loss of onsite emergency diesels with only one train of emergency buses being fed from offsite power. The subsequent loss of this single power source would result in a loss of all AC to the 480 V safeguards buses.

Indian Point Unit 2 has a blackout/unit trip/no safety injection logic that opens all the normal supply breakers and locks them out from re-closure. The blackout is sensed by under voltage on either 480V Bus 5A or 6A. The unit trip is sensed by lockout relays 86P and 86BU. Therefore, with 86P or 86BU relays tripped, under voltage on Bus 5A or 6A (a single failure) would cause a loss of all offsite power to the "essential buses." For the condition where all emergency diesel generators are inoperable when the unit is shut down and relays 86P and 86BU are not reset, a loss of power to either 480V Bus 5A or 480V Bus 6A will cause the normal supply breakers to all 480V buses to open.

If emergency bus AC power is reduced to a single source for greater than 15 minutes, an Unusual Event is declared under this EAL.

This cold condition EAL is equivalent to the hot condition loss of AC power EAL SA1.1.

IPEC Basis Reference(s):

1. FSAR Section 8.2
2. 2-ECA-0.0, "Loss of All AC Power"
3. 3-ECA-0.0, "Loss of All AC Power"

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – Loss of AC Power

Initiating Condition: Loss of **all** offsite and **all** onsite AC power to safeguards buses for 15 minutes or longer

EAL:

CA1.1 Alert

Loss of **all** offsite and onsite AC power (Table C-4) to 480 V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-4 Safeguard Bus AC Power Sources

	Onsite	Offsite
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling, D – Defueled

NEI 99-01 Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in Cold Shutdown, Refueling, or Defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency buses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by Abnormal Rad Levels / Radiological Effluent EALs.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

IPEC Basis:

This EAL is indicated by the loss of all offsite and onsite AC power to the safeguards buses (5A, 2A/3A, 6A).

This EAL is the cold condition equivalent of the hot condition loss of all AC power EAL SS1.1. When in Cold Shutdown, Refuel, or Defueled mode, the event can be classified as an Alert because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the emergency buses, relative to that existing when in hot conditions.

IPEC Basis Reference(s):

1. FSAR Section 8.2
2. 2-ECA-0.0, "Loss of All AC Power"
3. 3-ECA-0.0, "Loss of All AC Power"

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Reactor Vessel Level

Initiating Condition: RCS leakage

EAL:

CU2.1 Unusual Event

Inability to restore or maintain pressurizer level > 18% or RCS target level band due to RCS leakage for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Mode Applicability:

5 - Cold Shutdown

NEI 99-01 Basis:

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

Prolonged loss of RCS Inventory may result in escalation to the Alert emergency classification level via either CA2.1 or CA3.1.

IPEC Basis:

The condition of this EAL may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. When pressurizer level drops to 18% [18.87% (rounded to 18% for Unit 3)] of span. (low level alarm set-point), level is well below the normal control band (ref. 1, 2).

This Cold Shutdown EAL represents the hot condition EAL SU6.1, in which RCS leakage is associated with Technical Specification limits. In Cold Shutdown, these limits are not applicable; hence, the use of pressurizer level as the parameter of concern in this EAL.

IPEC Basis Reference(s):

1. 2-ARP-SAF Pressurizer Low Level
2. 3-ARP-003 Pressurizer Low Level

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Reactor Vessel Level

Initiating Condition: RCS Leakage

EAL:

CU2.2 Unusual Event

Unplanned reactor vessel level drop below vessel flange (69' elev.- RVLIS 83%) (or RCS target level band if the RCS level was procedurally being controlled below the vessel flange) for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Mode Applicability:

6 - Refueling

NEI 99-01 Basis:

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RCS water level below the RPV flange are carefully planned and procedurally controlled. An unplanned event that results in water level decreasing below the RPV flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the RPV flange), warrants declaration of an Unusual Event due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either CA2.1 or CA3.1.

The difference between CU2.1 and CU2.2 deals with the RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means.

This EAL involves a decrease in RCS level below the top of the RPV flange that continues for 15 minutes due to an unplanned event. This EAL is not applicable to decreases in flooded reactor cavity level, which is addressed by AU2.1, until such time as the level decreases to the level of the vessel flange.

If RPV level continues to decrease and reaches the Bottom ID of the RCS hot leg then escalation to CA2.1 would be appropriate.

IPEC Basis:

Unit 2

The Reactor Vessel flange mating surface is at 69' - RVLIS 83% (ref. 1). RCS elevations are illustrated in Figure C-3 (ref. 1). RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3

The Reactor Vessel flange mating surface is at 69' - RVLIS 83% (ref. 2). RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 5"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Reactor Vessel Level

Initiating Condition: RCS Leakage

EAL:

CU2.3 Unusual Event

Reactor vessel level **cannot** be monitored with unexplained rise in **any** Table C-1 sump / tank level or visual observation of RCS leakage

Table C-1 Sumps / Tanks
• Containment sumps • CCW surge tank • PRT • RCDT

Mode Applicability:

6 - Refueling

NEI 99-01 Basis:

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RPV water level below the RPV flange are carefully planned and procedurally controlled. An unplanned event that results in water level decreasing below the RPV flange, or below the planned RPV water level for the given evolution (if the planned RPV water level is already below the RPV flange), warrants declaration of an Unusual Event due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS inventory will result in escalation to the Alert emergency classification level via either CA2.1 or CA3.1.

This EAL addresses conditions in the refueling mode when normal means of core temperature indication and RPV level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA2.1 or CA3.1.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

In this EAL, all water level indication is unavailable, and the Reactor Vessel inventory loss must be detected by sump or tank level changes (Table C-1) or visual observation of RCS leakage. Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 3 - 9).

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. Unit 2 FSAR 4.2.7
4. Unit 2 FSAR 6.2.2.1.2
5. Unit 2 FSAR 9.2.2.4.3
6. Unit 3 FSAR 4.2.10
7. Unit 3 FSAR 6.7.2.3
8. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
9. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	88%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	81%	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	66'	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 6"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of reactor vessel inventory

EAL:

CA2.1 Alert

Reactor vessel level < bottom of the RCS hot leg (60' 4.8" elev. RVLIS 62%)

OR

Reactor vessel level **cannot** be monitored for ≥ 15 min. (Note 3) with unexplained rise in **any** Table C-1 sump / tank level or visual observation of RCS leakage

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-1 Sumps / Tanks
• Containment sumps • CCW surge tank • PRT • RCDT

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL serves as precursors to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates that makeup systems have not been effective and may not be capable of preventing further RPV level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

The Bottom ID of the RCS loop was chosen because at this level remote RCS level indication may be lost and loss of suction to decay heat removal systems has occurred. The Bottom ID of the RCS loop is the level equal to the bottom of the RPV loop penetration (not the low point of the loop).]

The inability to restore and maintain level after reaching this set-point would be indicative of a failure of the RCS barrier.

If RPV level continues to lower then escalation to Site Area Emergency will be via CS2.1.

In the cold shutdown mode, normal RPV level and RPV level instrumentation systems will usually be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 15-minute duration for the loss of level indication was chosen because it is half of the CS2.3 Site Area Emergency EAL duration. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1 hour per the analysis referenced in the CG1 basis. Therefore this EAL meets the definition for an Alert.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

Unit 2 and Unit 3 RVLIS Full Range indication of 62% corresponds to the bottom of the RCS hot leg penetration which is at 60.4' (60' 4.8") el. (ref. 3). If Reactor Vessel level cannot be monitored, the Reactor Vessel inventory loss must be detected by sump or tank level changes (Table C-1) or visual observation of RCS leakage. Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 4 - 10).

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. RCS-15 RVLIS Full Range Level Indication Map
4. Unit 2 FSAR 4.2.7
5. Unit 2 FSAR 6.2.2.1.2
6. Unit 2 FSAR 9.2.2.4.3
7. Unit 3 FSAR 4.2.10
8. Unit 3 FSAR 6.7.2.3
9. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
10. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 6"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of reactor vessel inventory affecting core decay heat removal capability

EAL:

CS2.1 Site Area Emergency

With Containment Closure (Note 5) **not** established, reactor vessel level < 6" below the bottom of the RCS hot leg (59' 10.8" elev.- RVLIS 60.8%)

Note 5: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met (all un-isolated flow paths are promptly closed and at least one door in each air lock is closed following an evacuation of containment).

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

Under the conditions specified by this EAL, continued decrease in RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG2.1 or AG1.1/AG1.3.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)

- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

Unit 2 and Unit 3 RVLIS Full Range indication of 60.8% corresponds to six inches below the bottom of the RCS hot leg penetration which is at 59.9' (59' 10.8") el. (ref. 3). If Reactor Vessel level cannot be monitored, the Reactor Vessel inventory loss must be detected by sump or tank level changes (Table C-1). Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 4 - 10).

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. RCS-15 RVLIS Full Range Level Indication Map
4. Unit 2 FSAR 4.2.7
5. Unit 2 FSAR 6.2.2.1.2
6. Unit 2 FSAR 9.2.2.4.3
7. Unit 3 FSAR 4.2.10
8. Unit 3 FSAR 6.7.2.3
9. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
10. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 6"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	61' 8"	0%		(64,500)	

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of reactor vessel inventory affecting core decay heat removal capability

EAL:

CS2.2 Site Area Emergency

With Containment Closure (Note 5) established, reactor vessel level < top of active fuel (57' 9.6" elev.- RVLIS 56%)

Note 5: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met (all un-isolated flow paths are promptly closed and at least one door in each air lock is closed following an evacuation of containment).

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

Under the conditions specified by this EAL, continued decrease in RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG2.1 or AG1.1/AG1.3.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)

- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

Unit 2 and Unit 3 RVLIS Full Range indication of 56% corresponds to top of active fuel (57.8' [57' 9.6"] elev.) (ref. 3). If Reactor Vessel level cannot be monitored, the Reactor Vessel inventory loss must be detected by sump or tank level changes (Table C-1). Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 4 - 10).

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. RCS-15 RVLIS Full Range Level Indication Map
4. Unit 2 FSAR 4.2.7
5. Unit 2 FSAR 6.2.2.1.2
6. Unit 2 FSAR 9.2.2.4.3
7. Unit 3 FSAR 4.2.10
8. Unit 3 FSAR 6.7.2.3
9. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
10. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63" 0"	0%		(56,375)	
Normal Draindown Level	62' 5"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Attachment 1 – Emergency Action Level Bases

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of reactor vessel inventory affecting core decay heat removal capability

EAL:

CS2.3 Site Area Emergency

Reactor vessel level **cannot** be monitored for ≥ 30 min. (Note 3) with a loss of inventory as indicated by **any** of the following:

- Containment High Range Radiation Monitor reading upscale
- Unexplained rise in **any** Table C-1 sump / tank level of visual observation of RCS leakage
- Erratic Source Range Monitor indication

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-1 Sumps / Tanks
• Containment sumps • CCW surge tank • PRT • RCDT

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

Under the conditions specified by this EAL, continued decrease in RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPV. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via CG2.1 or AG1.1/AG1.3.

In the cold shutdown mode, normal RPV level and RPV level instrumentation systems will usually be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the RPV lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in containment radiation monitor indication and possible alarm.

Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

In this EAL, all water level indication is unavailable, and the Reactor Vessel inventory loss must be detected by the following:

- Containment High Range Radiation Monitor reading upscale (meaning the monitor is reading above it's normal on scale bugged level)
- Sump or tank level changes (Table C-1) or visual observation of RCS leakage : Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 3 - 9).

- Erratic Source Range Monitor indication: Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and source range monitors can be used as a tool for making such determinations. Figure C-4 shows the response of the source range monitor during the first few hours of the TMI-2 accident. The instrument reported an increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel down-comer and the reduced shielding that the two-phase mixture provides to the source range monitor (ref. 10, 11). The two source range monitor channels indicate the source range neutron flux and startup rate and provide high flux level reactor trip and alarm signals to the reactor control and protection system. They are used at shutdown to provide audible alarms in the reactor containment and central control room of any inadvertent increase in reactivity. An audible count rate signal is used during initial phases of startup and is audible in both the reactor containment and central control room. Mounted on the front panel of the source range channel is a neutron flux level indicator calibrated in terms of count rate level (1 to 10^6 cps). Mounted on the control board is a neutron count rate level indicator (1 to 10^6 cps). Isolated neutron flux signals are available for recording by the nuclear instrumentation system recorder and startup rate computation. (ref 12, 13)

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. Unit 2 FSAR 4.2.7
4. Unit 2 FSAR 6.2.2.1.2
5. Unit 2 FSAR 9.2.2.4.3
6. Unit 3 FSAR 4.2.10
7. Unit 3 FSAR 6.7.2.3
8. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
9. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
10. Severe Accident Management Guidance Technical Basis Report, Volume 1: Candidate High-Level Actions and Their Effects, pgs. 2-18, 2-19
11. Nuclear Safety Analysis Center (NSAC), 1980, “Analysis of Three Mile Island - Unit 2 Accident,” NSAC-1
12. Unit 2 FSAR 7.4.2.1.3
13. Unit 3 FSAR 7.4.2

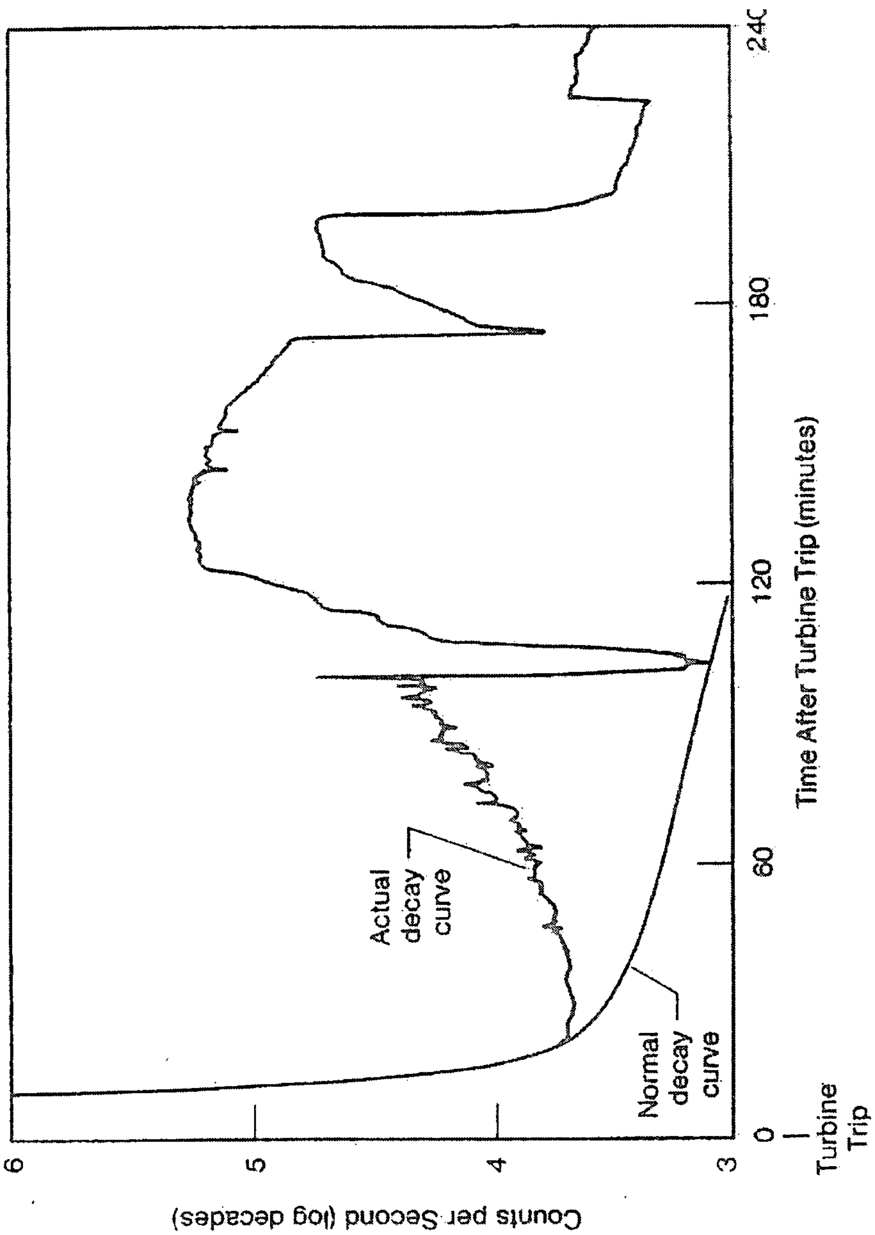
Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 5"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Attachment 1 – Emergency Action Level Bases

Figure C-4 – Response of the TMI-2 Source Range Measurement During the First Six Hours of the Accident (ref. 10, 11)



Attachment 1 – Emergency Action Level Bases

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of reactor vessel inventory affecting fuel clad integrity with Containment challenged

EAL:

CG2.1 General Emergency

Reactor vessel level < top of active fuel (57' 9.6" elev.- RVLIS 56%) for $\geq$ 30 min. (Note 3)

AND

Any Containment Challenge indication, Table C-5

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-5 Containment Challenge Indications
• Containment Closure (Note 5) **not** established • Containment hydrogen concentration $\geq$ 4% • Unplanned rise in containment pressure

Note 5: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met (all un-isolated flow paths are promptly closed and at least one door in each air lock is closed following an evacuation of containment).

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL represents the inability to restore and maintain RPV level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV level cannot be restored, as available decay heat will cause boiling, further reducing the RPV level. With the containment breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or imminent loss of function of all three barriers.

These EALs are based on concerns raised by Generic Letter 88-17, Loss of Decay Heat Removal, SECY 91-283, Evaluation of Shutdown and Low Power Risk Issues, NUREG-1449, Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States, and, NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If containment closure is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to GE would not occur.

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gasses in containment. However, containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)

- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

RVLIS Full Range indication of 56% corresponds to top of active fuel (57.8' [57' 9.6"] elev.) (ref. 3).

Three indications are associated with a challenge to Containment:

- Containment closure is the action taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure is established when Containment Integrity is established per Section 3.9.3 of Technical Specifications. During movement of recently irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In Cold Shutdown and Refuel modes, however, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements are referred to as "containment closure" rather than "containment OPERABILITY." (ref. 4)
- In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gases in containment.

However, containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists. A combustible mixture can be formed when hydrogen gas concentration in the containment atmosphere is greater than 4% by volume (ref. 5, 6). All hydrogen measurements are referenced to concentrations in dry air even though the actual containment environment may contain significant steam concentrations. Unit 2 Containment hydrogen analyzers AIT-5109-1 and AIT-5109-1 display hydrogen concentration and alarm at 4% hydrogen concentration (ref. 9). For Unit 3, The Containment Hydrogen Concentration Measurement System is used to monitor the post-accident hydrogen concentration. Two redundant sample systems are installed. One unit samples the plenum chambers of containment recirculation fans 32 and 35. The second unit samples the plenum chambers of recirculation fans 31, 33 and 34. (ref. 10)

- An unplanned pressurization that can breach the containment barrier signifies a challenge to the containment pressure retaining capability which is dependent on the status of the containment. If containment integrity is established for full power operation, a breach could occur if the design containment pressure is exceeded (47 psig). For this condition, a small unplanned pressure rise above atmospheric pressure does not challenge containment. If in refueling operations, however, a breach could occur if the unplanned pressure rise exceeded the capability of a temporary containment seal. This would occur at a much lower pressure than the containment design pressure. Use of the verb "...can breach...: instead of "breaches" provides the Emergency Director with the latitude to assess the magnitude and rate of the containment pressure rise with respect to the barrier status (for the existing operating mode) and determine that the containment challenge exists due to elevated pressure either before or at the time that the actual breach of the barrier occurs. (ref. 7, 8)

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. RCS-15 RVLIS Full Range Level Indication Map
4. Technical Specifications B3.9.3
5. 2-FR-C.1 RESPONSE TO INADEQUATE CORE COOLING
6. 3-FR-C.1 RESPONSE TO INADEQUATE CORE COOLING
7. 2-F-0.5 CONTAINMENT
8. 3-F-0.5 CONTAINMENT
9. 2-ARP-043 Accident Assessment Panel 1
10. SOP-SS-4 Containment Hydrogen Measurement System

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 8"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 6"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – RPV Level

Initiating Condition: Loss of RPV inventory affecting fuel clad integrity with Containment challenged

EAL:

CG2.2 General Emergency

Reactor vessel level cannot be monitored for ≥ 30 min. (Note 3)with core uncovery indicated by **ANY** of the following:

- Containment High Range Radiation Monitor reading upscale
- Unexplained rise in **any** Table C-1 sump / tank level or visual observation of RCS leakage
- Erratic Source Range Monitor indication

AND

Any Containment Challenge indication, Table C-5

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-1 Sumps / Tanks
• Containment sumps • CCW surge tank • PRT • RCDT

Table C-5 Containment Challenge Indications
• Containment Closure (Note 5) **not** established • Containment hydrogen concentration ≥ 4% • Unplanned rise in containment pressure

Note 5: The site specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements of Section 3.9.3 of Technical Specifications are met (all un-isolated flow paths are promptly closed and at least one door in each air lock is closed following an evacuation of containment).

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL represents the inability to restore and maintain reactor vessel level to above the top of active fuel with containment challenged. Fuel damage is probable if reactor vessel level cannot be restored, as available decay heat will cause boiling, further reducing the reactor vessel level. With the containment breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a General Emergency. The General Emergency is declared on the occurrence of the loss or imminent loss of function of all three barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include: mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition and steam generator U-tube draining.

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If containment closure is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to General Emergency would not occur.

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gasses in Containment. However, Containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists.

Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

In the cold shutdown mode, normal RCS level and reactor vessel level instrumentation systems will usually be available. In the Refueling Mode, normal means of reactor vessel level indication may not be available. Redundant means of reactor vessel level indication will usually be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that reactor vessel inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the reactor vessel lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in Containment High Range monitor indication and possible alarm.

Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

IPEC Basis:

Unit 2 RCS elevations are illustrated in Figure C-3 (ref. 1). Unit 2 RCS level can be monitored by one or more of the following (ref. 1):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3 RCS level can be monitored by one or more of the following (ref. 2):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

In this EAL, all water level indication is unavailable, and the Reactor Vessel inventory loss must be detected by the following:

- Containment High Range Radiation Monitor reading upscale (meaning the monitor is reading above it's normal on scale bugged level)
- Sump or tank level changes (Table C-1): Plant design and procedures provide the capability to detect and assess primary system leakage (ref. 3 - 9).
- Erratic Source Range Monitor indication: Post-TMI studies indicate that the installed nuclear instrumentation will operate erratically when the core is uncovered and source

range monitors can be used as a tool for making such determinations. Figure C-4 shows the response of the source range monitor during the first few hours of the TMI-2 accident. The instrument reported an increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel down-comer and the reduced shielding that the two-phase mixture provides to the source range monitor (ref. 10, 11). The two source range monitor channels indicate the source range neutron flux and startup rate and provide high flux level reactor trip and alarm signals to the reactor control and protection system. They are used at shutdown to provide audible alarms in the reactor containment and central control room of any inadvertent increase in reactivity. An audible count rate signal is used during initial phases of startup and is audible in both the reactor containment and central control room. Mounted on the front panel of the source range channel is a neutron flux level indicator calibrated in terms of count rate level (1 to 10^6 cps). Mounted on the control board is a neutron count rate level indicator (1 to 10^6 cps). Isolated neutron flux signals are available for recording by the nuclear instrumentation system recorder and startup rate computation. (ref 12, 13)

Three indications are associated with a challenge to Containment:

- Containment closure is the action taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to IPEC, Containment Closure exists when the requirements are met per Section 3.9.3 of Technical Specifications. During movement of recently irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In Cold Shutdown and Refuel modes, however, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements are referred to as "containment closure" rather than "containment OPERABILITY." (ref. 14)

- In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gases in containment. However, containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists. A combustible mixture can be formed when hydrogen gas concentration in the containment atmosphere is greater than 4% by volume (ref. 15, 16). All hydrogen measurements are referenced to concentrations in dry air even though the actual containment environment may contain significant steam concentrations.

- An unplanned pressurization that can breach the containment barrier signifies a challenge to the containment pressure retaining capability which is dependent on the status of the containment. If containment integrity is established for full power operation, a breach could occur if the design containment pressure is exceeded (47 psig). For this condition, a small unplanned pressure rise above atmospheric pressure does not challenge containment. If in refueling operations, however, a breach could occur if the unplanned pressure rise exceeded the capability of a temporary containment seal. This would occur at a much lower pressure than the containment design pressure. Use of the verb "...can breach...: instead of "breaches" provides the Emergency Director with the latitude to assess the magnitude and rate of the containment pressure rise with respect to the barrier status (for the existing operating mode) and determine that the containment challenge exists due to elevated pressure either before or at the time that the actual breach of the barrier occurs. (ref. 17, 18)

IPEC Basis Reference(s):

1. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
2. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor

Attachment 1 – Emergency Action Level Bases

3. Unit 2 FSAR 4.2.7
4. Unit 2 FSAR 6.2.2.1.2
5. Unit 2 FSAR 9.2.2.4.3
6. Unit 3 FSAR 4.2.10
7. Unit 3 FSAR 6.7.2.3
8. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
9. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
10. Severe Accident Management Guidance Technical Basis Report, Volume 1: Candidate High-Level Actions and Their Effects, pgs. 2-18, 2-19
11. Nuclear Safety Analysis Center (NSAC), 1980, "Analysis of Three Mile Island - Unit 2 Accident," NSAC-1
12. Unit 2 FSAR 7.4.2.1.3
13. Unit 3 FSAR 7.4.2
14. Technical Specifications B3.9.3
15. 2-FR-C.1 RESPONSE TO INADEQUATE CORE COOLING
16. 3-FR-C.1 RESPONSE TO INADEQUATE CORE COOLING
17. 2-F-0.5 CONTAINMENT
18. 3-F-0.5 CONTAINMENT

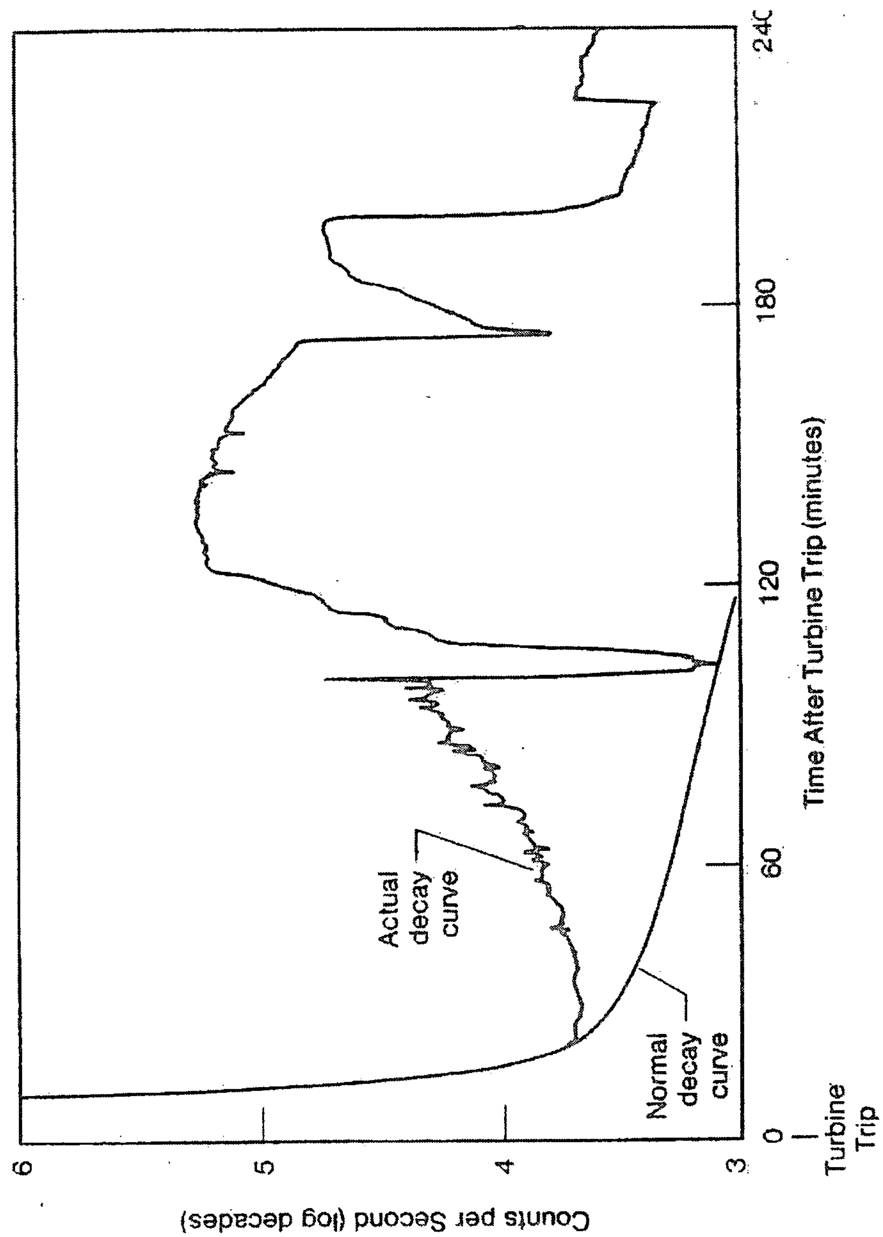
Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	**66'**	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 5"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Attachment 1 – Emergency Action Level Bases

Figure C-4 – Response of the TMI-2 Source Range Measurement During the First Six Hours of the Accident (ref. 10, 11)



Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Temperature

Initiating Condition: Unplanned loss of decay heat removal capability with irradiated fuel in the reactor vessel

EAL:

CU3.1 Unusual Event

Any unplanned event resulting in RCS temperature > 200°F due to loss of decay heat removal capability

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

Entry into Cold Shutdown conditions may be attained within hours of operating at power. Entry into the Refueling mode procedurally may not occur for many hours after the reactor has been shut down. Thus the heat up threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the Refueling mode with irradiated fuel in the RPV (note that the heat up threat could be lower for cold shutdown conditions if the entry into Cold Shutdown was following a refueling). In addition, the operators should be able to monitor RCS temperature and RPV level so that escalation to the alert level via CA2.1 or CA3.1 will occur if required.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS temperatures depending on the time since shutdown.

IPEC Basis:

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1). These include cold and hot leg RTDs, RHR heat exchanger inlet temperature, reactor vessel metal temperatures and core exit thermocouples (ref. 2, 3). Heat up and Cool down rate limitations are provided in Technical Specifications (ref. 4, 5).

IPEC Basis Reference(s):

1. Technical Specifications Table 1.1-1
2. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
4. Technical Specifications 3.4.3
5. Technical Specifications 3.4.9.2

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Temperature

Initiating Condition: Loss of decay heat removal capability with irradiated fuel in the reactor vessel

EAL:

CU3.2	**Unusual Event**
Loss of **all** RCS temperature and reactor vessel level indication for ≥ 15 min. (Note 3)	

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

Entry into Cold Shutdown conditions may be attained within hours of operating at power. Entry into the Refueling mode procedurally may not occur for many hours after the reactor has been shut down. Thus the heat up threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the Refueling mode with irradiated fuel in the RPV (note that the heat up threat could be lower for cold shutdown conditions if the entry into Cold Shutdown was following a refueling). In addition, the operators should be able to monitor RCS temperature and RPV level so that escalation to the alert level via CA2.1 or CA3.1 will occur if required.

During refueling the level in the RPV will normally be maintained above the RPV flange. Refueling evolutions that decrease water level below the RPV flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the refueling mode. Redundant means of RPV level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. However, if all level and temperature indication were to be lost in either the cold shutdown of refueling modes, this EAL would result in declaration of an Unusual Event if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via CA2.1 based on an inventory loss or CA3.1 based on exceeding its temperature criteria.

IPEC Basis:

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1). These include cold and hot leg RTDs, RHR heat exchanger inlet temperature, reactor vessel metal temperatures and core exit thermocouples (ref. 2, 3). Heat up and Cool down rate limitations are provided in Technical Specifications (ref. 4, 5).

Unit 2

The Reactor Vessel flange mating surface is at 69' (ref. 6). RCS elevations are illustrated in Figure C-3 (ref. 6). RCS level can be monitored by one or more of the following (ref. 6):

- Barton level system
- Tygon level system
- Mansell Level Monitoring System (MLMS)
- Intermediate range RCS level indicator (LT-7610)
- CCR Foxboro (RCS DRAIN DOWN NARROW RANGE)
- RVLIS

Unit 3

The Reactor Vessel flange mating surface is at 69' (ref. 7). RCS level can be monitored by one or more of the following (ref. 7):

- 32 & 34 Intermediate Leg Level Indicators (ILLI)
- Hand Held Ultrasonic Transducers
- Mansell Level Monitoring System
- Intermediate range RCS level indicator (LT-7610)
- RVLIS

IPEC Basis Reference(s):

1. Technical Specifications Table 1.1-1
2. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
4. Technical Specifications 3.4.3
5. Technical Specifications 3.4.9.2
6. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
7. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor

Attachment 1 – Emergency Action Level Bases

Figure C-3 – Unit 2 Component Elevations and Levels

COMPONENT	ELEVATION	PRZR LEVEL	RVLIS	Gallons Drained	
				S/G Tubes Empty	S/G Tubes Full
Top or RVLIS	84' 2"	27%	120%	37,900	10,150
20% PRZR Level	80' 10"	20%	112%	38,750	11,000
PLACE RX Head Vent in Service	76' 6"	10%	101%	40,000	12,250
Top or RX Head	75' 10"	9%	100%	40,200	12,450
PRZR Lower Tap	73' 7"	0%	86%	41,500	13,750
Bottom of PRZR	69' 7"	0%	85%	46,000	18,250
RX Vessel Flange	69'	0%	83%	46,700	18,950
RX Head Removal	**68'**	**0%**	**81%**	**47,800**	**20,050**
	67'	0%	--	49,100	21,300
Reduced Inventory	66'	0%	--	50,250	22,500
	65'	0%	--	51,400 (51,666)	23,650
	64'	0%	--	52,500 (53,500)	24,750
Top of Hot Leg	63' 6"	0%	70%	(54,750)	
	63' 0"	0%		(56,375)	
Normal Draindown Level	62' 6"	0%		(59,000)	
Middle of Hot Leg	62' 0"	0%		(62,250)	
Min. Level with RHR	**61' 8"**	**0%**		**(64,500)**	

Attachment 1 – Emergency Action Level Bases

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Temperature

Initiating Condition: Inability to maintain plant in cold shutdown

EAL:

CA3.1 Alert

Any unplanned event resulting in RCS temperature > 200°F for > Table C-3 duration

OR

RCS pressure increase > 10 psig due to a loss of RCS cooling
(not applicable to solid plant operations)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table C-3 – RCS Reheat Duration Thresholds

RCS	Containment Closure	Duration
Intact and **not** Reduced Inventory	N/A	60 minutes*
Not Intact **OR** Reduced Inventory	Established	20 minutes*
	Not Established	0 minutes

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, this EAL is **not** applicable.

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

The first condition of this EAL addresses events in which RCS temperature exceeds the CU3.1 EAL threshold of 200 °F (ref. 1) for the durations identified in Table C-3.

Table C-3 duration #3 addresses complete loss of functions required for core cooling during Refuel and Cold Shutdown modes when neither containment closure nor RCS integrity are established. RCS integrity is in place when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation. No delay time is allowed for duration #3 because the evaporated reactor coolant that may be released into the containment during this heat up condition could also be directly released to the environment.

Table C-3 duration #2 addresses the complete loss of functions required for core cooling for > 20 minutes during Refuel and Cold Shutdown modes when containment closure is established but RCS integrity is not established. RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the Cold Shutdown mode of operation. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible. The allowed time frame is consistent with the guidance provided by Generic Letter 88-17, "Loss of Decay Heat Removal" and is believed to be conservative given that a low pressure containment barrier to fission product release is established. The table note indicates that this duration is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the 20 minute time frame.

Table C-3 duration #1 addresses complete loss of functions required for core cooling for greater than 60 minutes during Refuel and Cold Shutdown modes when RCS integrity is established. As in duration #2 and #3, RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation. The status of containment closure in this EAL is immaterial given that the RCS is providing a high pressure barrier to fission product release to the environment. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The 10 psig pressure increase covers situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The table note indicates that duration #1 is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the 60 minute time frame assuming that the RCS pressure increase has remained less than 10 psig.

Escalation to Site Area would be via CS1.1 should boiling result in significant RPV level loss leading to core uncovery.

This EAL is based on concerns raised by Generic Letter 88-17, "Loss of Decay Heat Removal." A number of phenomena such as pressurization, vortexing, steam generator U-tube draining, RCS level differences when operating at a mid-loop condition, decay heat removal system design, and level instrumentation problems can lead to conditions where decay heat removal is lost and core uncovery can occur. NRC analyses show that sequences that can cause core uncovery in 15 to 20 minutes and severe core damage within an hour after decay heat removal is lost.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary unplanned excursion above 200 degrees F when the heat removal function is available.

The Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL threshold is imminent. If, in the judgment of the Emergency Director, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded.

IPEC Basis:

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1). These include cold and hot leg RTDs, RHR heat exchanger inlet temperature, reactor vessel metal temperatures and core exit thermocouples (ref. 2, 3). Heat up and Cool down rate limitations are provided in Technical Specifications (ref. 4, 5).

The 10 psig pressure increase can be detected on:

- Unit 2 – MLMS or PI-413K on panel SFF with computer input to the plant computer (ref. 2)
- Unit 3 – MLMS, PT-410 and PT-411 on RVLIS, or PI-413K (ref. 3)

IPEC Basis Reference(s):

1. Technical Specifications Table 1.1-1
2. 2-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
3. 3-POP-4.2 Operation Below 20% PRZR Level with Fuel in the Reactor
4. Technical Specifications 3.4.3
5. Technical Specifications 3.4.9.2

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 4 – Communications

Initiating Condition: Loss of **all** onsite or offsite communications capabilities

EAL:

CU4.1 Unusual Event

Loss of **all** Table C-2 onsite (internal) communications capability affecting the ability to perform routine operations

OR

Loss of **all** Table C-2 offsite (external) communications capability affecting the ability to perform offsite notifications

Table C-2 Communications Systems

System	Onsite (internal)	Offsite (external)
Plant Telephone System	X	X
Plant Radio System	X	
Page/Party System	X	
Emergency Notification System (ENS)		X

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling, D - Defueled

NEI 99-01 Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary offsite communications is sufficient to inform state and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to offsite locations, etc.) are being utilized to make communications possible.

The Table C-2 list for onsite communications loss encompasses the loss of all means of routine communications (e.g., commercial telephones, sound powered phone systems, page party system and radios / walkie-talkies).

The Table C-2 list for offsite communications loss encompasses the loss of all means of communications with offsite authorities. This includes the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems.

IPEC Basis:

Unit 2

Routine Unit 2 plant communications are conducted via telephone, radio, and Public Address (paging) systems.

The plant telephone and radio communications systems include two (2) PBX electronic switches, backup phone lines and a UHF radio system. A third PBX electronic switch is located at the EOF.

The public address system for Indian Point Unit 2 consists of "Page" and "Party" communications, which are common to both the primary (nuclear) and secondary (conventional) portions of Units 1 and 2. The “Page” and “Party” communications are also monitored at a speaker panel located in the CCR.

An in-house radio system provides communications between the Technical Support Center, the I&C office, and in-plant personnel.

Unit 3

The Unit 3 communications system was designed to ensure the reliable, timely flow of information and action directives necessary during normal operation, and particularly for the mitigation of emergencies.

The Public Address (PA) System has two subsystems: the Plant Party Paging and the Site PA System. The system consists of three channels. Two of these channels are common to both the primary (nuclear) and secondary (conventional) portions of the plant. The third line provides an additional channel in the primary portion of the Unit 3 plant. A “Page” handset is used for page purposes only and calls originating from this handset can be heard on all loudspeakers in the primary and secondary portions of the facility. The remaining two “Page-Party” handsets are used for loudspeakers paging and party-line conversations, as selected by the control room operator.

This EAL is the cold condition equivalent of the hot condition EAL SU4.2.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 7.7.4 Communications
2. Unit 3 FSAR Section 9.6.5 Plant Communications Systems

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 5 – Inadvertent Criticality

Initiating Condition: Inadvertent criticality

EAL:

CU5.1	**Unusual Event**
Unplanned sustained positive startup rate observed on nuclear instrumentation	

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

NEI 99-01 Basis:

This EAL addresses criticality events that occur in Cold Shutdown or Refueling modes [(NUREG 1449, Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States)] such as fuel miss-loading events and inadvertent dilution events. This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification.

This condition can be identified using startup rate monitors. The term "sustained" is used in order to allow exclusion of expected short term positive startup rates from planned fuel bundle or control rod movements during core alterations. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

Escalation would be by Emergency Director Judgment.

IPEC Basis:

The startup rate for each channel is indicated at the main control board in terms of decades per minute over the range of -0.5 to +5.0 decades/min.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 7.4 Nuclear Instrumentation
2. Unit 3 FSAR Section 7.4 Excore Nuclear Instrumentation

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 6 – Loss of DC Power

Initiating Condition: Loss of required DC power for 15 minutes or longer

EAL:

CU6.1 Unusual Event

< 105 VDC bus voltage indications on **all** Technical Specification required 125 VDC buses for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

NEI 99-01 Basis:

The purpose of this EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations.

This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

Plants will routinely perform maintenance on a train related basis during shutdown periods The required busses are the minimum allowed by Technical Specifications for the mode of operation. It is intended that the loss of the operating (operable) train is to be considered. If this loss results in the inability to maintain Cold Shutdown, the escalation to an Alert will be per CA3.1.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

IPEC Basis:

For Indian Point Unit 2, each 480V bus has an automatic transfer switch to provide alternate DC power supplies to the 480V buses. This DC power is also supplied to 480V motor control centers. With two Residual heat removal (RHR) pumps and two RHR heat exchangers available, only one DC bus is required to provide control to a single train of RHR cooling during shutdown and refueling. With one RHR pump or one RHR heat exchanger isolated for repair, a condition could exist where a loss of a single DC power supply could result in a loss of ability to control decay heat removal. Redundant and alternate indications needed to monitor decay heat removal are powered from different DC sources such that only a loss of all DC power would result in the inability to monitor core cooling status.

The bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate loads.

This EAL is the cold condition equivalent of the hot condition loss of DC power EAL SS7.1.

IPEC Basis Reference(s):

1. 2-AOP-DC-1 Loss Of A Battery Charger Or Any 125V DC Panel
2. 2-PT-R076A Station Battery 21 Load Test
3. 2-PT-R076C Station Battery 23 Load Test
4. 3-AOP-DC-1 Loss Of A 125V DC Panel
5. SOP-EL-003, Battery Charger and 125 Volt DC System Operations
6. 3PT-R156A Station Battery 31 Load Profile Service Test

Category H – Hazards

EAL Group: ANY (EALs in this category are applicable to any plant condition, hot or cold.)

Hazards are non-plant, system-related events that can directly or indirectly affect plant operation, reactor plant safety or personnel safety.

The events of this category pertain to the following subcategories:

1. Natural & Destructive Phenomena

Natural events include hurricanes, earthquakes or tornados that have potential to cause plant structure or equipment damage of sufficient magnitude to threaten personnel or plant safety. Non-naturally occurring events that can cause damage to plant facilities and include aircraft crashes, missile impacts, etc.

2. Fire or Explosion

Fires can pose significant hazards to personnel and reactor safety. Appropriate for classification are fires within the site Protected Area or which may affect operability of vital equipment.

3. Hazardous Gas

Non-naturally occurring events that can cause damage to plant facilities and include toxic, corrosive, asphyxiant or flammable gas leaks.

4. Security

Unauthorized entry attempts into the Protected Area, bomb threats, sabotage attempts, and actual security compromises threatening loss of physical control of the plant.

5. Control Room Evacuation

Events that are indicative of loss of Control Room habitability. If the Control Room must be evacuated, additional support for monitoring and controlling plant functions is necessary through the emergency response facilities.

6. Judgment

The EALs defined in other categories specify the predetermined symptoms or events that are indicative of emergency or potential emergency conditions and thus warrant classification. While these EALs have been developed to address the full spectrum of possible emergency conditions which may warrant classification and subsequent implementation of the Emergency Plan, a provision for classification of emergencies based on operator/management experience and judgment is still necessary. The EALs of this category provide the Emergency Director the latitude to classify emergency conditions consistent with the established classification criteria based upon Emergency Director judgment.

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.1 Unusual Event

Seismic event identified by **any two** of the following:

- Earthquake felt in plant by a consensus of Control Room Operators
- Unit 3 “Seismic Event Occurred” alarm (Panel SDF) or **any** amber Peak Shock Annunciator light is lit
- National Earthquake Information Center (Note 4)

Note 4: The NEIC can be contacted by calling **(303) 273-8500** to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: **41° 15' 55" north latitude, 73° 57' 08" west longitude**. Alternatively go to the USGS NEIC website: http://earthquake.usgs.gov.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

The seismic switches are set at an acceleration of about 0.01g. The method of detection is based on instrumentation, validated by a reliable source, or operator assessment.

The National Earthquake Information Center can confirm if an earthquake has occurred in the area of the plant.

IPEC Basis:

The method of detection with respect to emergency classification relies on the agreement of the shift operator's on-duty in the Control Room that the suspected ground motion is a "felt earthquake" as well as the actuation of the IPEC seismic instrumentation. Consensus of the Control Room operators with respect to ground motion helps avoid unnecessary classification if the seismic switches inadvertently trip or detect vibrations not related to an earthquake.

The National Earthquake Information Center can confirm if an earthquake has occurred in the area of the plant. The NEIC can be contacted by calling **(303) 273-8500** to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: **41° 15' 55" north latitude, 73° 57' 08" west longitude** (ref 3).

Alternatively go to the USGS NEIC website:

http://earthquake.usgs.gov/

The Strong Motion Accelerograph is located on the Unit 3 46' Elev., base mat; 100' Elev., Containment Structure Wall directly above the 46' Elev.

This event escalates to an Alert under EAL HA1.1 if the earthquake exceeds Operating Basis Earthquake (OBE) levels.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 5.1.2.2 Design Load Criteria
2. Unit 3 FSAR Section 16.1.3 General Seismic Design Criteria and Damping Values
3. Unit 2 FSAR Appendix 2A Meteorological Update Section 4.1.1 General
4. SOP-S-1 Seismic Monitoring Equipment
5. 0-AOP-SEISMIC-1 Seismic Event

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.2 Unusual Event

Tornado striking within Protected Area boundary

OR

Sustained high winds > 90 mph (40 m/sec)

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL is based on a tornado striking (touching down) or high winds within the Protected Area.

Escalation of this emergency classification level, if appropriate, would be based on visible damage, or by other in plant conditions, via HA1.2.

IPEC Basis:

A tornado striking (touching down) within the Protected Area warrants declaration of an Unusual Event regardless of the measured wind speed at the meteorological tower. A tornado is defined as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm.

Sustained 90 mph is the Unit 3 design wind speed (ref. 1). As used in this EAL the term "sustained high winds" is meant to exclude brief gusts above the specified wind speed of 90 mph.

IPEC Basis Reference(s):

1. Unit 3 FSAR Section 1.3 General Design Criteria

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.3 Unusual Event

Turbine failure resulting in **EITHER**:

Casing penetration

OR

Damage to turbine or generator seals

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual fires and flammable gas build up are appropriately classified via HU2.1 and HU3.1.

This EAL is consistent with the definition of a Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

Escalation of this emergency classification level, if appropriate, would be to HA1.3 based on damage done by projectiles generated by the failure..

IPEC Basis:

The turbine generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine generator parts is insufficient, external missiles will be released. These ejected missiles may impact various plant structures, including those housing safety related equipment.

In the event of missile ejection, the probability of a strike on a plant region is a function of the energy and direction of an ejected missile and of the orientation of the turbine with respect to the plant region.

IPEC Basis Reference(s):

None

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.4 Unusual Event

Flooding in **any** Table H-1 area that has the potential to affect safety-related equipment needed for the current operating mode

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

The Table H-1 Safe Shutdown Areas include those areas that contain systems required for safe shutdown of the plant, which are not designed to be partially or fully submerged (ref. 1, 2).

Escalation of this emergency classification level, if appropriate, would be based visible damage via HA1.5, or by other plant conditions.

IPEC Basis:

The areas of concern are list in Table H-1 Safe Shutdown Areas. The listed areas consist of the designated Class I structures, systems and components. Class I structures, systems and components are those necessary to assure the capability to shut down the reactor and maintain it in the shutdown condition.

Flooding in these areas could have the potential to cause a reactor trip and could result in consequential failures to important systems.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.5 Unusual Event

River Water Level > 14 ft. 6 in. (ØMSL)

OR

Service Water Bay (Intake Structure) water level < - 4 ft. 5 in. (ØMSL)

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses external flooding and low intake (river) water levels that can also be precursors of more serious events.

IPEC Basis:

Unusual Events in this subcategory are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators. Escalation of the event to an Alert occurs when the magnitude of the event is sufficient to result in damage to equipment contained in the specified location.

This EAL covers high river water level conditions that could be a precursor of more serious events as well as low river (intake) water level conditions which may threaten operability of plant cooling systems.

River water level ≥ 14 ft. 6 in. above zero mean sea level (ØMSL) corresponds to the maximum anticipated river run-up level (ref. 1).

Service water bay (intake structure) level < 4.5 ft. below zero mean sea level (ØMSL) corresponds to the minimum level to support design service water flow rate. (ref. 2).

Unit 2

A level indicator is mounted on the railing in the Service Water Pit. There are hose clamps at 6 inch intervals starting 6 inches below the platform. The platform is at 6 foot elevation, and the first bracket is at negative 2 foot elevation. There are fifteen hose clamps between the platform and the first bracket. The indicator continues down to the negative 4 foot 6 inch elevation. Other indicators of high river water level are use of tape/rope measurement or outfall level reading (ref. 3).

Unit 3

To calculate river level, place measuring device (at least 8' long) through an open floor slot on the river side of the traveling water screens at the intake structure. Measure the distance between the 15 ft. elevation and current river height. Subtract the measurement I from 15 ft. to determine river level (ref. 4).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 2.5, "Hydrology"
2. Unit 3 FSAR Section 9.6.1, "Service Water System"
3. 2-AOP-FLOOD, "Flooding"
4. 3-AOP-FLOOD, "Flooding"

Category: H – Hazards

Subcategory: 1 - Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.1 Alert

Two or more annunciators are lit on the Peak Shock Annunciator panel, one of which is red

AND

Strong Motion Event Indicator is lit

AND

Earthquake confirmed by **any** of the following:

- Earthquake felt in plant by a consensus of Control Room Operators
- National Earthquake Information Center (Note 4)
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

Note 4: The NEIC can be contacted by calling **(303) 273-8500** to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: **41° 15' 55" north latitude, 73° 57' 08" west longitude**. Alternatively go to the USGS NEIC website: http://earthquake.usgs.gov.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL escalates from HU1.1 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage.

The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Seismic events of this magnitude can result in a vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Information Center can confirm if an earthquake has occurred in the area of the plant.

IPEC Basis:

Ground motion acceleration of 0.1 g horizontal or 0.05 g vertical is the Operating Basis Earthquake for IPEC (ref. 1, 2).

The seismic monitoring and recording equipment is normally maintained in a standby condition.

The National Earthquake Information Center can confirm if an earthquake has occurred in the area of the plant. The NEIC can be contacted by calling **(303) 273-8500** to confirm recent seismic activity in the vicinity of IPEC. Provide the analyst with the following IPEC coordinates: **41° 15' 55" north latitude, 73° 57' 08" west longitude** (ref. 3).

Alternatively go to the USGS NEIC website:

http://earthquake.usgs.gov

The Strong Motion Accelerograph is located on the Unit 3 46' Elev., base mat; 100' Elev., Containment Structure Wall directly above the 46' Elev.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 5.1.2.2 Design Load Criteria
2. Unit 3 FSAR Section 16.1.3 General Seismic Design Criteria and Damping Values
3. Unit 2 FSAR Appendix 2A Meteorological Update Section 4.1.1 General

Category: H – Hazards

Subcategory: 1 - Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.2 Alert

Tornado striking or sustained high winds > 90 mph (40 m/sec) resulting in **EITHER**:

Visible damage to **any** Table H-1 plant structures containing safety systems or components

OR

Control Room indication of degraded performance of safety systems

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

This EAL escalates from HU1.2 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL is based on a tornado striking (touching down) or high winds that have caused visible damage to structures containing functions or systems required for safe shutdown of the plant.

IPEC Basis:

This threshold addresses events that may have resulted in Safe Shutdown Areas being subjected to forces (tornado or sustained high winds > 90 mph, ref. 1) beyond design limits and thus damage may be assumed to have occurred to plant safety systems. Table H-1 Safe Shutdown Areas house equipment the operation of which may be needed to ensure the reactor safely reaches and is maintained shutdown (ref. 2, 3). As used in this EAL the term "sustained high winds" is meant to exclude brief gusts above the specified wind speed of 90 mph.

A tornado striking (touching down) within the Protected Area resulting in visible damage warrants declaration of an Alert regardless of the measured wind speed at the meteorological tower. A tornado is defined as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm.

IPEC Basis Reference(s):

1. Unit 3 FSAR Section 1.3 General Design Criteria
2. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
3. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.3 **Alert**

Vehicle crash resulting in visible damage to **EITHER**:

Any Table H-1 plant structures containing safety systems or components

OR

Control Room indication of degraded performance of safety systems

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses vehicle crashes within the Protected Area that results in visible damage to vital areas or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

IPEC Basis:

Table H-1 Safe Shutdown Areas house equipment the operation of which may be needed to ensure the reactor reaches and is maintained in shutdown (ref. 1, 2).

If the vehicle crash is determined to be hostile in nature, the event is classified under security based EALs.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.4 Alert

Turbine failure-generated projectiles resulting in **EITHER**:

Visible damage to or penetration of **any** Table H-1 area containing safety systems or components

OR

Control room indication of degraded performance of safety systems

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

This EAL escalates from HU1.3 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses the threat to safety related equipment imposed by projectiles generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an Alert in that the potential exists for actual or substantial potential degradation of the level of safety of the plant.

IPEC Basis:

The turbine generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine generator parts is insufficient, external missiles will be released. These ejected missiles may impact various plant structures, including those housing safety related equipment.

In the event of missile ejection, the probability of a strike on a plant region is a function of the energy and direction of an ejected missile and of the orientation of the turbine with respect to the plant region.

The list of Table H-1 areas includes all areas containing safety-related equipment, their controls, and their power supplies (ref. 1, 2).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.5 Alert

Flooding in **any** Table H-1 area resulting in **EITHER**:

An electrical shock hazard that precludes necessary access to operate or monitor safety equipment

OR

Control room indication of degraded performance of required safety systems

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

This EAL escalates from HU1.4 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

IPEC Basis:

Flooding in Table H-1 Safe Shutdown Areas could have the potential to cause a reactor trip and could result in consequential failures to important systems (ref. 1, 2).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Category: H – Hazards

Subcategory: 1 – Natural & Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.6 **Alert**
River Water Level > 15 ft. (ØMSL)
OR
Low Service Water Bay (Intake Structure) level resulting in a loss of service water flow

Mode Applicability:

All

NEI 99-01 Basis:

This EAL escalates from HU1.4 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses other site specific phenomena that result in visible damage to vital areas or results in indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

IPEC Basis:

HA1.6 covers high river water level conditions that could pose a significant threat to plant safety as well as low river (intake) water level conditions which may threaten operability of vital emergency plant cooling systems.

A river water level of 15.25 ft. (rounded to 15 ft.). is considered the critical elevation beyond which water would begin to enter plant buildings.

Low intake levels could be caused either by Intake Structure and/or Traveling Screen blockage due to debris or ice or due to a loss of level in the Hudson River. This represents a significant challenge to plant safety.

Unit 2

A level indicator is mounted on the railing in the Service Water Pit. There are hose clamps at 6 inch intervals starting 6 inches below the platform. The platform is at 6 foot elevation, and the first bracket is at negative 2 foot elevation. There are fifteen hose clamps between the platform and the first bracket. The indicator continues down to the negative 4 foot 6 inch elevation. Other indicators of high river water level are use of tape/rope measurement or outfall level reading (ref. 3).

Unit 3

To calculate river level, place measuring device (at least 8' long) through an open floor slot on the river side of the traveling water screens at the intake structure. Measure the distance between the 15 ft. elevation and current river height. Subtract the measurement "L" from 15 ft. to determine river level (ref. 4).

The Unit 3 Service Water Pump suctions are at 10 ft. 11 3/8 in. below ØMSL (ref. 2).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 2.5, "Hydrology"
2. Unit 3 FSAR Section 9.6.1, "Service Water System"
3. 2-AOP-FLOOD, "Flooding"
4. 3-AOP-FLOOD, "Flooding"
5. 3-AOP-SWL-1, "Low Service Water Bay Level"

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 2 – Fire or Explosion

Initiating Condition: Fire within the Protected Area not extinguished within 15 minutes of detection or explosion within the Protected Area

EAL:

HU2.1 Unusual Event

Fire in **any** Table H-1area not extinguished within 15 minutes (Note 3) of Control Room notification or verification of a control room fire alarm

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses the magnitude and extent of fires that may be potentially significant precursors of damage to safety systems. It addresses the fire, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

The 15 minute time period begins with a credible notification that a fire is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a fire unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the fire and to discriminate against small fires that are readily extinguished (e.g., smoldering waste paper basket).

Escalation of this emergency classification level, if appropriate, would be based on HA2.1.

IPEC Basis:

Fire, as used in this EAL, means combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Category: H – Hazards

Subcategory: 2 – Fire or Explosion

Initiating Condition: Fire within the Protected Area not extinguished within 15 minutes of detection or explosion within the Protected Area

EAL:

HU2.2	**Unusual Event**
Explosion within Protected Area boundary	

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses the magnitude and extent of explosions that may be potentially significant precursors of damage to safety systems. It addresses the explosion, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

This EAL addresses the magnitude and extent of explosions that may be potentially significant precursors of damage to safety systems. It addresses the explosion, and not the degradation in performance of affected systems that may result.

This EAL addresses only those explosions of sufficient force to damage permanent structures or equipment within the Protected Area.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the explosion is sufficient for declaration.

The Emergency director also needs to consider any security aspects of the explosion, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on HA2.1.

IPEC Basis:

As used here, an explosion is a rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to nearby structures and materials.

If the explosion is determined to be hostile in nature, the event is classified under security based EALs.

IPEC Basis Reference(s):

None

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 2 – Fire or Explosion

Initiating Condition: Fire or explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown

EAL:

HA2.1 Alert

Fire or explosion resulting in **EITHER**:

Visible damage to **any** Table H-1 area containing safety systems or components

OR

Control Room indication of degraded performance of safety systems

Table H-1 Safe Shutdown Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Fuel Storage Building • Primary Auxiliary Building/Fan House • Vapor Containment Building • EDG Buildings • Auxiliary Feed-pump Building • Condensate Storage Tank • Refueling Water Storage Tank

Mode Applicability:

All

NEI 99-01 Basis:

Visible damage is used to identify the magnitude of the fire or explosion and to discriminate against minor fires and explosions.

The reference to structures containing safety systems or components is included to discriminate against fires or explosions in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the fire or explosion was large enough to cause damage to these systems.

The use of visible damage should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the explosion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier Degradation or Abnormal Rad Levels / Radiological Effluent EALs.

IPEC Basis:

The listed areas contain functions and systems required for the safe shutdown of the plant (ref. 1).

Fire, as used in this EAL, means combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

An explosion is a rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment that potentially imparts significant energy to nearby structures and materials.

A steam line break or steam explosion that damages permanent structures or equipment would be classified under this EAL. The method of damage is not as important as the degradation of plant structures or equipment. The need to classify the steam line break itself is considered in fission product barrier degradation monitoring (EAL Category F).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment

Category: H – Hazards

Subcategory: 3 – Hazardous Gas

Initiating Condition: Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

EAL:

HU3.1	**Unusual Event**
Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect normal plant operations	

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA3.1.

IPEC Basis:

As used in this EAL, affecting normal plant operations means that activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures have been impacted. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from normal plant operations and thus would be considered to have been affected.

The release may have originated within the Site Boundary, or it may have originated offsite and subsequently drifted onto the Site Boundary. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) resulting in the plant being within the evacuation area should also be considered in this EAL because of the adverse effect on normal plant operations.

Some gases are toxic by their very nature. Others, like carbon dioxide, can be lethal if it reduces oxygen to low concentrations (asphyxiant) that are immediately dangerous to life and health (IDLH). Oxygen deficient atmospheres (less than 19.5% oxygen) are considered IDLH (ref. 1). NRC position is that anytime carbon dioxide is discharged in plant areas such that the area becomes uninhabitable, regardless of whether anyone is in the areas, conditions for classification exist. The EAL assumes an uncontrolled process that has the potential to affect plant operations or personnel safety. Releases occurring during planned surveillance activities or planned maintenance/tag-out activities, therefore, are excluded.

Should the release affect access to plant Safe Shutdown Areas, escalation to an Alert would be based on EAL HA3.1. Should an explosion or fire occur due to flammable gas within an affected plant area, an Alert may be appropriate based on EAL HA2.1.

IPEC Basis Reference(s):

None

Category: H – Hazards

Subcategory: 3 – Hazardous Gas

Initiating Condition: Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal operation of the plant

EAL:

HU3.2	**Unusual Event**
Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event	

Mode Applicability:

All

NEI 99-01 Basis:

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on HA3.

IPEC Basis:

This EAL is based on the existence of an uncontrolled release originating offsite and local, county or state officials have reported the need for evacuation or sheltering of site personnel. Offsite events (e.g., tanker truck accident releasing toxic gases, etc.) are considered in this EAL because they may adversely affect normal plant operations.

State officials may determine the evacuation area for offsite spills by using the Department of Transportation (DOT) Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

Should the release affect plant Safe Shutdown Areas, escalation to an Alert would be based on EAL HA3.1. Should an explosion or fire occur due to flammable gas within an affected plant area, an Alert may be appropriate based on EAL HA2.1.

IPEC Basis Reference(s):

None

Category: H – Hazards

Subcategory: 3 – Hazardous Gas

Initiating Condition: Access to a vital area is prohibited due to release of toxic, corrosive, asphyxiant or flammable gases which jeopardizes operation of systems required to maintain safe operations or safely shutdown the reactor

EAL:

HA3.1 Alert

Access to **any** Table H-2 area is prohibited due to release of toxic, corrosive, asphyxiant or flammable gases which jeopardizes operation of systems required to maintain safe operations or safely shutdown the reactor

Table H-2 Safe Shutdown Access Areas
• Control Buildings and associated Electrical Tunnels and Battery Rooms • Service Water Pump Structure and Valve Pits • Vapor Containment Building • Primary Auxiliary Building/Fan House • Auxiliary Feed-pump Building

Mode Applicability:

All

NEI 99-01 Basis:

Gases in a vital area can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases. This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions, Fission Product Barrier Degradation or Abnormal Rad Levels / Radioactive Effluent EALs.

IPEC Basis:

This EAL is based on gases that have entered a plant structure in concentrations that could be unsafe for plant personnel and, therefore, preclude access to equipment necessary for the safe shutdown of the plant. Table H-2 safe shutdown access areas contain systems that are required to be locally operated to establish or maintain safe shutdown (ref. 1, 2, 3, 4, 5, 6).

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 1.11.2 Classification of Particular Structures and Equipment
2. Unit 3 FSAR Section 16.1.2 Classification of Particular Structures and Equipment
3. POP 2.1 Operation at Greater than 45% Power
4. POP 1.3 Plant Startup from Zero to 45% Power
5. POP 3.1 Plant Shutdown from 45% Power
6. POP 3.1 Plant Cool down - Hot Shutdown to Cold Shutdown

Category: H – Hazards

Subcategory: 4 – Security

Initiating Condition: Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant

EAL:

HU4.1	**Unusual Event**

A security condition that does **not** involve a hostile action as reported by the Security Shift Supervisor

OR

A credible site-specific security threat notification

OR

A validated notification from NRC providing information of an aircraft threat

Mode Applicability:

All

NEI 99-01 Basis:

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as hostile actions are classifiable under HA4.1, HS4.1 and HG4.1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The Shift Manager shall consider upgrading the emergency response status and emergency classification level in accordance with the site's Safeguards Contingency Plan and Emergency Plan.

<u>1st Threshold</u>

Reference is made to site specific security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on site specific security plans. Site specific Safeguards Contingency Plans are based on guidance provided by NEI 03-12.

2nd Threshold

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the site specific Safeguards Contingency Plan.

3rd Threshold

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to IPEC if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via HA4.1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

IPEC Basis:

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

0-AOP-SEC-1, "Response to Security Compromise" (ref. 2) provides guidance for response to security related events based on contingency events at the IPEC Plant.

IPEC Basis Reference(s):

1. IPEC Safeguards Contingency Plan
2. 0-AOP-SEC-1, "Response to Security Compromise"

Category: H – Hazards

Subcategory: 4 – Security

Initiating Condition: Hostile action within the owner controlled area or airborne attack threat

EAL:

HA4.1 Alert

A hostile action is occurring or has occurred within the Owner Controlled Area as reported by the Security Shift Supervisor

OR

A validated notification from NRC of an airliner attack threat within 30 minutes of the site

Mode Applicability:

All

NEI 99-01 Basis:

Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

<u>1st Threshold</u>

This EAL addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Owner Controlled Area. Those events are adequately addressed by other EALs.

Note that this EAL is applicable for any hostile action occurring, or that has occurred, in the Owner Controlled Area. This includes ISFSI's that may be outside the Protected Area but still within the Owner Controlled Area.

Although nuclear plant security officers are well trained and prepared to protect against hostile action, it is appropriate for Offsite Response Organizations to be notified and encouraged to begin activation (if they do not normally) to be better prepared should it be necessary to consider further actions.

If not previously notified by the NRC that the airborne hostile action was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.

2nd Threshold

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to IPEC if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

IPEC Basis:

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

IPEC Basis Reference(s):

1. IPEC Safeguards Contingency Plan
2. 0-AOP-SEC-1, “Response to Security Compromise”

Category: H – Hazards

Subcategory: 4 – Security

Initiating Condition: Hostile action within the Protected Area

EAL:

HS4.1	**Site Area Emergency**
A hostile action is occurring or has occurred within the Protected Area as reported by the Security Shift Supervisor	

Mode Applicability:

All

NEI 99-01 Basis:

This condition represents an escalated threat to plant safety above that contained in the Alert in that a hostile force has progressed from the Owner Controlled Area to the Protected Area.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organizations readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Protected Area.

Although nuclear plant security officers are well trained and prepared to protect against hostile action, it is appropriate for Off-Site Response Organizations to be notified and encouraged to begin preparations for public protective actions (if they do not normally) to be better prepared should it be necessary to consider further actions.

If not previously notified by NRC that the airborne hostile action was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

IPEC Basis:

Reference is made to the Security Shift Supervisor because this individual is the designated on-site person qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the IPEC Safeguards Contingency Plan (Safeguards) (ref. 1).

IPEC Basis Reference(s):

1. IPEC Safeguards Contingency Plan
2. 0-AOP-SEC-1 Response to Security Compromise

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 4 – Security

Initiating Condition: Hostile action resulting in loss of physical control of the facility

EAL:

HG4.1 General Emergency

A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

OR

A hostile action has caused failure of Spent Fuel Cooling Systems and imminent fuel damage is likely

Mode Applicability:

All

NEI 99-01 Basis:

1st Threshold

This EAL threshold encompasses conditions under which a hostile action has resulted in a loss of physical control of Vital Areas (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location.

These safety functions are reactivity control, RCS inventory, and secondary heat removal.

Loss of physical control of the control room or remote shutdown capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

<u>2nd Threshold</u>

This EAL threshold addresses failure of spent fuel cooling systems as a result of hostile action if imminent fuel damage is likely, such as when a freshly off-loaded reactor core is in the spent fuel pool.

IPEC Basis:

None

IPEC Basis Reference(s):

1. IPEC Safeguards Contingency Plan
2. 0-AOP-SEC-1 Response to Security Compromise

Category: H – Hazards

Subcategory: 5 – Control Room Evacuation

Initiating Condition: Control Room evacuation has been initiated

EAL:

HA5.1	**Alert**
Control Room evacuation initiated	

Mode Applicability:

All

NEI 99-01 Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other emergency response facility is necessary.

Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency.

IPEC Basis:

2[3]-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control", provides the instructions for tripping the unit, and maintaining RCS inventory from outside the Control Room. The Shift Manager (SM) determines if the Control Room is inoperable and requires evacuation. Control Room inhabitability may be caused by fire, dense smoke, noxious fumes, bomb threat in or adjacent to the Control Room, or other life threatening conditions.

IPEC Basis Reference(s):

1. 2-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control"
2. 3-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control"

Category: H – Hazards

Subcategory: 5 – Control Room Evacuation

Initiating Condition: Control Room evacuation has been initiated and plant control **cannot** be established

EAL:

HS5.1 Site Area Emergency

Control Room evacuation has been initiated

AND

Control of the plant **cannot** be established within 15 min.

Mode Applicability:

All

NEI 99-01 Basis:

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control, RCS inventory, and secondary heat removal.

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the site specific time for transfer (15 min.) that the Shift Manager has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by Fission Product Barrier Degradation or Abnormal Rad Levels/Radiological Effluent EALs.

IPEC Basis:

2[3]-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control", provides the instructions for tripping the unit, and maintaining RCS inventory from outside the Control Room. The Shift Manager (SM) determines if the Control Room is inoperable and requires evacuation. Control Room inhabitability may be caused by fire, dense smoke, noxious fumes, bomb threat in or adjacent to the Control Room, or other life threatening conditions.

The 15 minute criteria applies from the time that the Control Room is evacuated.

IPEC Basis Reference(s):

1. 2-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control"
2. 3-AOP-SSD, "Control Room Inaccessibility Safe Shutdown Control"

Category: H – Hazards

Subcategory: 6 – Judgment

Initiating Condition: Other conditions exist that in the judgment of the Emergency Director warrant declaration of a UE

EAL:

HU6.1 Unusual Event

Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. **No** releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Unusual Event emergency classification level.

IPEC Basis:

The Emergency Director is the designated onsite individual having the responsibility and authority for implementing the IPEC Emergency Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Director and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Director, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

IPEC Basis Reference(s):

1. IPEC Emergency Plan Part 2 Section B, Station Emergency Response Organization

Category: H – Hazards

Subcategory: 6 – Judgment

Initiating Condition: Other conditions exist that in the judgment of the Emergency Director warrant declaration of an Alert

EAL:

HA6.1 Alert

Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER**:

An actual or potential substantial degradation of the level of safety of the plant

OR

A security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action

Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels beyond the site boundary.

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency classification level.

IPEC Basis:

The Emergency Director is the designated onsite individual having the responsibility and authority for implementing the IPEC Emergency Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Director and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Director, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref.1).

IPEC Basis Reference(s):

1. IPEC Emergency Plan Part 2 Section B, Station Emergency Response, Organization

Attachment 1 – Emergency Action Level Bases

Category: H – Hazards

Subcategory: 6 – Judgment

Initiating Condition: Other conditions exist that in the judgment of the Emergency Director warrant declaration of Site Area Emergency

EAL:

HS6.1 Site Area Emergency

Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER**:

Actual or likely major failures of plant functions needed for protection of the public

OR

Hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to equipment needed for the protection of the public

Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

IPEC Basis:

The Emergency Director is the designated onsite individual having the responsibility and authority for implementing the IPEC Emergency Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Director and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Director, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

IPEC Basis Reference(s):

1. IPEC Emergency Plan Part 2 Section B, Station Emergency Response, Organization

Category: H – Hazards

Subcategory: 6 – Judgment

Initiating Condition: Other conditions existing that in the judgment of the Emergency Director warrant declaration of General Emergency

EAL:

HG6.1 General Emergency

Other conditions exist that in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve **EITHER**:

Actual or imminent substantial core degradation or melting with potential for loss of containment integrity

OR

Hostile action that results in an actual loss of physical control of the facility

Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1 Rem TEDE and 5 Rem thyroid CDE) beyond the site boundary

Mode Applicability:

All

NEI 99-01 Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

IPEC Basis:

The Emergency Director is the designated onsite individual having the responsibility and authority for implementing the IPEC Emergency Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Director and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Director, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

Releases can reasonably be expected to exceed EPA PAG plume exposure levels outside the Site Boundary.

IPEC Basis Reference(s):

1. IPEC Emergency Plan Part 2 Section B, Station Emergency Response, Organization

Category S – System Malfunction

EAL Group: Hot Conditions (RCS temperature > 200°F); EALs in this category are applicable only in one or more hot operating modes.

Numerous system-related equipment failure events that warrant emergency classification have been identified in this category. They may pose actual or potential threats to plant safety.

The events of this category pertain to the following subcategories:

1. Loss of AC Power

Loss of emergency AC electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of onsite and offsite sources for 480 VAC safeguards buses.

2. ATWS / Criticality

Events related to failure of the Reactor Protection System (RPS) to initiate and complete reactor trips. In the plant licensing basis, postulated failures of the RPS to complete a reactor trip comprise a specific set of analyzed events referred to as Anticipated Transient Without Scram (ATWS) events. For EAL classification however, ATWS is intended to mean any trip failure event that does not achieve reactor shutdown. If RPS actuation fails to assure reactor shutdown, positive control of reactivity is at risk and could cause a threat to Fuel Clad, RCS and Containment integrity. Inadvertent criticalities pose potential personnel safety hazards as well being indicative of losses of reactivity control.

3. Inability to Reach Shutdown Conditions

One EAL falls into this subcategory. It is related to the failure of the plant to be brought to the required plant operating condition required by technical specifications if a limiting condition for operation (LCO) is not met.

4. Instrumentation / Communications

Certain events that degrade plant operator ability to effectively assess plant conditions within the plant warrant emergency classification. Loss of annunciators or indicators is in this subcategory.

Certain events that degrade plant operator ability to effectively communicate with essential personnel within or external to the plant warrant emergency classification.

5. Fuel Clad Degradation

During normal operation, reactor coolant fission product activity is very low. Small concentrations of fission products in the coolant are primarily from the fission of tramp uranium in the fuel clad or minor perforations in the clad itself. Any significant increase from these base-line levels (2% - 5% clad failures) is indicative of fuel failures and is covered under the Fission Product Barrier Degradation category. However, lesser amounts of clad damage may result in coolant activity exceeding Technical Specification limits. These fission products will be circulated with the reactor coolant and can be detected by coolant sampling.

6. RCS Leakage

The Reactor Vessel provides a volume for the coolant that covers the reactor core. The Reactor Vessel and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel clad integrity fail.

Excessive RCS leakage greater than Technical Specification limits are utilized to indicate potential pipe cracks that may propagate to an extent threatening fuel clad, RCS and Containment integrity.

7. Loss of DC Power

Loss of vital 125 VDC DC electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity.

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 1 – Loss of Power

Initiating Condition: Loss of **all** offsite AC power to emergency buses for 15 minutes or longer

EAL:

SU1.1 Unusual Event

Loss of **all** offsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table S-1 Safeguard Bus AC Power Sources

	Onsite	Offsite
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

Prolonged loss of off-site AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency buses.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of off-site power.

IPEC Basis:

The 15-minute interval was selected as a threshold to exclude transient or momentary power losses. If neither emergency bus is energized by an offsite source within 15 minutes, an Unusual Event is declared under this EAL.

Unit 2

A single-line diagram showing the connections of the main generator to the power system grid and standby power source is shown in Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2] (ref. 1).

Three external sources of standby power are available to Indian Point Unit 2. They are the 138- kV tie from the Buchanan 345-kV substation, the 138-kV Buchanan-Millwood ties, and the gas turbine generators. Upon loss of 345/138-kV autotransformer supply at Buchanan, two 138-kV ties are designed to provide additional auxiliary power from the Millwood 138-kV substation. A further source of reliable auxiliary power, independent of transmission system connections, is provided by the Appendix R Diesel Generator. The Appendix R Diesel Generator can provide an alternate backup power source in case of loss of onsite emergency power and concurrent loss of offsite power as well as required auxiliary power for alternate safe shutdown systems equipment.

The plant turbine generator is a main source of 6.9-kV auxiliary electrical power during "online" plant operation. Power to the auxiliaries on 6.9-kV Buses 1 thru 4 is supplied by a 22/6.9-kV unit auxiliary transformer that is connected to the main generator. Power to the auxiliaries on

6.9-kV buses 5 and 6 during "on line" plant operation is supplied by a 13.8/6.9-kV station auxiliary transformer connected to an offsite supply. Power to the 480-V buses is supplied from four 6900/480-V station service transformers.

The 6.9-kV system is arranged as six buses. During normal plant operation, two buses (5 and 6) receive power from the 138-kV system by bus main breakers and the 138/6.9-kV station auxiliary transformer, while buses 1, 2, 3, and 4 receive power from the main generator by bus main breakers and the unit auxiliary transformer. The 480-V switchgear buses are supplied from the 6.9-kV buses as follows: 2A from 2, 3A from 3, 5A from 5, and 6A from 6 (buses 2A and 3A are within the same power train). Tie breakers are provided between 480-V Switchgear buses 2A and 3A, 2A and 5A, and 3A and 6A. (ref. 2, 3, 4)

<u>Unit 3</u>

A single-line diagram, showing the connections of the main generator to the power system grid and to standby power source is shown on Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1] (ref. 5).

Offsite (standby) power is supplied from Buchanan Substation by 138 kV and 345 kV feeders, and two underground 13.8 kV feeders. In addition, there is an Appendix R Diesel Generator. The 13.8 kV feeders are connected to the 6.9 kV buses through autotransformers. The 480 volt engineered safety feature buses are connected to the 6.9 kV buses through station auxiliary transformers.

The 6900 volt system is divided into seven buses. These buses supply 6900 volt auxiliaries directly and 480 volt auxiliaries via the station service transformers. Two buses, numbers 5 and 6, are connected to the 138 kV system via bus main breakers and the Station Auxiliary Transformer. An alternate connection is available to the Appendix R Diesel Generator and/or the 13.8 kV off-site power network. Buses No. 1, 2, 3, and 4 are connected to the generator main breakers and the Unit Auxiliary Transformer. Buses No. 1 and 2 can be tied to Bus No. 5 and Buses No. 3 and 4 can be tied to Bus No. 6 via bus tie breakers to provide auxiliary power during unit down time. The 480 volt system consists of seven buses, each supplied from a

6900 volt bus via a station service transformer. Four of these Buses, No. 2A, 3A, 5A and 6A, supplied from Buses No. 2, 3, 5, and 6 respectively, comprise the safety related 480 volt system. (ref. 2, 3)

IPEC Basis Reference(s):

1. Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2]
2. FSAR 8.2
3. 2-ECA-0.0, "Loss of All AC Power"
4. 3-ECA-0.0, "Loss of All AC Power"
5. Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1]

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 1 – Loss of Power

Initiating Condition: AC power capability to safeguards buses reduced to a single power source for 15 minutes or longer such that **any** additional single failure would result in loss of **all** AC power to safeguard buses

EAL:

SA1.1 Alert

AC power capability to 480 V safeguards buses (5A, 2A/3A, 6A) reduced to a single power source (Table S-1) for $\geq$ 15 min. (Note 3) such that **any** additional single failure would result in loss of **all** AC power to safeguard buses

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table S-1 Safeguard Bus AC Power Sources

	Onsite	**Offsite**
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is intended to provide an escalation from EAL SU.1.1

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a loss of all AC power to the safeguards buses. This condition could occur due to a loss of off-site power with a concurrent failure of two emergency generators to supply power to their emergency buses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of emergency buses being back fed from the unit main generator, or the loss of on-site emergency generators with only one train of emergency buses being back-fed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with SS1.1.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

IPEC Basis:

The 15-minute interval was selected as a threshold to exclude transient or momentary power losses. If the capability of a second source of emergency bus power is not restored within 15 minutes, an Alert is declared under this EAL.

The condition indicated by this EAL would include the degradation of the offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency bus. Another related condition could be the loss of all offsite power and loss of onsite emergency diesels with only one train of emergency buses being fed from the unit main generator, or the loss of onsite emergency diesels with only one train of emergency buses being fed from offsite power. The subsequent loss of this single power source would result in a loss of all AC to the 480 V safeguards buses.

Indian Point Unit 2 has a blackout/unit trip/no safety injection logic that opens all the normal supply breakers and locks them out from re-closure. The blackout is sensed by under voltage on either 480V Bus 5A or 6A. The unit trip is sensed by lockout relays 86P and 86BU.

Therefore, with 86P or 86BU relays tripped, under voltage on Bus 5A or 6A (a single failure) would cause a loss of all offsite power to the "essential buses." For the condition where all emergency diesel generators are inoperable when the unit is shut down and relays 86P and 86BU are not reset, a loss of power to either 480V Bus 5A or 480V Bus 6A will cause the normal supply breakers to all 480V buses to open.

This hot condition EAL is equivalent to the cold condition loss of AC power EAL CU1.1.

IPEC Basis Reference(s):

1. FSAR Section 8.2
2. 2-ECA-0.0, "Loss of All AC Power"
3. 3-ECA-0.0, "Loss of All AC Power"

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 1 – Loss of Power

Initiating Condition: Loss of **all** offsite power and loss of **all** onsite AC power to safeguards buses for 15 minutes or longer

EAL:

SS1.1 Site Area Emergency

Loss of **all** offsite and **all** onsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A, 6A) for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table S-1 Safeguard Bus AC Power Sources		
	Onsite	**Offsite**
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

Loss of all AC power to safeguards buses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to safeguards buses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of off-site power.

Escalation to General Emergency is via Fission Product Barrier Degradation or EAL SG1.1.

IPEC Basis:

This EAL is the hot condition equivalent of the cold condition loss of all AC power EAL CA1.1. When in Cold Shutdown, Refuel, or Defueled mode, the event can be classified as an Alert because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the emergency buses, relative to that existing when in hot conditions.

Unit 2

A single-line diagram showing the connections of the main generator to the power system grid and standby power source is shown in Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2] (ref. 1).

Three external sources of standby power are available to Indian Point Unit 2. They are the 138- kV tie from the Buchanan 345-kV substation, the 138-kV Buchanan-Millwood ties, and the gas turbine generators. Upon loss of 345/138-kV autotransformer supply at Buchanan, two 138-kV ties are designed to provide additional auxiliary power from the Millwood 138-kV substation. A further source of reliable auxiliary power, independent of transmission system connections, is provided by the Appendix R Diesel Generator. The Appendix R Diesel Generator can provide an alternate backup power source in case of loss of onsite emergency power and concurrent loss of offsite power as well as required auxiliary power for alternate safe shutdown systems equipment.

The plant turbine generator is a main source of 6.9-kV auxiliary electrical power during "online" plant operation. Power to the auxiliaries on 6.9-kV Buses 1 thru 4 is supplied by a 22/6.9-kV unit auxiliary transformer that is connected to the main generator. Power to the auxiliaries on 6.9-kV buses 5 and 6 during "on line" plant operation is supplied by a 13.8/6.9-kV station auxiliary transformer connected to an offsite supply. Power to the 480-V buses is supplied from four 6900/480-V station service transformers.

The 6.9-kV system is arranged as six buses. During normal plant operation, two buses (5 and 6) receive power from the 138-kV system by bus main breakers and the 138/6.9-kV station auxiliary transformer, while buses 1, 2, 3, and 4 receive power from the main generator by bus main breakers and the unit auxiliary transformer. The 480-V switchgear buses are supplied from the 6.9-kV buses as follows: 2A from 2, 3A from 3, 5A from 5, and 6A from 6 (buses 2A and 3A are within the same power train). Tie breakers are provided between 480-V Switchgear buses 2A and 3A, 2A and 5A, and 3A and 6A. One emergency diesel-generator provides emergency power to bus 5A, one to 6A, and the other two buses 2A and 3A. Each emergency diesel generator will automatically start on a safety injection signal or upon under voltage on any 480-V switchgear bus. (ref. 2, 3, 4)

Unit 3

A single-line diagram, showing the connections of the main generator to the power system grid and to standby power source is shown on Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1] (ref. 5).

Offsite (standby) power is supplied from Buchanan Substation by 138 kV and 345 kV feeders, and two underground 13.8 kV feeders. In addition, there is 1-25.4 MW and 1-16.9 MW combustion turbine generators at Buchanan substation connected to the 13.8 kV feeders and a 21 MW combustion turbine generator located at the Indian Point Site. The 13.8 kV feeders are connected to the 6.9 kV buses through autotransformers. The 480 volt engineered safety feature buses are connected to the 6.9 kV buses through station auxiliary transformers.

The 6900 volt system is divided into seven buses. These buses supply 6900 volt auxiliaries directly and 480 volt auxiliaries via the station service transformers. Two buses, numbers 5 and 6, are connected to the 138 kV system via bus main breakers and the Station Auxiliary Transformer. An alternate connection is available to the Appendix R Diesel Generator and/or the 13.8 kV off-site power network. Buses No. 1, 2, 3, and 4 are connected to the generator main breakers and the Unit Auxiliary Transformer. Buses No. 1 and 2 can be tied to Bus No. 5 and Buses No. 3 and 4 can be tied to Bus No. 6 via bus tie breakers to provide auxiliary power during unit down time. The 480 volt system consists of seven buses, each supplied from a 6900 volt bus via a station service transformer. Four of these Buses, No. 2A, 3A, 5A and 6A, supplied from Buses No. 2, 3, 5, and 6 respectively, comprise the safety related 480 volt system. One emergency diesel-generator set is connected to bus No. 5A, one to 6A and the third to the combination of Bus No. 2A and Bus 3A. Each diesel generator is automatically started upon under-voltage on its associated 480 volt bus. (ref. 2, 3, 4)

IPEC Basis Reference(s):

1. Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2]
2. FSAR 8.2
3. 2-ECA-0.0 Loss of All AC Power
4. 3-ECA-0.0, “Loss of All AC Power”
5. Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1]

Attachment 1 – Emergency Action Level Bases

Category: S –System Malfunction

Subcategory: 1 – Loss of Power

Initiating Condition: Prolonged loss of **all** offsite and **all** onsite AC power to safeguards buses

EAL:

SG1.1 General Emergency

Loss of **all** offsite and **all** onsite AC power (Table S-1) to 480 V safeguards buses (5A, 2A/3A, 6A)

AND EITHER:

Restoration of at least one safeguards bus within 4 hours is **not** likely

OR

Actual or imminent conditions requiring entry into ORANGE or RED path on F-0.2, "CORE COOLING"

Table S-1 Safeguard Bus AC Power Sources

	Onsite	Offsite
Unit 2	* 480 V EDG 21 * 480 V EDG 22 * 480 V EDG 23 * Appendix R Diesel	* Unit Auxiliary transformer* * Station Auxiliary transformer* * 13.8 KV gas turbine auto transformer* * * With 86P or 86BU tripped, all offsite power supplies must be considered as one power supply.
Unit 3	* 480V EDG 31 * 480V EDG 32 * 480V EDG 33 * Appendix R Diesel	* Unit Auxiliary transformer * Station Auxiliary transformer * 13W92 feeder * 13W93 feeder

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

Loss of all AC power to safeguards buses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to safeguards buses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

The four hours to restore AC power is based on a site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout" Although this EAL may be viewed as redundant to the Fission Product Barrier Degradation EALs, its inclusion is necessary to better assure timely recognition and emergency response.

This EAL is specified to assure that in the unlikely event of a prolonged loss of all safeguards bus AC power, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one safeguards bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded.

Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Director a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that loss or potential loss of Fission Product Barriers is imminent?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Emergency Director judgment as it relates to imminent loss or potential loss of fission product barriers and degraded ability to monitor fission product barriers.

IPEC Basis:

Unit 2

A single-line diagram showing the connections of the main generator to the power system grid and standby power source is shown in Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2] (ref. 1).

Three external sources of standby power are available to Indian Point Unit 2. They are the 138- kV tie from the Buchanan 345-kV substation, the 138-kV Buchanan-Millwood ties, and the gas turbine generators. Upon loss of 345/138-kV autotransformer supply at Buchanan, two 138-kV ties are designed to provide additional auxiliary power from the Millwood 138-kV substation. A further source of reliable auxiliary power, independent of transmission system connections, is provided by the Appendix R Diesel Generator. The Appendix R Diesel Generator can provide an alternate backup power source in case of loss of onsite emergency power and concurrent loss of offsite power as well as required auxiliary power for alternate safe shutdown systems equipment.

The plant turbine generator is a main source of 6.9-kV auxiliary electrical power during "online" plant operation. Power to the auxiliaries on 6.9-kV Buses 1 thru 4 is supplied by a 22/6.9-kV unit auxiliary transformer that is connected to the main generator. Power to the auxiliaries on 6.9-kV buses 5 and 6 during "on line" plant operation is supplied by a 13.8/6.9-kV station auxiliary transformer connected to an offsite supply. Power to the 480-V buses is supplied from four 6900/480-V station service transformers.

The 6.9-kV system is arranged as six buses. During normal plant operation, two buses (5 and 6) receive power from the 138-kV system by bus main breakers and the 138/6.9-kV station auxiliary transformer, while buses 1, 2, 3, and 4 receive power from the main generator by bus main breakers and the unit auxiliary transformer. The 480-V switchgear buses are supplied from the 6.9-kV buses as follows: 2A from 2, 3A from 3, 5A from 5, and 6A from 6 (buses 2A and 3A are within the same power train). Tie breakers are provided between 480-V Switchgear buses 2A and 3A, 2A and 5A, and 3A and 6A. One emergency diesel-generator provides emergency power to bus 5A, one to 6A, and the other two buses 2A and 3A. Each emergency diesel generator will automatically start on a safety injection signal or upon under voltage on any 480-V switchgear bus. (ref. 2, 3, 4)

Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path is entered if core exit thermocouples (TCs) are ≥ 700°F with reduced RCS Sub Cooling Margin (SCM), and any of the following (ref. 5):

- No RCPs are running and either: core exit TCs are ≥ to 700°F and RVLIS nat. circ. range is > 41%, or core exit TCs are < 700°F but RVLIS full range is ≤ 41%.
- At least one RCP is running and Reactor Vessel water level is ≤ RVLIS running range readings corresponding to Top of Active Fuel, (AF) AF.

These conditions indicate sub-cooling has been lost and that some fuel clad damage may potentially occur.

Critical Safety Function Status Tree (CSFST) Core Cooling-RED path is entered if either (ref. 6):

- Core exit TCs ≥ to 1,200°F, or
- Core exit TCs ≥ 700 (715) °F with reduced RCS sub-cooling margin, no RCPs are running, and Unit 2 Natural Circulation range RVLIS is ≤ to 41% (Unit 3 RVLIS Full Range ≤ 33%).

Either set of conditions indicates significant core exit superheating and core uncovery. This is considered a loss of the Fuel Clad barrier.

Unit 3

A single-line diagram, showing the connections of the main generator to the power system grid and to standby power source is shown on Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1] (ref. 5).

Offsite (standby) power is supplied from Buchanan Substation by 138 kV and 345 kV feeders, and two underground 13.8 kV feeders. In addition, there is an Appendix R Diesel Generator at Buchanan substation connected to the 13.8 kV feeders and a 21 MW combustion turbine generator located at the Indian Point Site. The 13.8 kV feeders are connected to the 6.9 kV buses through autotransformers. The 480 volt engineered safety feature buses are connected to the 6.9 kV buses through station auxiliary transformers.

The 6900 volt system is divided into seven buses. These buses supply 6900 volt auxiliaries directly and 480 volt auxiliaries via the station service transformers. Two buses, numbers 5 and 6, are connected to the 138 kV system via bus main breakers and the Station Auxiliary Transformer. An alternate connection is available to the Appendix R Diesel Generator and/or the 13.8 kV off-site power network. Buses No. 1, 2, 3, and 4 are connected to the generator main breakers and the Unit Auxiliary Transformer. Buses No. 1 and 2 can be tied to Bus No. 5 and Buses No. 3 and 4 can be tied to Bus No. 6 via bus tie breakers to provide auxiliary power during unit down time. The 480 volt system consists of seven buses, each supplied from a 6900 volt bus via a station service transformer. Four of these Buses, No. 2A, 3A, 5A and 6A, supplied from Buses No. 2, 3, 5, and 6 respectively, comprise the safety related 480 volt system. One emergency diesel-generator set is connected to bus No. 5A, one to 6A and the third to the combination of Bus No. 2A and Bus 3A. Each diesel generator is automatically started upon under-voltage on its associated 480 volt bus. (ref. 2, 3, 4)

Critical Safety Function Status Tree (CSFST) Core Cooling-RED path is entered if either (ref. 7):

- Core exit TCs ≥ to 1,200°F, or
- Core exit TCs ≥ 700 (715) °F with reduced RCS SCM, no RCPs are running, and Unit 2 Natural Circulation range RVLIS is ≤ to 41% (Unit 3 RVLIS Full Range ≤ 33%).

Either set of conditions indicates significant core exit superheating and core uncovery. This is considered a loss of the Fuel Clad barrier.

Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path is entered if core exit thermocouples (TCs) are ≥ 715°F with reduced RCS SCM, and any of the following (ref. 7):

- No RCPs are running and either: core exit TCs are ≥ to 715°F with RVLIS full range > 33%, or core exit TCs < 700°F but RVLIS full range ≤ 33%.
- At least one RCP is running and Reactor Vessel water level is ≤ RVLIS dynamic head range readings corresponding to TAF.

These conditions indicate sub-cooling has been lost and that some fuel clad damage may potentially occur.

IPEC Basis Reference(s):

1. Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2]
2. FSAR 8.2
3. 2-ECA-0.0, “Loss of All AC Power”
4. 3-ECA-0.0, “Loss of All AC Power”
5. Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1]
6. 2-F-0.2, “Core Cooling”
7. 3-F-0.2, “Core Cooling”

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 2 – ATWS / Criticality

Initiating Condition: Inadvertent criticality

EAL:

SU2.1	**Unusual Event**
Unplanned sustained positive startup rate observed on nuclear instrumentation	

Mode Applicability:

3 - Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL addresses inadvertent criticality events. This EAL indicates a potential degradation of the level of safety of the plant, warranting an Unusual Event classification. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

This condition can be identified using startup rate monitors. The term "sustained" is used in order to allow exclusion of expected short term positive startup rates from planned control rod movements such as shutdown bank withdrawal. These short term positive startup rates are the result of the increase in neutron population due to subcritical multiplication.

Escalation would be by the Fission Product Barrier Table, as appropriate to the operating mode at the time of the event.

IPEC Basis:

The startup rate for each channel is indicated at the main control board in terms of decades per minute over the range of -0.5 to +5.0 decades/min.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 7.4 Nuclear Instrumentation
2. Unit 3 FSAR Section 7.4 Excore Nuclear Instrumentation

Category: S – System Malfunction

Subcategory: 2 – ATWS / Criticality

Initiating Condition: Automatic trip fails to shut down the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

EAL:

SA2.1 Alert

Failure of an automatic trip signal to reduce power range < 5%

AND

Manual trip actions taken at the reactor control console (manual reactor trip switches) are successful

Mode Applicability:

1 - Power Operations, 2 - Startup

NEI 99-01 Basis:

The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (5% power). This EAL equates to the criteria used to determine a valid Sub-criticality Red Path.

Manual trip actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

This condition indicates failure of the automatic protection system to trip the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad or RCS and because of the failure of the Reactor Protection System to automatically shut down the plant.

If manual actions taken at the reactor control console fail to shut down the reactor, the event would escalate to a Site Area Emergency.

IPEC Basis:

CSFST Sub-criticality - RED path is entered based on > 5% reactor power following a reactor trip (ref. 1).

A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined set-points.

Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a negative startup rate as nuclear power drops into the source range.

If expected shutdown responses cannot be verified, operators perform contingency actions that manually insert control rods, opening the reactor trip and bypass breakers. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room which are the manual reactor trip switches. These switches and controls can be rapidly manipulated from the Control Room. (ref. 2, 3)

In the event that the operator identifies a reactor trip is imminent and successfully initiates a manual reactor trip before the automatic trip set-point is reached, no declaration is required. The successful manual trip of the reactor before it reaches its automatic trip set-point or reactor trip signals caused by instrumentation channel failures do not lead to a potential fission product barrier loss. If manual reactor trip actions in the Control Room fail to reduce reactor power below the power associated with the safety system design (< 5%), the event escalates to the Site Area Emergency under EAL SS2.1.

IPEC Basis Reference(s):

1. CSFST F-0.1, Sub-criticality
2. 2-E-0 REACTOR TRIP OR SAFETY INJECTION
3. 3-E-0 REACTOR TRIP OR SAFETY INJECTION

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 2 – ATWS / Criticality

Initiating Condition: Automatic trip fails to shut down the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

EAL:

SS2.1 Site Area Emergency

Failure of an automatic trip signal to reduce power range < 5%

AND

Manual trip actions taken at the reactor control console (manual reactor trip switches) are **not** successful

Mode Applicability:

1 - Power Operations, 2 - Startup

NEI 99-01 Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS.

The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (5% power). This EAL equates to the criteria used to determine a valid Sub-criticality Red Path.

Manual trip actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual trip actions are not considered successful if action away from the reactor control console is required to trip the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shut down the plant.

Although this IC may be viewed as redundant to the Fission Product Barrier Degradation EALs, its inclusion is necessary to better assure timely recognition and emergency response.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

IPEC Basis:

CSFST Sub-criticality - RED path is entered based on > 5% reactor power following a reactor trip (ref. 1).

A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined set-points.

Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a negative startup rate as nuclear power drops into the source range.

If expected shutdown responses cannot be verified, operators perform contingency actions that manually insert control rods, opening the reactor trip and bypass breakers. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a “successful” manual reactor trip. For purposes of emergency classification, a “successful” manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room which are the manual reactor trip switches. These switches and controls can be rapidly manipulated from the Control Room. (ref. 2, 3)

IPEC Basis Reference(s):

1. CSFST F-0.1, Sub-criticality
2. 2-E-0 REACTOR TRIP OR SAFETY INJECTION
3. 3-E-0 REACTOR TRIP OR SAFETY INJECTION

Category: S – System Malfunction

Subcategory: 2 – ATWS / Criticality

Initiating Condition: Automatic trip and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists

EAL:

SG2.1 General Emergency

Failure of automatic **and** all manual trip signals to reduce power range < 5%

AND

Actual or imminent conditions requiring entry into **EITHER**:

RED path in F-0.2, CORE COOLING

OR

RED path in F-0.3, HEAT SINK

Mode Applicability:

1 - Power Operations, 2 - Startup

NEI 99-01 Basis:

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful.

The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (5% power). This EAL equates to the criteria used to determine a valid Sub-criticality Red Path.

An extreme challenge to the ability to cool the core exists when core exit temperatures are at or approaching 1200 degrees F or if reactor vessel water level is below the top of active fuel. This EAL equates to a Core Cooling RED condition combined with a Sub-criticality RED condition.

Another consideration is the inability to initially remove heat during the early stages of this sequence. If emergency feed-water flow is insufficient to remove the amount of heat required by design from at least one steam generator, an extreme challenge should be considered to exist. This condition equates to a Heat Sink RED condition combined with a Sub-criticality RED condition.

In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

IPEC Basis:

CSFST Sub-criticality - RED path is entered based on > 5% reactor power following a reactor trip.

CSFST Heat Sink - RED path is entered based on both:

All S/G's narrow range level < 9 (7)% [26 (17)% adv. cnmt.]

AND

Total feed-water flow to S/Gs < 400 (365) gpm

CSFST Core Cooling - RED path is entered based on either:

Core exit thermocouples > 1200° F

OR

Core exit thermocouples > 700 (715) ° F

AND

RVLIS level < 41 (33)% w/ no RCPs (TAF)

The combination of these conditions (reactor power > 5% and Heat Sink-RED or Core Cooling RED path) indicates the ultimate heat sink function is under extreme challenge. Additionally, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat load for which the safety systems were designed. This situation could be the precursor for a core melt sequence.

A major consideration is the inability to initially remove heat during the early stages of this sequence. If emergency feed-water flow is insufficient to remove the amount of heat required by design from at least one steam generator, an extreme challenge should be considered to exist. This equates to a HEAT Sink RED condition. If CETs indicate > 1200° F or are > 700 (715) ° F with RVLIS < 41 (33) % a condition indicative of severe challenge to heat removal also exists.

In the event this challenge exists at a time when the reactor has not been brought below the power associated with safety system design power (5%) a core melt sequence is considered to exist. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum offsite intervention time.

IPEC Basis Reference(s):

1. CSFST F-0.1, Sub-criticality
2. CSFST F-0.2, Core Cooling
3. CSFST F-0.3, Heat Sink
4. FR-S.1, Response to Reactor Restart/ATWS
5. FR-S.2, Response to Loss of Core Shutdown

Category: S – System Malfunction

Subcategory: 3 – Inability to Reach Shutdown Conditions

Initiating Condition: Inability to reach required shutdown within Technical Specification limits

EAL:

SU3.1	**Unusual Event**
Plant is **not** brought to required operating mode within Technical Specifications LCO action statement time	

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate Unusual Event is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed. Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other EALs.

IPEC Basis:

None

IPEC Basis Reference(s):

1. Technical Specifications

Category: S – System Malfunction

Subcategory: 4 – Instrumentation / Communications

Initiating Condition: Unplanned loss of safety system annunciation or indication in the control room for 15 minutes or longer

EAL:

SU4.1	**Unusual Event**
Unplanned loss of > approximately 75% of Control Room Overhead annunciators or Control Room indicators, Table S-3, associated with safety systems for ≥ 15 min. (Note 3)	

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table S-3 Safety System Indicators
• Reactivity Control
• RCS Inventory
• Reactor Trip
• Decay Heat Removal
• Fission Product Barriers

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10CFR50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU3.1 "Inability to Reach Required Shutdown Within Technical Specification Limits."

Annunciators or indicators associated with safety systems include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no applicability is indicated during these modes of operation.

This Unusual Event will be escalated to an Alert based on a concurrent loss of compensatory indications or if a significant transient is in progress during the loss of annunciation or indication.

IPEC Basis:

Computer-based monitoring capability include PICS, CMFS and QSPDS.

IPEC Basis Reference(s):

None

Category: S – System Malfunction

Subcategory: 4 – Instrumentation / Communications

Initiating Condition: Loss of **all** onsite or offsite communications capabilities

EAL:

SU4.2 Unusual Event

Loss of **all** Table S-4 onsite (internal) communications capability affecting the ability to perform routine operations

OR

Loss of **all** Table S-4 offsite (external) communications capability affecting the ability to perform offsite notifications

Table S-4 Communications Systems

System	Onsite (internal)	Offsite (external)
Plant Telephone System	X	X
Plant Radio System	X	
Page/Party System	X	
Emergency Notification System		X

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities.

The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant problems. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from non-routine radio transmissions, individuals being sent to off-site locations, etc.) are being used to make communications possible.

The Table S-4 list for on-site communications loss encompasses the loss of all means of communications (e.g., commercial telephones, sound powered phone systems, page party system (Gaitronics) and radios / walkie-talkies) routinely used for operations.

The Table S-4 list for off-site communications loss encompasses the loss of all means of communications with off-site authorities. This includes the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems that are routinely used for offsite emergency notifications.

IPEC Basis:

Unit 2

Routine Unit 2 plant communications are conducted via telephone, radio, and Public Address (paging) systems.

The plant telephone and radio communications systems include two (2) PBX electronic switches, backup phone lines and a UHF radio system. A third PBX electronic switch is located at the EOF.

The public address system for Indian Point Unit 2 consists of "Page" and "Party" communications, which are common to both the primary (nuclear) and secondary (conventional) portions of Units 1 and 2. The “Page” and “Party” communications are also monitored at a speaker panel located in the CCR.

An in-house radio system provides communications between the Technical Support Center, the I&C office, and in-plant personnel.

Unit 3

The Unit 3 communications system was designed to ensure the reliable, timely flow of information and action directives necessary during normal operation, and particularly for the mitigation of emergencies.

The Public Address (PA) System has two subsystems: the Plant Party Paging and the Site PA System. The system consists of three channels. Two of these channels are common to both the primary (nuclear) and secondary (conventional) portions of the plant. The third line provides an additional channel in the primary portion of the Unit 3 plant. A "Page" handset is used for page purposes only and calls originating from this handset can be heard on all loudspeakers in the primary and secondary portions of the facility. The remaining two "Page-Party" handsets are used for loudspeakers paging and party-line conversations, as selected by the control room operator.

This EAL is the hot condition equivalent of the cold condition EAL CU4.1.

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 7.7.4 Communications
2. Unit 3 FSAR Section 9.6.5 Plant Communications Systems

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 4 – Instrumentation / Communications

Initiating Condition: Unplanned loss of safety system annunciation or indication in the control room with either (1) a significant transient in progress, or (2) compensatory indicators unavailable

EAL:

SA4.1 Alert

Unplanned loss of > approximately 75% of Control Room Overhead annunciators or Control Room indicators, Table S-3, associated with safety systems for ≥ 15 min. (Note 3)

AND EITHER:

Any significant transient is in progress, Table S-2

OR

Compensatory indications are unavailable

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Table S-2 Significant Transient
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety injection activation
• Thermal power oscillations of > 10%

Table S-3 Safety System Indicators
• Reactivity Control
• RCS Inventory
• Reactor Trip
• Decay Heat Removal
• Fission Product Barriers

Attachment 1 – Emergency Action Level Bases

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a significant transient.

Recognition of the availability of computer based indication equipment is considered (e.g., PICS, CMFS or QSPDS).

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU3.1 "Plant is not brought to required operating mode within Technical Specifications LCO action statement time."

The annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).

"Compensatory indications" in this context includes computer based information such as PICS, CMFS or QSPDS. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no EAL is indicated during those modes of operation.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a significant transient in progress during the loss of annunciation or indication.

IPEC Basis:

Significant transients are listed in Table S-2 and include response to automatic or manually initiated functions such as trips, runbacks involving greater than 25% thermal power change, electrical load rejections of greater than 25% full electrical load, safety injections, or thermal power oscillations of 10% or greater.

IPEC Basis Reference(s):

None

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 4 – Instrumentation / Communications

Initiating Condition: Inability to monitor a significant transient in progress

EAL:

SS4.1 Site Area Emergency

Loss of > approximately 75% of Control Room Overhead annunciators or Control Room indicators, Table S-3, associated with safety systems

AND

Any significant transient is in progress, Table S-2

AND

Compensatory indications are unavailable

Table S-2 Significant Transient
• Automatic turbine runback > 25% thermal reactor power
• Electrical load rejection > 25% full electrical load
• Reactor trip
• Safety injection activation
• Thermal power oscillations of > 10%

Table S-3 Safety System Indicators
• Reactivity Control
• RCS Inventory
• Reactor Trip
• Decay Heat Removal
• Fission Product Barriers

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a significant transient.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This is addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the Unusual Event is based on SU3.1 "Inability to Reach Required Shutdown Within Technical Specification Limits."

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Annunciators for this EAL are limited to include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (.g., area, process, and/or effluent rad monitors, etc.)]

Indications needed to monitor safety functions necessary for protection of the public must include control room indications, computer generated indications and dedicated annunciation capability.

Indications should be those used to determine such functions as the ability to shut down the reactor, maintain the core cooled, to maintain the reactor coolant system intact, maintain the spent fuel cooled, and to maintain containment intact.

"Compensatory indications" in this context includes computer based information such as PICS, CMFS or QSPDS.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no EAL is indicated during those modes of operation.

IPEC Basis:

Significant transients are listed in Table S-2 and include response to automatic or manually initiated functions such as trips, runbacks involving greater than 25% thermal power change, electrical load rejections of greater than 25% full electrical load, safety injections, or thermal power oscillations of 10% or greater.

IPEC Basis Reference(s):

None

Category: S – System Malfunction

Subcategory: 5 – Fuel Clad Degradation

Initiating Condition: Fuel clad degradation

EAL:

SU5.1 Unusual Event

[Unit 3]: 1(2)RM063A/B Gross Failed Fuel Detector High alarm (> 50 μCi/ml)

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

This threshold addresses gross failed fuel detector radiation monitor readings that provide indication of a degradation of fuel clad integrity.

IPEC Basis:

Unit 2

Unit 2 does not have installed radiation monitoring capable of detecting fuel damage equivalent to Technical Specification coolant activity. Unit 2 would declare the Unusual event based on EAL SU5.2 due to a coolant sample exceeding Technical Specification limit of > 60 μCi/gm I-131 dose equivalent.

Unit 3

The Unit 3 1(2)RM063 Gross Failed Fuel Detector high alarm (Radiation Monitoring Control Cabinet - R63A/B GFFD) provides indication of fuel damage > 50 μCi/cc.

IPEC Basis Reference(s):

1. 3-AOP-HIACT-1 RCS High Activity
2. 3-ARP-040 R63A/B GFFD
3. 3-SOP-RM-10 Radiation Monitor Set point Control

Category: S – System Malfunction

Subcategory: 5 – Fuel Clad Degradation

Initiating Condition: Fuel clad degradation

EAL:

SU5.2 Unusual Event

Coolant sample activity:

>60 µCi/gm I-131 dose equivalent

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

IPEC Basis:

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems.

This EAL addresses reactor coolant samples exceeding Technical Specification LCO limit 3.4.16 A.1, which is applicable in Hot operating modes (ref. 1). The iodine spike limit of 60.0 µCi/gm I-131 dose equivalent provides an iodine peak or spike limit for the reactor coolant concentration to assure that the radiological consequence of a postulated Steam Line Break or SGTR are within 10CFR50.67 dose guidelines (ref. 1).

10CFR50.67 dose guidelines (ref. 2)

IPEC Basis Reference(s):

1. Unit 2 Technical Specifications Section 3.4.16 A.1
2. Unit 3 Technical Specifications Section 3.4.16 A.1 (Revised)

Category: S – System Malfunction

Subcategory: 6 – RCS Leakage

Initiating Condition: RCS leakage

EAL:

SU6.1 Unusual Event

Unidentified or pressure boundary leakage > 10 gpm

OR

Identified leakage > 25 gpm

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

The conditions of this EAL may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

The threshold for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this EAL to the Alert level is via Fission Product Barrier Degradation EALs.

IPEC Basis:

RCS Leak Rate Evaluations are routinely performed once a week per 0-SOP-LEAKRATE-1 (ref. 5). The Shift Manager may request performance of additional RCS Leak Rate Evaluations for reasons other than unidentified leakage increase. Leak rate evaluation can be performed by computer or manually if the computer is not available.

Steam Generator tube leakage is considered identified leakage.

Charging Pump leakage is considered separately as Non-RCPB Leakage and therefore is removed from the total identified leakage components. (ref. 3, 4)

IPEC Basis Reference(s):

1. Unit 2 Technical Specification Section 3.4.13 RCS Operational Leakage
2. Unit 3 Technical Specification Section 3.4.13 RCS Operational Leakage
3. 2-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
4. 3-AOP-LEAK-1 Sudden Increase in Reactor Coolant System Leakage
5. 0-SOP-LEAKRATE-1 RCS Leak-rate Surveillance, Evaluation and Leak Identification

Attachment 1 – Emergency Action Level Bases

Category: S – System Malfunction

Subcategory: 7 – Loss of DC Power

Initiating Condition: Loss of **all** vital DC power for 15 minutes or longer

EAL:

SS7.1 Site Area Emergency

< 105 VDC bus voltage indications on **all** safety-related DC buses for ≥ 15 min. (Note 3)

Note 3: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation to a General Emergency would occur by Abnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

IPEC Basis:

For Indian Point Unit 2, each 480V bus has an automatic transfer switch to provide alternate DC power supplies to the 480V buses. This DC power is also supplied to 480V motor control centers.

The bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate loads.

This EAL is the hot condition equivalent of the cold condition loss of DC power EAL CU6.1.

IPEC Basis Reference(s):

1. 2-AOP-DC Loss Of A Battery Charger Or Any 125V DC Panel
2. 2-PT-R076A Station Battery 21 Load Test
3. 2-PT-R076C Station Battery 23 Load Test
4. 3-AOP-DC-1 Loss Of A 125V DC Panel
5. SOP-EL-003, Battery Charger and 125 Volt DC System Operations
6. 3PT-R156A Station Battery 31 Load Profile Service Test

Category E – ISFSI

EAL Group: ANY (The EAL in this category is applicable to any plant condition, hot or cold.)

An Independent Spent Fuel Storage Installation (ISFSI) is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask must escape its packaging and enter the biosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety.

An Unusual Event is declared on the basis of the occurrence of an event of sufficient magnitude that a loaded cask *confinement boundary* is damaged or violated. This includes classification based on a loaded fuel storage cask *confinement boundary* loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Security events affecting the ISFSI are classifiable under security based EALs in the Hazards Category.

Minor surface damage that does not affect storage cask boundary is excluded from the scope of these EALs.

Category: E – ISFSI

Subcategory: None

Initiating Condition: Damage to a loaded cask confinement boundary

EAL:

EU1.1	**Unusual Event**
Damage to a loaded cask confinement boundary	

Mode Applicability:

All

NEI 99-01 Basis:

An Unusual Event in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

IPEC Basis:

Confinement Boundary means the outline formed by either: (1) the sealed, cylindrical enclosure of the Multi-Purpose Canister (MPC) shell welded to a solid baseplate, a lid welded around the top circumference of the shell wall, the port cover plates welded to the lid, and the closure ring welded to the lid and MPC shell providing the redundant sealing; or (2) the sealed, cylindrical enclosure of the Shielded Transfer Canister (STC) inner shell welded to a solid base plate and an upper flange, with the upper flange bolted to a solid closure lid with the lid to flange interface having a double elastomeric o-ring seal, and with the lid having vent and drain ports with bolted solid cover plates with each cover plate having an elastomeric o-ring seal.

Minor surface damage that does not affect storage cask boundary is excluded from the scope of this EAL.

IPEC Basis Reference(s):

1. Holtec International FSAR for the HI-STORM 100 Cask System

Category F – Fission Product Barrier Degradation

EAL Group: Hot Conditions (RCS temperature > 200 °F); EALs in this category are applicable only in one or more hot operating modes including Power Operations, Startup, Hot Standby and Hot Shutdown.

EALs in this category represent threats to the defense in depth design concept that precludes the release of highly radioactive fission products to the environment. This concept relies on multiple physical barriers any one of which, if maintained intact, precludes the release of significant amounts of radioactive fission products to the environment. The primary fission product barriers are:

A. Reactor Fuel Clad (FC): The zirconium tubes which house the ceramic uranium oxide pellets along with the end plugs which are welded into each end of the fuel rods comprise the fuel clad.

B. Reactor Coolant System (RCS): The Reactor Vessel shell, vessel head, vessel nozzles and penetrations and all primary systems directly connected to the Reactor Vessel up to the first isolation valve comprise the RCS.

C. Containment (CNMT): The vapor Containment structure and all isolation valves required to maintain Containment integrity under accident conditions comprise the Containment barrier.

The EALs in this category require evaluation of the loss and potential loss thresholds listed in the fission product barrier matrix of Table F-1 (Attachment 2). “Loss” and “Potential Loss” signify the relative damage and threat of damage to the barrier. “Loss” means the barrier no longer assures containment of radioactive materials. “Potential Loss” means integrity of the barrier is threatened and could be lost if conditions continue to degrade. The number of barriers that are lost or potentially lost and the following criteria determine the appropriate emergency classification level:

Unusual Event:

Any loss or any potential loss of Primary Containment

Alert:

Any loss or any potential loss of either Fuel Clad or RCS

Site Area Emergency:

Loss or potential loss of any two barriers

General Emergency:

Loss of any two barriers and loss or potential loss of third barrier

The logic used for emergency classification based on fission product barrier monitoring should reflect the following considerations:

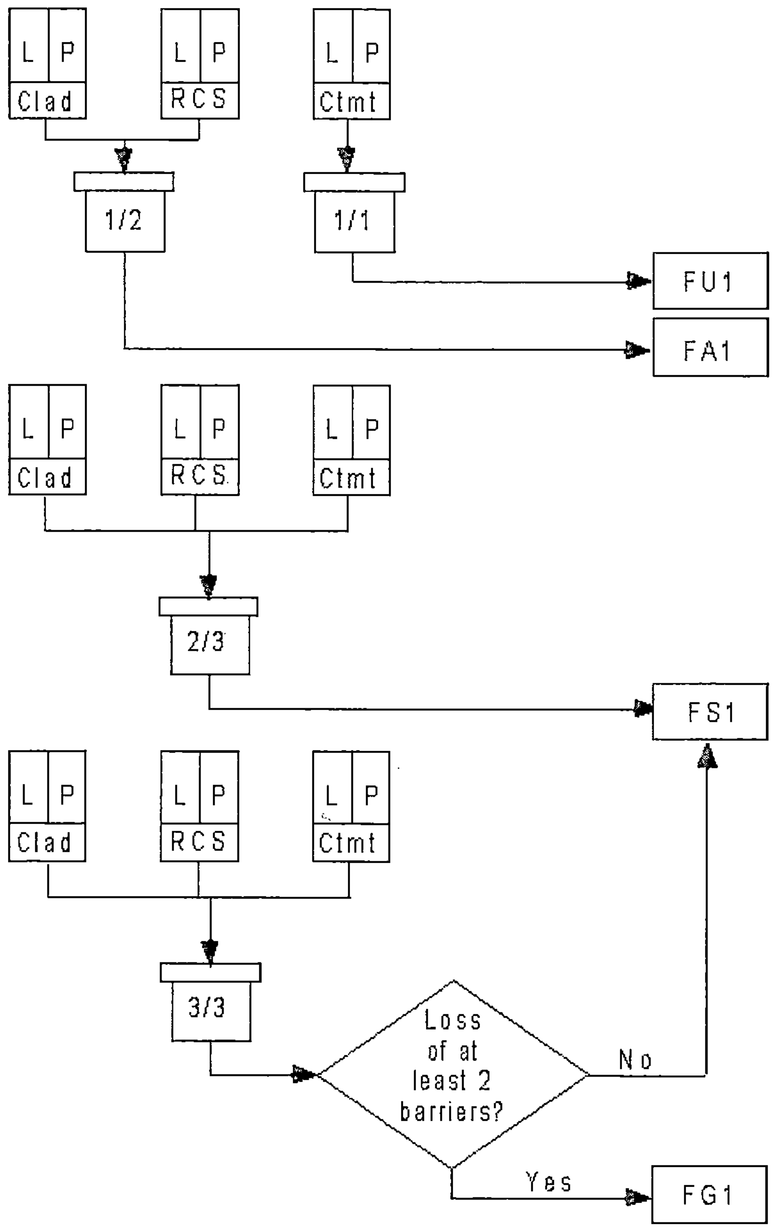
- The Fuel Clad barrier and the RCS barrier are weighted more heavily than the Containment barrier. UE EALs associated with RCS and Fuel Clad barriers are addressed under System Malfunction EALs.
- At the Site Area Emergency level, there must be some ability to dynamically assess how far present conditions are from the threshold for a General Emergency. For example, if Fuel Clad and RCS barrier "loss" EALs existed, that, in addition to offsite dose assessments, would require continual assessments of radioactive inventory and containment integrity. Alternatively, if both Fuel Clad and RCS barrier "Potential Loss" EALs existed, the Emergency Director would have more assurance that there was **no** immediate need to escalate to a General Emergency.
- The ability to escalate to higher emergency classes as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety.

Fission Product Barrier EALs must be capable of addressing event dynamics. Imminent Loss or Potential Loss should result in a classification as if the affected threshold(s) are already exceeded, particularly for the higher emergency classes.

Determine which combination of the three barriers are lost or have a potential loss (Figure F-1) and use FU1.1, FA1.1, FS1.1 and FG1.1 to classify the event. Also an event for multiple events could occur which result in the conclusion that exceeding the loss or potential loss thresholds is imminent. In this imminent loss situation use judgment and classify as if the thresholds are exceeded.

Attachment 1 – Emergency Action Level Bases

Figure F-1



Subcategory: N/A

Initiating Condition: **Any** loss or **any** potential loss of Containment

EAL:

FU1.1	**Unusual Event**
Any loss or **any** potential loss of Containment (Table F-1)	

Mode Applicability:

1 - Power Operations, 2 – Startup, 3 - Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

None

IPEC Basis:

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

Fuel Clad and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Fuel Clad and RCS barriers, the loss of either of which results in an Alert (EAL FA1.1), loss of the Containment barrier in and of itself does not result in the relocation of radioactive materials or the potential for degradation of core cooling capability. However, loss or potential loss of the Containment barrier in combination with the loss or potential loss of either the Fuel Clad or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.1.

IPEC Basis Reference(s):

None

Attachment 1 – Emergency Action Level Bases

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: **Any** loss or **any** potential loss of either Fuel Clad or RCS

EAL:

FA1.1	**Alert**
Any loss or **any** potential loss of either Fuel Clad or RCS (Table F-1)	

Mode Applicability:

1 - Power Operations, 2 – Startup, 3 - Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

None

IPEC Basis:

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the Alert classification level, Fuel Clad and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Clad or RCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Clad or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.

IPEC Basis Reference(s):

None

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: Loss or potential loss of **any** two barriers

EAL:

FS1.1	**Site Area Emergency**
Loss or potential loss of **any** two barriers (Table F-1)	

Mode Applicability:

1 - Power Operations, 2 – Startup, 3 - Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

None

IPEC Basis:

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the Site Area Emergency classification level, each barrier is weighted equally. A Site Area Emergency is therefore appropriate for any combination of the following conditions:

- One barrier loss and a second barrier loss (i.e., loss - loss)
- One barrier loss and a second barrier potential loss (i.e., loss - potential loss)
- One barrier potential loss and a second barrier potential loss (i.e., potential loss - potential loss)

At the Site Area Emergency classification level, the ability to dynamically assess the proximity of present conditions with respect to the threshold for a General Emergency is important. For example, the existence of Fuel Clad and RCS Barrier loss thresholds in addition to offsite dose assessments would require continual assessments of radioactive inventory and Containment integrity in anticipation of reaching a General Emergency classification. Alternatively, if both Fuel Clad and RCS potential loss thresholds existed, the Emergency Director would have greater assurance that escalation to a General Emergency is less imminent.

IPEC Basis Reference(s):

None

Attachment 1 – Emergency Action Level Bases

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: Loss of **any** two barriers and loss or potential loss of third barrier

EAL:

FG1.1 General Emergency

Loss of **any** two barriers

AND

Loss or potential loss of third barrier (Table F-1)

Mode Applicability:

1 - Power Operations, 2 – Startup, 3 - Hot Standby, 4 - Hot Shutdown

NEI 99-01 Basis:

None

IPEC Basis:

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the General Emergency classification level each barrier is weighted equally. A General Emergency is therefore appropriate for any combination of the following conditions:

- Loss of Fuel Clad, RCS and Containment barriers
- Loss of Fuel Clad and RCS barriers with potential loss of Containment barrier
- Loss of RCS and Containment barriers with potential loss of Fuel Clad barrier
- Loss of Fuel Clad and Containment barriers with potential loss of RCS barrier

IPEC Basis Reference(s):

None

Introduction

Table F-1 lists the threshold conditions that define the Loss and Potential Loss of the three fission product barriers (Fuel Clad, Reactor Coolant System, and Containment). The table is structured so that each of the three barriers occupies adjacent columns. Each fission product barrier column is further divided into two columns; one for Loss thresholds and one for Potential Loss thresholds.

The first column of the table (to the left of the Fuel Clad Loss column) lists the categories (types) of fission product barrier thresholds. The fission product barrier categories are:

A. CSFST

B. Core Exit T/Cs

C. Radiation

D. Inventory

E. Other

F. Judgment

Each category occupies a row in Table F-1 thus forming a matrix defined by the categories. The intersection of each row with each Loss/Potential Loss column forms a cell in which one or more fission product barrier thresholds appear. If NEI 99-01 does not define a threshold for a barrier Loss/Potential Loss, the word "None" is entered in the cell.

Thresholds are assigned sequential numbers within each Loss and Potential Loss column beginning with number one. In this manner, a threshold can be identified by its category title and number. For example, the first Fuel Clad barrier Loss in Category A would be assigned "FC Loss A.1," the third Containment barrier Potential Loss would be assigned "CMNT P-Loss B.3," etc.

If a cell in Table F-1 contains more than one numbered threshold, each of the numbered thresholds, if exceeded, signifies a Loss or Potential Loss of the barrier. It is not necessary to exceed all of the thresholds in a category before declaring a barrier Loss/Potential Loss.

Subdivision of Table F-1 by category facilitates association of plant conditions to the applicable fission product barrier Loss and Potential Loss thresholds. This structure promotes a systematic approach to assessing the classification status of the fission product barriers.

When equipped with knowledge of plant conditions related to the fission product barriers, the EAL-user first scans down the category column of Table F-1, locates the likely category and then reads across the fission product barrier Loss and Potential Loss thresholds in that category to determine if a threshold has been exceeded. If a threshold has not been exceeded, the EAL-user proceeds to the next likely category and continues review of the thresholds in the new category

If the EAL-user determines that any threshold has been exceeded, by definition, the barrier is lost or potentially lost – even if multiple thresholds in the same barrier column are exceeded, only that one barrier is lost or potentially lost. The EAL-user must examine each of the three fission product barriers to determine if other barrier thresholds in the category are lost or potentially lost. For example, if containment radiation is sufficiently high, a Loss of the Fuel Clad and RCS barriers and a Potential Loss of the Containment barrier can occur. Barrier Losses and Potential Losses are then applied to the algorithms given in EALs FG1.1, FS1.1, FA1.1 and FU1.1 to determine the appropriate emergency classification.

In the remainder of this Attachment, the Fuel Clad barrier threshold bases appear first, followed by the RCS barrier and finally the Containment barrier threshold bases. In each barrier, the bases are given according category Loss followed by category Potential Loss beginning with Category A, then B,…,E.

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Table F-1 Fission Product Barrier Matrix

	Fuel Cladding Barrier (FC)		Reactor Coolant System Barrier (RCS)		Containment Barrier (CNMT)	
	☐ Loss	☐ Potential Loss	☐ Loss	☐ Potential Loss	☐ Loss	☐ Potential Loss
A.CSFST	☐ 1. Core-Cooling RED entry conditions met	☐ 1. Core Cooling - ORANGE entry conditions met OR Heat Sink - RED entry conditions met and heat sink is required		☐ 1. Integrity - RED entry conditions met OR Heat Sink - RED entry conditions met and heat sink is required		☐ 1. Containment - RED entry conditions met
B.Core Exit TCs	☐ 2. Core exit TCs > 1,200°F	☐ 2. Core exit TCs [Unit 2] > 700°F [Unit 3] > 715°F				☐ 2. Core exit TCs > 1,200°F AND Core exit TCs not lowering within 15 minutes after restoration procedure entry ☐ 3. Core exit TCs [Unit 2] > 700°F [Unit 3] > 715°F AND RVLIS [Unit 2] < 41% [Unit 3] < 33% w/ no RCPs AND Core exit TCs not lowering or RVLIS not rising within 15 minutes after restoration procedure entry
C.Radiation	☐ 3. Containment radiation monitor R-25 or R-26 > 17 R/hr		☐ 1. [Unit 2] R-41 > 1.2E-5 µCi/cc or R-42 > 1.0E-2 µCi/cc [Unit 3] R-11 > 1.2E-5 µCi/cc or R-12 > 5.0E-2 µCi/cc			☐ 4. Containment radiation monitor R-25 or R-26 > 68 R/hr
D.Inventory		☐ 3. RVLIS [Unit 2] < 41% [Unit 3] < 33% with no RCPs running	☐ 2. RCS leak rate resulting in a loss of RCS subcooling (< Table F-2) ☐ 3. Ruptured SG results in an ECCS (SI) actuation	☐ 2. RCS leak rate indicated greater than 87 gpm	☐ 1. A Containment pressure rise followed by a rapid unexplained drop in Containment pressure ☐ 2. Containment pressure or sump level response not consistent with LOCA conditions ☐ 3. Ruptured SG faulted outside of containment ☐ 4. Primary-to-secondary leak rate > 10 gpm AND Unisolable steam release from affected SG to the environment	☐ 5. Containment pressure > 47 psig and rising ☐ 6. Containment hydrogen concentration ≥ 4% ☐ 7. Containment pressure > Phase B isolation signal setpoint following LOCA AND Less than Table F-3 depressurization equipment operating as designed
E.Other	☐ 4. Primary coolant activity > 300 µCi/gm I-131 dose equivalent				☐ 5. Inability to isolate all valves in any one line AND Direct downstream pathway to the environment exists after containment isolation signal	
F. Judgment	☐ 5. Any condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	☐ 4. Any condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	☐ 4. Any condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	☐ 3. Any condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	☐ 6. Any condition in the opinion of the Emergency Director that indicates loss of the Containment barrier	☐ 8. Any condition in the opinion of the Emergency Director that indicates potential loss of the Containment barrier

Barrier: Fuel Clad

Category: A. CSFST

Degradation Threat: Loss

Threshold:

1. Core Cooling - RED entry conditions met

NEI 99-01 Basis:

Core Cooling - RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.

IPEC Basis:

Critical Safety Function Status Tree (CSFST) Core Cooling-RED path is entered if either (ref. 1, 2):

- Core exit TCs $\geq$ to 1,200°F, or
- Core exit TCs $\geq$ 700 (715) °F with reduced RCS sub cooling margin, no RCPs are running, and Unit 2 Natural Circulation range RVLIS is $\leq$ to 41% (Unit 3 RVLIS Full Range $\leq$ 33%).

Either set of conditions indicates significant core exit superheating and core uncovery. This is considered a loss of the Fuel Clad barrier.

IPEC Basis Reference(s):

1. 2-F-0.2 Core Cooling
2. 3-F-0.2 Core Cooling

Barrier: Fuel Clad

Category: A. CSFST

Degradation Threat: Potential Loss

Threshold:

1. Core Cooling - ORANGE entry conditions met

   OR

   Heat Sink - RED entry conditions met and heat sink is required

NEI 99-01 Basis:

Core Cooling - ORANGE indicates sub-cooling has been lost and that some clad damage may occur.

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

IPEC Basis:

Unit 2

Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path is entered if core exit thermocouples (TCs) are $\geq$ 700°F with reduced RCS SCM, and any of the following (ref. 1):

- No RCPs are running and either: core exit TCs are $\geq$ to 700°F and RVLIS nat. circ. range is > 41%, or core exit TCs are < 700°F but RVLIS full range is $\leq$ 41%.
- At least one RCP is running and Reactor Vessel water level is $\leq$ RVLIS running range readings corresponding to TAF.

These conditions indicate sub-cooling has been lost and that some fuel clad damage may potentially occur.

Indication that heat removal is extremely challenged is manifested by entry conditions to CSFST Heat Sink-RED path (ref. 3). CSFST Heat Sink-RED path is entered if all SG NR LVLs are ≤ 10% [27%] and total FW flow is ≤ to 400 gpm. The combination of these conditions when heat sink is required indicates the ultimate heat sink function is under extreme challenge. This condition addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus is a challenge of the Fuel Clad barrier.

Unit 3

Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path is entered if core exit thermocouples (TCs) are ≥ 715°F with reduced RCS SCM, and any of the following (ref. 2):

- No RCPs are running and either: core exit TCs are ≥ to 715°F with RVLIS full range > 33%, or core exit TCs < 700°F but RVLIS full range ≤ 33%.
- At least one RCP is running and Reactor Vessel water level is ≤ RVLIS dynamic head range readings corresponding to TAF.

These conditions indicate sub-cooling has been lost and that some fuel clad damage may potentially occur.

Indication that heat removal is extremely challenged is manifested by entry conditions to CSFST Heat Sink-RED path (ref. 4). CSFST Heat Sink-RED path is entered if all SG NR LVLs are ≤ 9% [14%] and total FW flow is ≤ to 365 gpm. The combination of these conditions when heat sink is required indicates the ultimate heat sink function is under extreme challenge. This condition addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus is a challenge of the Fuel Clad barrier.

IPEC Basis Reference(s):

1. 2-F-0.2 Core Cooling
2. 3-F-0.2 Core Cooling
3. 2-F-0.3 Heat Sink
4. 3-F-0.3 Heat Sink

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Fuel Clad

Category: B. Core Exit TCs

Degradation Threat: Loss

Threshold:

2. Core exit TCs > 1,200°F

NEI 99-01 Basis:

Core exit TCs > 1,200°F corresponds to significant superheating of the coolant.

IPEC Basis:

This indication of inadequate core cooling requires prompt operator action. Inadequate core cooling is caused by a substantial loss of primary coolant resulting in a partially or fully uncovered core. Without adequate heat removal, the core decay energy will cause the fuel temperatures to increase. Severe fuel damage will occur unless core cooling is promptly restored.

IPEC Basis Reference(s):

1. 2-F-0.2 Core Cooling
2. 3-F-0.2 Core Cooling
3. 2-FR-C.1 Response to Inadequate Core Cooling
4. 3-FR-C.1 Response to Inadequate Core Cooling

Barrier: Fuel Clad

Category: B. Core Exit TCs

Degradation Threat: Potential Loss

Threshold:

2. Core exit TCs [Unit 2] > 700 °F [Unit 3] > 715 °F

NEI 99-01 Basis:

Core Exit TCs > 700 °F (715 °F) correspond to loss of sub-cooling.

IPEC Basis:

This indication of degraded core cooling requires prompt operator action. Degraded core cooling is caused by a substantial loss of primary coolant resulting in a partially or fully uncovered core. Without adequate heat removal, the core decay energy will cause the fuel temperatures to increase. Significant fuel damage will occur unless core cooling is promptly restored.

IPEC Basis Reference(s):

1. 2-F-0.2 Core Cooling
2. 3-F-0.2 Core Cooling
3. 2-FR-C.1 Response to Inadequate Core Cooling
4. 3-FR-C.1 Response to Inadequate Core Cooling

Barrier: Fuel Clad

Category: C. Radiation

Degradation Threat: Loss

Threshold:

3. Containment radiation monitor R-25 or R-26 > 17 R/hr.

NEI 99-01 Basis:

The specified value indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage.

This value is higher than that specified for RCS barrier Loss threshold #1. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

IPEC Basis:

NOTE: At Unit 3 radiation monitors R-25 and R-26 are susceptible to Temperature Induced Current which could cause erroneous readings for the first 3 minutes of an event with a large temperature change in the VC. R-25 and R-26 readings should be validated against other radiation monitors, R-2 and R-7, for erroneous readings during this timeframe.

The 17 R/hr. reading is a value that indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μCi/gm dose equivalent 1-131 into the containment atmosphere. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed within technical specifications and are therefore indicative of fuel damage (approximately 5 % clad failure depending on core inventory and RCS volume).

IPEC Basis Reference(s):

1. EAL Technical Basis Documentation for R-25 and R-26, Containment Radiation Monitors, Calculation by Dennis Quinn, dated 11/2010

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Fuel Clad

Category: C. Radiation

Degradation Threat: Potential Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Fuel Clad

Category: D. Inventory

Degradation Threat: Loss

Threshold:

None

Barrier: Fuel Clad

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

3. RVLIS [Unit2] < 41% [Unit 3] < 33% with no RCPs running

NEI 99-01 Basis:

The specified value for the potential loss threshold corresponds to the top of the active fuel.

IPEC Basis:

The reactor vessel water level used in this EAL is the value corresponds to the level which is used in CSFSTs to indicate challenge to core cooling and loss of the fuel clad barrier. This is the minimum water level to assure core cooling without further degradation of the clad. Severe core damage can occur and reactor coolant system pressure boundary integrity may not be assured if reactor vessel water level is not maintained above that corresponding to RVLIS at 41% [33%] wl no RCPs running (Unit 2 Dynamic range: < 44% w/ 4 RCPs, < 30% w/ 3 RCPs, < 20% w/ 2 RCPs, < 13% w/ 1 RCPs). RVLIS dynamic range indications are not utilized in this EAL since the RCPs would not be running under conditions where vessel level is approaching the inadequate core cooling condition.

IPEC Basis Reference(s):

1. 2-FR-C.1 Response to Inadequate Core Cooling
2. 3-FR-C.1 Response to Inadequate Core Cooling

Barrier: Fuel Clad

Category: E. Other

Degradation Threat: Loss

Threshold:

4. Primary coolant activity > 300 µCi/gm I-131 dose equivalent

NEI 99-01 Basis:

The specified value corresponds to 300 µCi/gm I-131 equivalent. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

IPEC Basis:

None

IPEC Basis Reference(s):

1. NEI 99-01 Revision 5

Barrier: Fuel Clad

Category: E. Other

Degradation Threat: Potential Loss

Threshold:

None

Barrier: Fuel Clad

Category: F. Judgment

Degradation Threat: Loss

Threshold:

5. **Any** condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Fuel Clad barrier is lost. In addition, the inability to monitor the barrier should also be considered as a factor in Emergency Director judgment that the barrier may be considered lost.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term "imminent" refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.
- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.
- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC

power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

Barrier: Fuel Clad

Category: F. Judgment

Degradation Threat: Potential Loss

Threshold:

4. **Any** condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Fuel Clad barrier is potentially lost. In addition, the inability to monitor the barrier should also be considered as a factor in Emergency Director judgment that the barrier may be considered potentially lost.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term "imminent" refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.
- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

Barrier: Reactor Coolant System

Category: A. CSFST

Degradation Threat: Loss

Threshold:

None

Barrier: Reactor Coolant System

Category: A. CSFST

Degradation Threat: Potential Loss

Threshold:

1. Integrity-RED entry conditions met

   OR

   Heat Sink-RED entry conditions met and heat sink is required

NEI 99-01 Basis:

RCS Integrity - Red indicates an extreme challenge to the safety function derived from appropriate instrument readings.

Heat Sink - Red when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

IPEC Basis:

Unit 2

Critical Safety Function Status Tree (CSFST) Integrity-Red path is entered if both of the following (ref. 1):

- Temperature decrease in any RCS cold leg $\geq$ 100 F/hr.
- Any RCS pressure-cold leg temperature point to the right of Limit A (Figure F-04-1).

The combination of these conditions indicates the RCS barrier is under significant challenge.

Indication that heat removal is extremely challenged is manifested by entry conditions to CSFST Heat Sink-RED path (ref. 3). CSFST Heat Sink-RED path is entered if all SG NR LVLs are ≤ 10% [27%] and total FW flow is ≤ to 400 gpm. The combination of these conditions when heat sink is required indicates the ultimate heat sink function is under extreme challenge. This condition addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus is a challenge of the Fuel Clad barrier.

Unit 3

Critical Safety Function Status Tree (CSFST) Integrity-Red path is entered if both of the following (ref. 2):

- Temperature decrease in any RCS cold leg ≥ 100 F/hr.
- Any RCS pressure-cold leg temperature point to the right of Limit A (Figure F-04-1).

The combination of these conditions indicates the RCS barrier is under significant challenge.

Indication that heat removal is extremely challenged is manifested by entry conditions to CSFST Heat Sink-RED path (ref. 4). CSFST Heat Sink-RED path is entered if all SG NR LVLs are ≤ 9% [14%] and total FW flow is ≤ to 365 gpm. The combination of these conditions when heat sink is required indicates the ultimate heat sink function is under extreme challenge. This condition addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus is a challenge of the Fuel Clad barrier.

IPEC Basis Reference(s):

1. 2-F-0.4 Integrity
2. 3-F-0.4 Integrity
3. 2-F-0.3 Heat Sink
4. 3-F-0.3 Heat Sink

Barrier: Reactor Coolant System

Category: B. Core Exit TCs

Degradation Threat: Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System

Category: B. Core Exit TCs

Degradation Threat: Potential Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System

Category: C. Radiation

Degradation Threat: Loss

Threshold:

1. [Unit 2] R-41 >1.25E-5 µCi/cc or R-42 > 1.0E-2 µCi/cc
   [Unit 3] R-11 >1.25E-5 µCi/cc or R-12 > 5.0E-2 µCi/cc

NEI 99-01 Basis:

The specified values indicate the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier threshold #3. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

IPEC Basis:

> 1.25E-5 µCi/cc on R-41[11] OR > 1.0E-2 µCi/cc on R-42 [Unit 2] or > 5.0E-2 µCi/cc on R-12 [Unit 3] due to RCS leakage indicates the release of reactor coolant to the containment. The indication was derived assuming an increase in RCS leak rate from 1 gpm to 75 gpm over a one hour period and dispersal of the reactor coolant noble gas and iodine inventory associated with FSAR (1% defects) into the containment atmosphere. This EAL is indicative of a RCS leak only. If R-25/R-26 readings increase to that specified by fuel clad loss indicator #3, significant fuel damage would also be indicated..

IPEC Basis Reference(s):

1. EAL Technical Basis Documentation for R-11, R-12, R-41 and R-42, Calculation by Dennis Quinn, dated 11/23/10

Barrier: Reactor Coolant System

Category: C. Radiation

Degradation Threat: Potential Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System
Category: D. Inventory Loss
Degradation Threat: Loss
Threshold:

2. RCS leak rate resulting in a loss of RCS sub-cooling (< Table F-2)

Table F-2 RCS Sub-cooling

	RCS Pressure (PSIG)	Sub-cooling (°F) Non-adverse Containment	Sub-cooling (°F) Adverse Containment
Unit 2	0 – 400	52	83
	401 – 800	36	49
	801 – 1200	23	30
	1201 - 2500	19	26
Unit 3	< 1000	40	112
	1000 – 1900	40	78
	> 1900	40	63

NEI 99-01 Basis:

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of sub-cooling has occurred. The loss of sub-cooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

IPEC Basis:

2[3]-F-0.2 Critical Safety Function Status Tree, Core Cooling, indicates that if sub-cooling margin based on core exit TCs is less than that specified in Table F-1 RCS Sub-cooling, a loss of RCS sub-cooling has occurred. The loss of sub-cooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak. This threshold addresses conditions in which leakage from the RCS is greater than available inventory control capacity such that a loss of sub-cooling has occurred. 2[3]-AOP-Leak-1, Sudden Increase in RCS Leakage (ref. 2), provides a list of conditions that may be observed when excessive RCS leakage occurs and provides appropriate actions to prevent and mitigate the consequences of RCS leakage.

Following an uncomplicated reactor trip, sub-cooling margin should be greater than that specified in Table F-1 RCS Sub-cooling. Sub-cooling margin greater than the applicable Table F-1 value ensures the fluid surrounding the core is sufficiently cooled and provides margin for reestablishing flow should sub-cooling deteriorate when SI flow is secured. The loss of sub-cooling is therefore the fundamental indication that the inventory control systems are incapable of counteracting the mass loss through the leak in the RCS.

The loss of sub-cooling as a result of inability to establish RCS heat transfer to the ultimate heat sink is indicative of Potential Losses of the Fuel Clad and RCS barriers.

IPEC Basis Reference(s):

1. 2-F-0.2 Core Cooling
2. 3-F-0.2 Core Cooling
3. 2-AOP-Leak-1, Sudden Increase in RCS Leakage
4. 3-AOP-Leak-1, Sudden Increase in RCS Leakage

Barrier: Reactor Coolant System
Category: D. Inventory Loss
Degradation Threat: Loss

Threshold:

3. Ruptured SG results in an ECCS (SI) actuation

NEI 99-01 Basis:

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with containment barrier Loss thresholds. It addresses ruptured SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent with the RCS leak rate barrier Potential Loss threshold.

This condition is described by entry into 2[3]-E-3 SGTR required by EOPs.

By itself, this threshold will result in the declaration of an Alert. However, if the SG is also faulted (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per containment barrier Loss thresholds.

IPEC Basis:

In conjunction with Containment barrier Loss #3 and the Fuel Clad barrier thresholds, this threshold addresses the full spectrum of Steam Generator Tube Rupture (SGTR) events. To meet this threshold, the leakage must be large enough to require actuation of ECCS (SI). ECCS (SI) actuation is caused by:

- Low-low pressurizer pressure
- High steam-line pressure differential between the steam generators
- High steam-line flow in two out of three steam lines, coincident with either low steam-line pressure or low-low T_{avg} in two out of three loops
- High containment pressure

Technical Specifications Table 3.3.2-1 lists allowable values for Safety Injection actuation set-points.

IPEC Basis Reference(s):

1. 2-E-3 Steam Generator Tube Rupture
2. 3-E-3 Steam Generator Tube Rupture
3. Technical Specifications Table 3.3.2-1 Engineered Safety Feature Actuation Set point Instrumentation

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

2. RCS leak rate indicated greater than 87 gpm

NEI 99-01 Basis:

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are not successful. Additional charging pumps being required is indicative of a substantial RCS leak.

IPEC Basis:

Primary system leakage above 87 gpm is based on the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System, which is considered one charging pump discharging to the charging header.

IPEC Basis Reference(s):

1. 2-AOP-LEAK-1 Sudden Increase in RCS Leakage
2. 3-AOP-LEAK-1 Sudden Increase in RCS Leakage
3. FSAR Table 9.2-2 CVCS Letdown Requirements

Barrier: Reactor Coolant System

Category: E. Other

Degradation Threat: Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System

Category: E. Other

Degradation Threat: Potential Loss

Threshold:

None

Barrier: Reactor Coolant System

Category: F. Judgment

Degradation Threat: Loss

Threshold:

4. **Any** condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is lost. In addition, the inability to monitor the barrier should also be considered in this threshold as a factor in Emergency Director judgment that the barrier may be considered lost.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term "imminent" refers to the recognition of the inability to reach safety acceptance criteria before completion of all checks.
- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

Barrier: Reactor Coolant System

Category: E. Judgment

Degradation Threat: Potential Loss

Threshold:

3. **Any** condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is potentially lost. In addition, the inability to monitor the barrier should also be considered in this threshold as a factor in Emergency Director judgment that the barrier may be considered potentially lost.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term "imminent" refers to the inability to reach final safety acceptance criteria before completing all checks.
- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: A. CSFST

Degradation Threat: Loss

Threshold:

None

Barrier: Containment

Category: A. CSFST

Degradation Threat: Potential Loss

Threshold:

1. Containment-RED entry conditions met

NEI 99-01 Basis:

RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment.

Conditions leading to a containment RED path result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this threshold is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

IPEC Basis:

RED path is entered based on exceeding containment design pressure of 47 psig (ref. 1). This pressure is well in excess of that expected from the design basis loss of coolant accident (ref. 1, 2, 3). This is indicative of a loss of both RCS and fuel clad boundaries in that it is not possible to reach this condition without also being in a Heat Sink-RED or Core Cooling-RED CSFST. The source of energy must be the result of severe degradation of core cooling or loss of heat sink. Since containment pressures at or approaching design levels is also a potential loss of containment, this combination of conditions is expected to require the declaration of a General Emergency.

IPEC Basis Reference(s):

1. 2-F-0.5 Containment
2. 3-F-0.5 Containment
3. Unit 2 FSAR Section 5.1.1.1.5 Reactor Containment
4. Unit 3 FSAR Section 5.1.1.1 Principal Design Criteria

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: B. Core Exit TCs

Degradation Threat: Loss

Threshold:

None

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: B. Core Exit TCs

Degradation Threat: Potential Loss

Threshold:

2. Core exit TCs > 1200 ° F.
   AND
   Core exit TCs not lowering within 15 min. of restoration procedure entry

NEI 99-01 Basis:

The conditions in this threshold represents an imminent core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

IPEC Basis:

This threshold indicates significant core exit superheating and core uncovery. If core exit thermocouple (TC) readings are greater than 1,200°F, Fuel Clad barrier is lost. Core exit TCs provide an indirect indication of fuel clad temperature by measuring the temperature of the primary coolant that leaves the core region. Although clad rupture due to high temperature is not expected for core exit TC readings less than the threshold, temperatures of this magnitude signal significant superheating of the reactor coolant and core uncovery. Events that result in core exit TC readings above the loss threshold are severe accidents and are a severe accident Management "Badly Damaged (BD)" condition. The BD descriptor signifies possible core overheating to the point that clad ballooning/collapse may occur and portions of the core may have melted. It must also be assumed that the loss of RCS inventory is a result of a loss of RCS barrier. These conditions, if not mitigated, will likely lead to core melt which will in turn result in a potential loss of containment.

IPEC Basis Reference(s):

1. 2-F-0.1 Core Cooling
2. 3-F-0.1 Core Cooling
3. 2-FR-C.1 Response to Inadequate Core Cooling
4. 3-FR-C.1 Response to Inadequate Core Cooling

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: B. Core Exit TCs

Degradation Threat: Potential Loss

Threshold:

3. Core exit TCs > [Unit 2] > 700 °F [Unit 3] > 715 °F.

   AND

   RVLIS [Unit 2] <41% [Unit 3] < 33% w/ no RCPs

   AND

   Core exit TCs not lowering or RVLIS not rising within 15 min. of restoration procedure entry

NEI 99-01 Basis:

The conditions in this threshold represents an imminent core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

IPEC Basis:

This threshold indicates significant core exit superheating (core exit TC readings >700°F [715 °F] and core uncovery. It must be assumed that the loss of RCS inventory is a result of a loss of the RCS barrier. If RVLIS is reading greater than or equal to the 41% (33%), safety injection has been successful in restoring RCS inventory and core cooling. In the event that RVLIS reads less than 41% [33%], core cooling continues to be degraded. It must also be assumed that the loss of RCS inventory is a result of a loss of RCS barrier. These conditions, if not mitigated, will likely lead to core melt which will in turn result in a challenge of Containment.

IPEC Basis Reference(s):

1. 2-F-0.1 Core Cooling
2. 3-F-0.1 Core Cooling
3. 2-FR-C.1 Response to Inadequate Core Cooling
4. 3-FR-C.1 Response to Inadequate Core Cooling

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: C. Radiation

Degradation Threat: Loss

Threshold:

None

Barrier: Containment

Category: C. Radiation

Degradation Threat: Potential Loss

Threshold:

4. Containment radiation monitor R-25 or R-26 > 68 R/hr.

NEI 99-01 Basis:

The site specific reading is a value which indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers. A major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel cladding allows radioactive material to be released from the core into the reactor coolant.

Regardless of whether containment is challenged, this amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment, such that a General Emergency declaration is warranted.

IPEC Basis:

NOTE: At Unit 3 radiation monitors R-25 and R-26 are susceptible to Temperature Induced Current which could cause erroneous readings for the first 3 minutes of an event with a large temperature change in the VC. R-25 and R-26 readings should be validated against other radiation monitors, R-2 and R-7, for erroneous readings during this timeframe.

The specified reading is higher than that specified for Fuel Clad barrier Loss #3 and RCS barrier Loss #3. Containment radiation readings at or above the Containment barrier Potential Loss threshold, therefore, signify a loss of two fission product barriers and Potential Loss of a third, indicating the need to upgrade the emergency classification to a General Emergency.

The 68 R/hr. reading is a value which indicates significant fuel damage (20 % clad failure) well in excess of the EALs associated with both loss of fuel clad and loss of RCS barriers. NUREG-1228 "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%.

IPEC Basis Reference(s):

1. EAL Technical Basis Documentation for R-25 and R-26, Containment Radiation Monitors, Calculation by Dennis Quinn, dated 11/2010

Barrier: Containment

Category: D. Inventory

Degradation Threat: Loss

Threshold:

1. A containment pressure rise followed by a rapid unexplained drop in containment pressure

NEI 99-01 Basis:

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

IPEC Basis:

FSAR Chapter 14 describes Containment pressure response under accident conditions.

IPEC Basis Reference(s):

1. FSAR Chapter 14 Safety Analysis

Barrier: Containment

Category: D. Inventory

Degradation Threat: Loss

Threshold:

2. Containment pressure or sump level response not consistent with LOCA conditions

NEI 99-01 Basis:

Containment pressure and sump levels should increase as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

IPEC Basis:

FSAR Chapter 14 describes Containment pressure response under accident conditions.

IPEC Basis Reference(s):

1. FSAR Chapter 14 Safety Analysis

Barrier: Containment

Category: D. Inventory

Degradation Threat: Loss

Threshold:

3. Ruptured SG faulted outside of containment

NEI 99-01 Basis:

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

Users should realize that Containment Loss thresholds #3 and #4 could be considered redundant. This was recognized during the development process. The inclusion of a threshold that uses Emergency Procedure commonly used terms like "ruptured and faulted" adds to the ease of the classification process and has been included based on this human factor concern.

Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

This threshold addresses the condition in which a ruptured steam generator is also faulted. This condition represents a bypass of the RCS and containment barriers and is a subset of the threshold #4. In conjunction with RCS leak rate barrier loss threshold, this would always result in the declaration of a Site Area Emergency.

IPEC Basis:

None

IPEC Basis Reference(s):

1. 2-E-2 Faulted SG
2. 3-E-2 Faulted SG
3. 2-E-3 SG Tube Rupture
4. 3-E-3 SG Tube Rupture

Barrier: Containment

Category: D. Inventory

Degradation Threat: Loss

Threshold:

4. Primary-to-Secondary leak-rate > 10 gpm.
   AND
   Unisolable steam release from affected SG to the environment

NEI 99-01 Basis:

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

Users should realize that Containment Loss thresholds #3 and #4 could be considered redundant. This was recognized during the development process. The inclusion of a threshold that uses Emergency Procedure commonly used terms like “ruptured and faulted” adds to the ease of the classification process and has been included based on this human factor concern.

This threshold results in a Unusual Event for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an unisolable release path to the environment from the affected steam generator. The threshold for establishing the unisolable secondary side release is intended to be a prolonged release of radioactivity from the ruptured steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the ruptured steam generator is required for plant cool down or a stuck open relief valve). If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an unisolable release path to the environment. These minor releases are assessed using Abnormal Rad Levels / Radiological Effluent EALs.

IPEC Basis:

None

IPEC Basis Reference(s):

1. 2-E-2 Faulted SG
2. 3-E-2 Faulted SG
3. 2-E-3 SG Tube Rupture
4. 3-E-3 SG Tube Rupture

Barrier: Containment

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

5. Containment pressure > 47 psig and rising

NEI 99-01 Basis:

47 psig is the containment design pressure.

IPEC Basis:

This threshold is the containment design pressure and is in excess of that expected from the design basis loss of coolant accident (LOCA). Proper actuation and operation of the Containment heat removal system when required should maintain containment pressure well below the design pressure. The Containment response for the spectrum of LOCAs considered in the plant design basis is described in Chapter 14 of the FSAR (ref. 2). The threshold is therefore indicative of a loss of both RCS and Fuel Clad barriers in that it should not be reached without severe core degradation (metal-water reaction) or failure to trip in combination with RCS breach. This condition would be expected to require the declaration of a General Emergency.

IPEC Basis Reference(s):

1. 2-F-0.5 Containment
2. 3-F-0.5 Containment
3. FSAR Chapter 14 Safety Analysis

Barrier: Containment

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

6. Containment hydrogen concentration $\geq$ 4%

NEI 99-01 Basis:

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The indications of potential loss under this EAL corresponds to some of those leading to the RED path in potential loss threshold #1 (ref. 1).

IPEC Basis:

After a LOCA, the containment atmosphere is a homogeneous mixture of steam, air, solid and gaseous fission products, hydrogen, and water droplets. During and following a LOCA, the hydrogen concentration in the containment results from radio lytic decomposition of water and metal-water reaction. If hydrogen concentration reaches or exceeds the lower flammability limit (4%, ref. 3) in an oxygen rich environment, a potentially explosive mixture exists. Operation of the Containment Hydrogen Re-combiner with Containment hydrogen concentrations at or above 4% could result in ignition of the hydrogen. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur. To generate such levels of combustible gas, loss of the Fuel Clad and RCS barriers must also have occurred. Since this threshold is also indicative of loss of both Fuel Clad and RCS barriers with the Potential Loss of the Containment barrier, it therefore will likely warrant declaration of a General Emergency.

Unit 2

Containment hydrogen analyzers AIT-5109-1 and AIT-5109-1 display hydrogen concentration and alarm at 4% hydrogen concentration (ref. 2).

Unit 3

The Containment Hydrogen Concentration Measurement System is used to monitor the post-accident hydrogen concentration. Two redundant sample systems are installed. One unit samples the plenum chambers of containment recirculation fans 32 and 35. The second unit samples the plenum chambers of recirculation fans 31, 33 and 34. (ref. 4)

IPEC Basis Reference(s):

1. 2-F-0.5 Containment
2. 3-F-0.5 Containment
3. 2-ARP-043 Accident Assessment Panel 1
4. 2-FR-C.1 Response to Inadequate Core Cooling
5. 3-FR-C.1 Response to Inadequate Core Cooling
6. SOP-SS-4 Containment Hydrogen Measurement System

Barrier: Containment

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

7. Containment pressure > Phase B isolation signal set-point following LOCA

   AND

   Less than Table F-3 depressurization equipment operating

Table F-3 Minimum Containment Cooling Systems	
FCUs	**Spray Pumps**
< 3	2
3	1
5	0

NEI 99-01 Basis:

This threshold represents a potential loss of containment in that the containment heat removal/depressurization systems are either lost or performing in a degraded manner, as indicated by plant parameters such as containment pressure, pressurizer level and steam line pressure in excess of the set-point at which the equipment was supposed to have actuated.

IPEC Basis:

Adequate heat removal capability for the containment is provided by two separate, full capacity, engineered safety features systems. These are the containment spray system and the containment air recirculation cooling and filtration system. These systems are of different engineering principles and serve as independent backups for each other.

Together these two systems provide the single failure protection for the containment cooling function as analyzed in Chapter 14 of the FSAR.

The containment air recirculation cooling system is designed to recirculate and cool the containment atmosphere in the event of a loss-of-coolant accident and thereby ensure that the containment pressure will not exceed its design value of 47 psig.

Any of the following combinations of equipment will provide sufficient heat removal capability to maintain the post-accident containment pressure below the design value, assuming that the core residual heat is released to the containment as steam (ref. 1, 2):

1. All five containment cooling fans (FCUs)
2. Both Containment Spray alone
3. One containment spray pump and three of the five containment cooling fans

IPEC Basis Reference(s):

1. Unit 2 FSAR Section 6.4.1.1 Containment Heat Removal Systems
2. Unit 3 FSAR Section 6.4.1 Containment Heat Removal Systems

Barrier: Containment

Category: E. Other

Degradation Threat: Loss

Threshold:

5. Inability to isolate all valves in any one line **AND** Direct downstream pathway to the environment exists after containment isolation signal

NEI 99-01 Basis:

This threshold addresses incomplete containment isolation that allows direct release to the environment.

The use of the modifier "direct" in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

IPEC Basis:

This threshold is intended to address incomplete containment isolation that allows direct downstream release path to the environment.

The "inability to isolate all valves in any one line" term is intended to mean that available immediate action has been taken to isolate the system providing a direct release pathway outside containment but has failed. If no immediate action to isolate the system is available at the time it is recognized, or the location of the leak is not known such that immediate action to isolate cannot be initiated, then assume the "inability to isolate" condition exists for the purpose of emergency classification. Actions external to the Control Room shall be considered available only if they can be completed using normal operational procedures consistent with the requirement for "timely" emergency classification (within 15 minutes).

IPEC Basis Reference(s):

None

Barrier: Containment

Category: F. Judgment

Degradation Threat: Loss

Threshold:

6. **Any** condition in the opinion of the Emergency Director that indicates loss of the Containment barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost. In addition, the inability to monitor the barrier should also be considered as a factor in Emergency Director judgment that the barrier may be considered lost.

The Containment barrier should not be declared lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Primary Containment barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.
- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

Barrier: Containment

Degradation Threat: Potential Loss

Category: E. Judgment

Threshold:

6. **Any** condition in the opinion of the Emergency Director that indicates potential loss of the Containment barrier

NEI 99-01 Basis:

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Primary Containment barrier is potentially lost. In addition, the inability to monitor the barrier should also be considered as a factor in Emergency Director judgment that the barrier may be considered potentially lost.

The Containment barrier should not be declared potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

IPEC Basis:

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Primary Containment barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term "imminent" refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.
- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Director should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

IPEC Basis Reference(s):

None

CONTROLLED

Indian Point Energy Center

Emergency Plan

	Print Name	Signature	Date
Prepared by:	Antonio Iraola	[signature]	8/29/19
Approval:	Frank J Mitchell	[signature]	8/29/19

Effective Date: September 19, 2019

LIST OF EFFECTIVE PAGES

Indian Point Energy Center Emergency Plan

Table of Contents

Page

Table of Contents

Table of Contents

Table of Contents

Table of Contents

Part 1: INTRODUCTION

Section A: Purpose

As required by the licensing conditions set forth by the Nuclear Regulatory Commission (NRC) this document describes the emergency preparedness program for the Entergy Indian Point Units 1, 2 and 3 Generating Stations (Indian Point Energy Center). The philosophy that guides the development and maintenance of this program is the protection of the health and safety of the general public in the communities around the Indian Point Energy Center units and the personnel who work at the plant.

The Indian Point Energy Center Emergency Plan (Plan) outlines the basis for response actions that would be implemented in an emergency. This document is not intended to be used as a procedure. Detailed Emergency Plan implementing procedures are maintained separately and used to guide those responsible for implementing emergency actions.

This Plan documents the methods by which Entergy's Emergency Preparedness Programs meet the criteria set forth in Title 10 of the Code of Federal Regulations (CFR), Part 50, Section 47(b) and Appendix E.

The Plan is applicable to plant conditions that may cause or may threaten to cause radiological hazards at Units 1, 2 or 3 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 Plan is solely dedicated to Indian Point Energy Center and includes details of how Entergy utilizes its resources to assist the plant operating staff during an emergency situation.

Section B: Background

Description of the Indian Point Energy Center

Indian Point Energy Center (IPEC) 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 IPEC Site 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. The Site is approximately 239 acres and contains three pressurized water reactors owned by Entergy. Figures 1.B-1 and 1.B-2 are maps that show the general location of the Site and its environs within a 10-mile and 50-mile radius, respectively.

Exclusion Area

Entergy has the authority within the site boundary, called the Exclusion Area, to determine all activities including the exclusion or removal of personnel and property (see Figure 1.B-3).

There are no residences within the exclusion area nor are there any public highways or public railroads traversing the exclusion area.

One main and one alternate access roads service the exclusion area. Several other roads interconnect with these two roads. In the event of an evacuation, all vehicular traffic will be directed to the appropriate access road depending on the wind direction, and traffic would exit the site onto Broadway in Buchanan.

Protected Area

A Security fence marks the perimeter of the Protected Area of the site. Access beyond the fence is restricted to badged employees or escorted visitors. Metal and bomb detectors are located at the Protected Area entrance. All buildings related to plant functions are within the Protected Area security fence.

The Independent Spent Fuel Storage Installation (ISFSI) is located within the Protected Area boundary for interim dry storage of spent fuel. The HOLTEC spent fuel storage casks are designed to ensure protection of public health and safety through use of physical barriers to guard against the uncontrolled release of radioactivity and through the use of shielding to minimize radiation dose to the public from both normal and off-normal conditions of operation. The analyses summarized in the HOLTEC Cask UFSAR demonstrate that under assumed accident conditions, the consequences of accidents challenging the integrity of the barriers will not exceed limits established in 10 CFR 72.106.

Population Distribution

Approximately 13,000 people live within a two mile radius, approximately 84,000 people live within a five-mile radius and approximately 300,000 within a ten-mile radius of the site based on the 2010 US Census population. A more detailed summary of population distribution can be found in Appendix 5 and the station's Evacuation Time Estimate Study.

Site Topography

The Indian Point Energy Center is surrounded on almost all sides by high ground with elevations ranging from 600 to 1000 feet above sea level. The general orientation of this mass of high ground is northeast to southwest. The Hudson River runs northeast to southwest at the Indian Point Energy Center location but turns sharply northwest approximately two miles north of the plant.

Steep, heavily wooded slopes flank the west bank of the Hudson: the Dunderberg and West Mountains to the northwest (elevation 1086 feet and 1257 feet, respectively) and Buckberg Mountain to the west southwest (elevation 793 feet). Further west are slightly higher peaks.

To the east of the site, peaks are generally lower: Spitzenberg and Blue Mountains average about 600 feet in elevation, and a weak, poorly defined series of ridges run in a north-northeast direction. The River south of the plant makes another sharp bend to the southeast and then widens as it flows past the towns of Croton and Haverstraw.

Plant

Unit 1 (615 MWt, defueled), Unit 2 (3216 Mwt) and Unit 3 (3189 Mwt). Figure 1.B-3 shows a general layout of the Site.

In a nuclear reactor system, containment is defined as the means of restricting, to sharply defined volumes, the distribution of radioactive materials that are in the process of nuclear fission. The IP-2 and IP-3 units have three containment barriers that exemplify the "Defense in Depth" philosophy.

The first or innermost of the barriers is the fuel rod. This encapsulates the fuel pellets that generate the heat energy and is designed to maintain its integrity for the anticipated core life.

The second containment barrier is the reactor pressure vessel. This pressure vessel contains the fuel rods, grouped into fuel assemblies, and the attached reactor coolant system which is comprised of four steam generators, four cooling pumps, pressurizer, and piping.

The third barrier, called the reactor containment structure, surrounds the reactor coolant system. The reactor containment is a steel-lined reinforced concrete cylinder with a hemispherical dome and a flat base. This outer containment is designed to withstand the internal pressure that accompanies a loss of coolant accident. The structure provides radiation shielding for both normal operations and accident conditions.

Section C: Scope

The primary hazard consideration at the Indian Point Energy Center is the potential unplanned release of radioactive material resulting from an accident at the site. The probability of such a release is considered very low due to plant design and strict operational guidelines enforced by the Nuclear Regulatory Commission (NRC). However, Federal regulations and common sense require that an emergency preparedness program exist for each commercial nuclear power station.

This Plan describes the response of Entergy personnel at the Indian Point Energy Center Site during emergencies. It identifies an IPEC Emergency Response Organization (ERO), describes facilities and equipment, assigns responsibilities and authorities and identifies procedures for responding to emergencies from minor injury to personnel to conditions having offsite radiological consequences. Implementing Procedures have been developed to implement this Plan. These procedures identify the elements of the ERO and the interface with supporting offsite organizations. In addition to the Implementing Procedures (IP), Plan Administrative Directives (AD) have been developed to ensure proper maintenance of the program. A listing of procedures cross-referenced to sections of the Plan are contained in Appendix 3. Complete copies of the Plan Implementing Procedures are maintained in the Control Rooms, Technical Support Center, Emergency Operations Facility and Alternate Emergency Operations Facility. Additional copies of individual procedures are distributed as needed to support the ERO.

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 Rooms for use by the operating staff. Radiological control procedures are available for use by the Watch Radiation Protection personnel. Procedures that address security requirements during emergencies for the security force are contained in the Security Procedures and Safeguards Documents.

This Plan includes agreements made with offsite organizations that furnish support during emergencies. These agreements are listed in Appendix 2. Specific notification and direction instructions are incorporated into the 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.

Section D: Planning Basis

The Plan, in conjunction with the implementing and administrative procedures, documents the methods by which the Entergy Emergency Preparedness Program meets the planning standards set forth in 10-CFR-50.47 (b) and the requirements of 10-CFR-50 Appendix E. Other applicable regulations, publications, and guidance were used (see Appendix 1, "References") along with site-specific documents to ensure consistency in the planning effort.

This plan was developed in coordination with the New York State Office of Emergency Management and local county Offices of Emergency Management. These organizations have complementary emergency response plans.

Indian Point Units 1&2 previously owned by Consolidated Edison and Indian Point Unit 3 previously owned by the New York Power Authority, were consolidated under one owner, Entergy Corporation in 2001. Much of the planning efforts prior to the consolidation were carried on as a joint venture between the previous owners. In order to further streamline processes, planning efforts and establish standard responses, this single Plan was developed.

This Plan was developed to respond to and minimize the onsite and offsite impact of an accident at Indian Point Energy Center. 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. Protective measures outside the exclusion area (offsite) are the responsibility of state and local government authorities. The Onsite and Offsite Emergency Organizations can respond to any incident or accident 24-hours every day. These emergency organizations consist of many subgroups. The responsibilities, authorities and interactions between the subgroups are discussed in Part 2, Section B of this Plan.

This Plan incorporates a classification system for emergencies and prescribes the recommended actions which are recommended to Offsite to be taken to protect the safety of the public, plant personnel and property both onsite and offsite. These actions are contained in the Plan Implementing 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 Office of Emergency Management and the County Offices of Emergency Management as described in their respective Emergency Plans.

The response to an emergency occurs in three phases.

1. The first phase (initial) 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 (refer to Part 2 section B) with the assistance of other in-house personnel as needed.
2. The second phase (activation) includes 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 (ED) at the EOF/AEOF. This phase includes augmenting the Onsite Emergency Organization with support from offsite.
3. The third phase (recovery) begins once the emergency is terminated and includes planned actions for re-entry by workers to restore the station to normal operation, assisting offsite authorities return the public evacuated from around the Site, and implementing post accident environmental sampling as needed. This phase is the responsibility of the Site Recovery Director.

Section E: Governmental Emergency Planning

Entergy works with Federal, State and Local government agencies to insure an integrated emergency response within the Emergency Planning Zones (Figures 1.B-1 and 1.B-2) located around the Indian Point Energy Center.

Section F: Emergency Plan Guidance and Criteria

The Indian Point Emergency Plan and related implementing procedures integrates guidance from several governmental and industry standards to provide the best protection of the health and safety of the public. See Appendix 1, References, for a list of documents used in development of this plan.

Section G: Assistance to Non-Entergy Planning Efforts

Entergy provides technical assistance and other assistance as required to State and Local Agencies who are involved in the emergency planning effort for Indian Point Energy Center.

Section H: Response Organization

This Plan and its associated implementing procedures outline Entergy's responsibilities for the protection of onsite persons. Specific responsibilities, organizations and program implementation are outlined in other sections of this Plan, its associated Implementing Procedures and supporting Administrative Directives.

Section I: Federal Response

The Federal Government has an integrated response plan in the event of a radiological emergency at any facility. Provisions are made within this Plan for the integration of appropriate elements of the federal assistance activities. Arrangements have been made to accommodate a federal response organization presence in the Entergy emergency response facilities as well as support communications between utility and federal emergency facilities. NRC response as described in NUREG-0728, "Concept of Operations: NRC Incident Response", was used in the development of the Plan as guidance to ensure coordination between Entergy and NRC EROs.

Section J: Form and Content of Plan

This Plan has been formatted similar to NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants", Revision 1.

Because this Plan is formatted in the same manner as the guidance document, no section cross-reference is needed.

An appendix is provided to cross reference Implementing Procedures and Administrative Procedures to sections of the Plan.

Figure 1.B-1
10-Mile Emergency Planning Zone

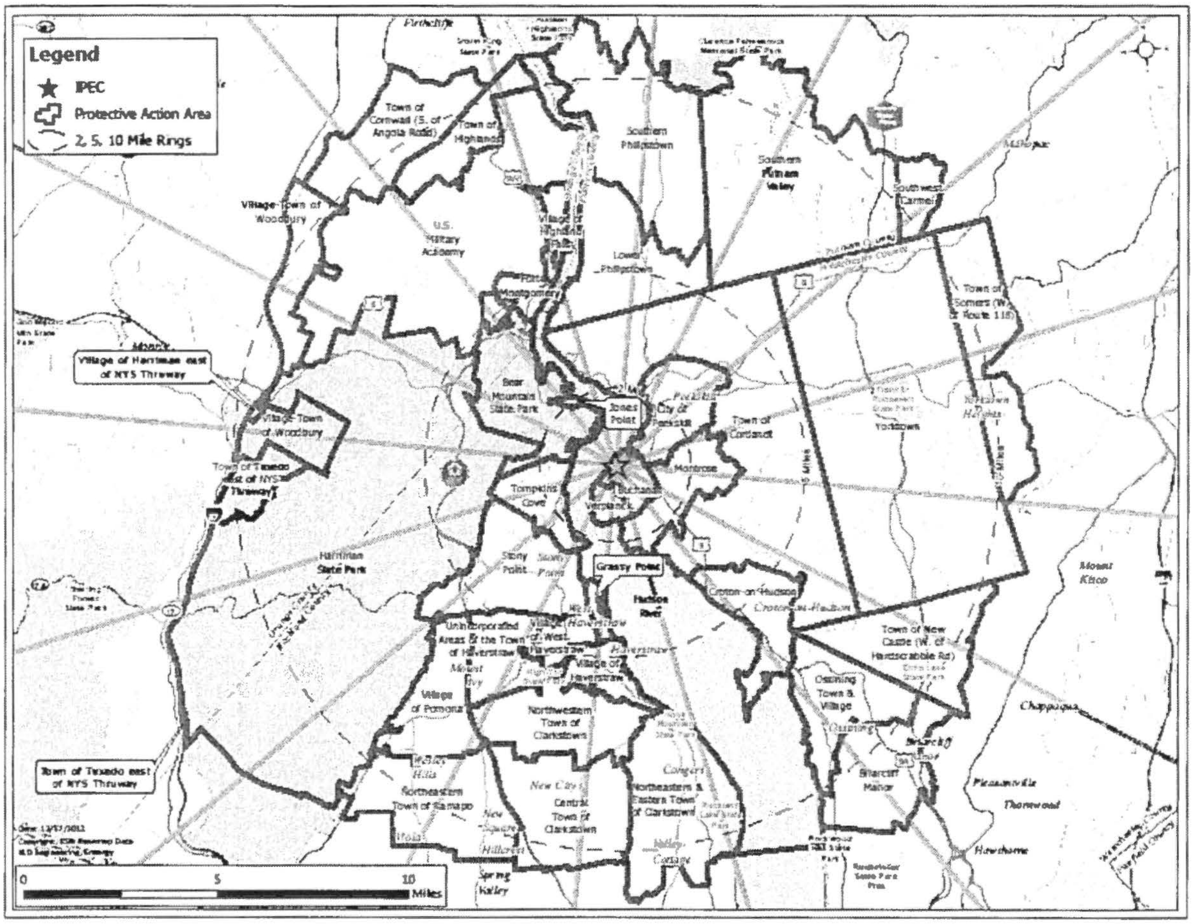
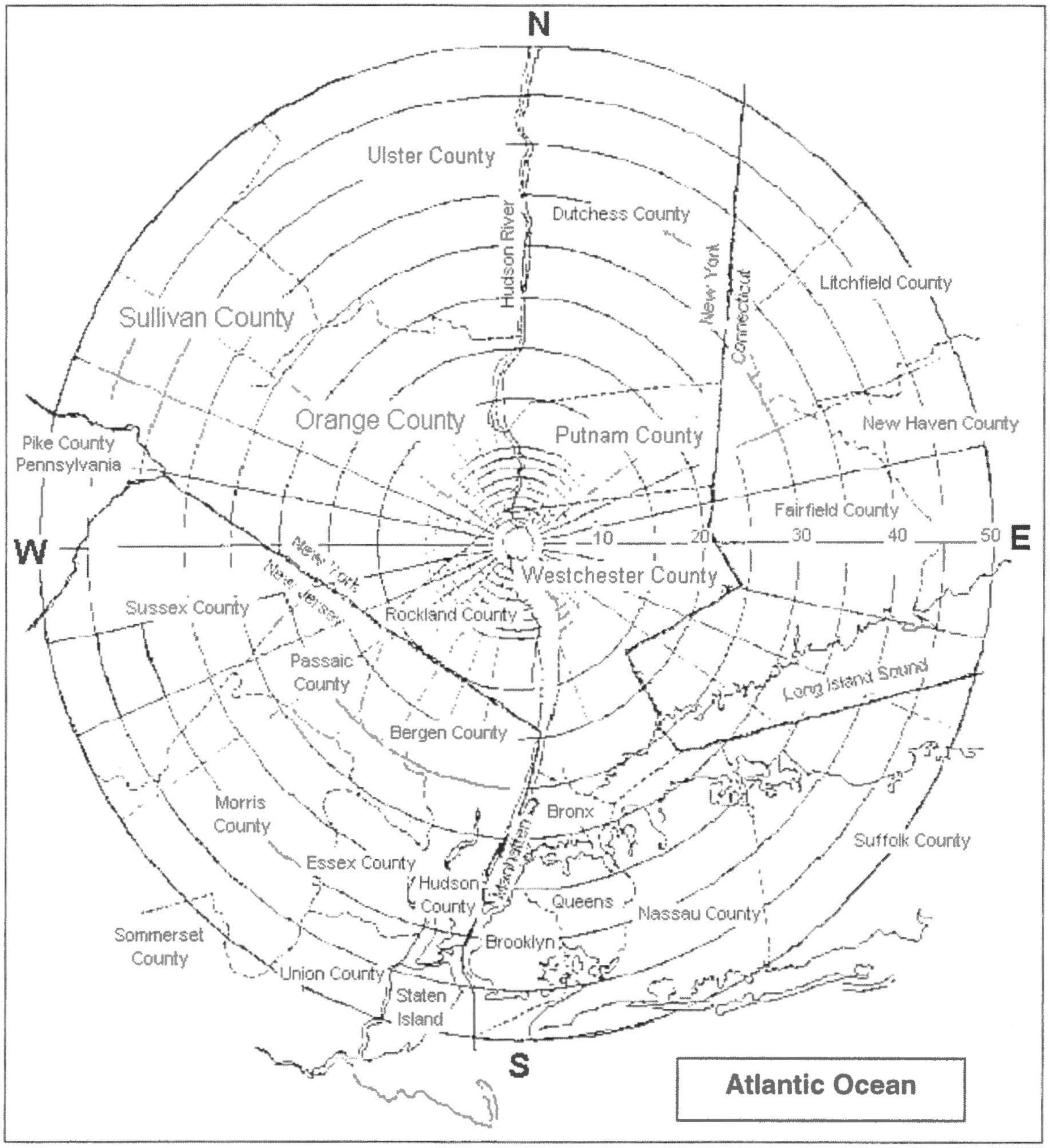
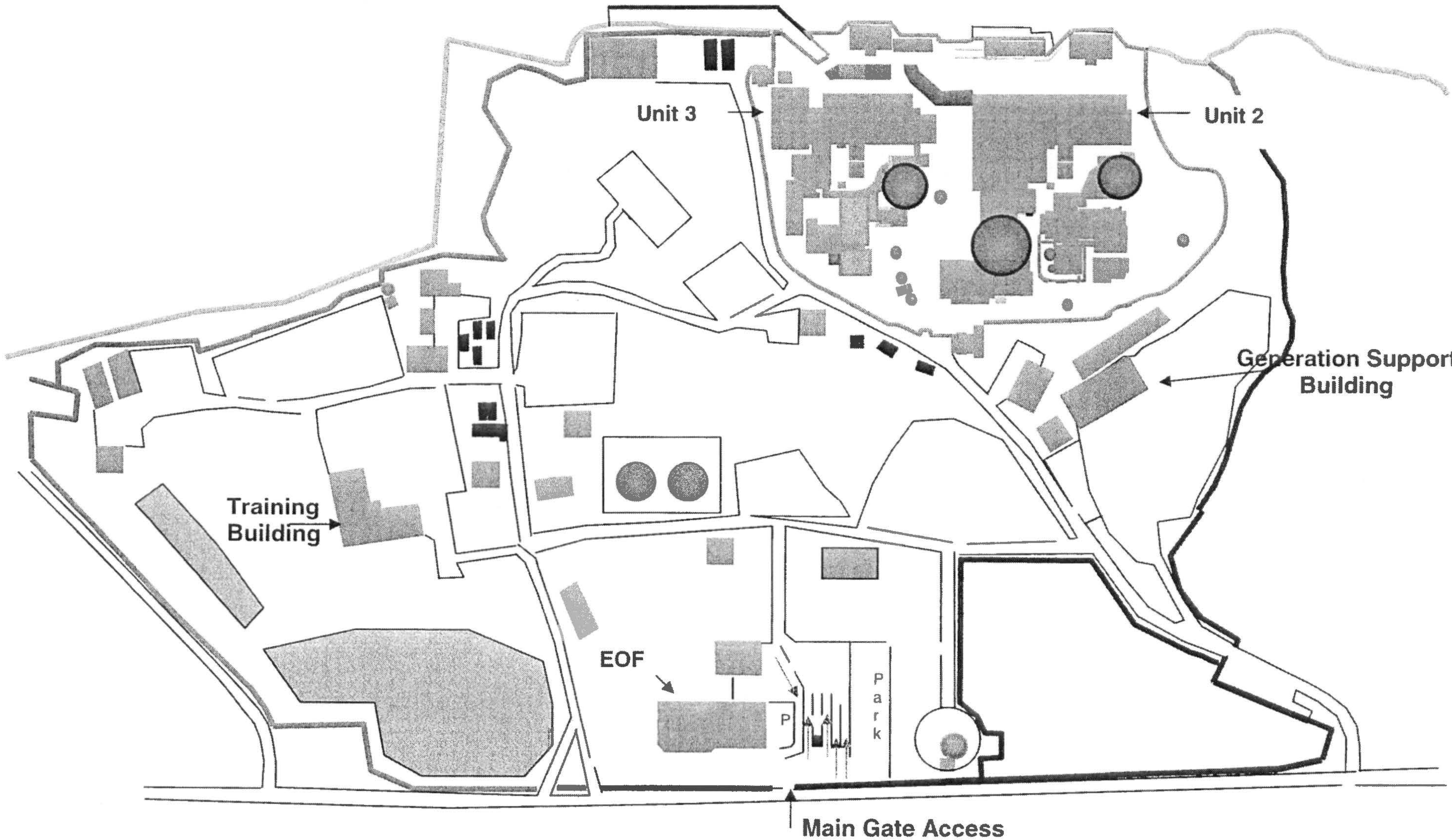


Figure 1.B-2
50 Mile Emergency Planning Zone



INDIAN POINT ENERGY CENTER SITE MAP

Figure 1.B-3



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Part 2: PLANNING STANDARDS AND CRITERIA

Section A: Assignment of Responsibility

This section describes the primary responsibilities for emergency response by IPEC, Federal, State, and local organizations within the Indian Point Plume Exposure Pathway and the Ingestion Pathway Emergency Planning Zones (EPZs). Various supporting organizations are also described as well as staffing for initial and continuous response.

In the event of an emergency, as defined in Part 2, Section D, various Federal, State, and County organizations will 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.

1. Organizations

   The relationships and the concept of operations for the organizations and agencies supporting a response in the Indian Point Emergency Planning Zones are as follows:

   a. Identified below are Federal, State, local, and private organizations that are involved in a response to an emergency at Indian Point Energy Center.

      Federal Agencies

      The Federal Radiological Emergency Response Plan (FRERP) outlines the statutory and regulatory responsibilities. The primary Federal response at Indian Point Energy Center supporting an emergency includes:

      - Nuclear Regulatory Commission (NRC), who act as technical/regulatory advisors to Indian Point Energy Center during an emergency. They provide Federal communications capabilities, coordination of Federal assistance, and assessment of onsite radiological incidents and potential offsite consequences.

      - The U.S. Department of Energy operates a Radiological Assistance Program 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 at their 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. The expected time of arrival is approximately 3 hours. The ED 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.

- Federal Emergency Management Agency (FEMA), who coordinates the overall offsite Federal response and provides Federal resources and assistance to state and local governments. FEMA is a division of the Department of Homeland Security (DHS).

- Environmental Protection Agency (EPA), who assists with field radiological monitoring/sampling and non-plant, related recovery and re-entry guidance.

- During a radiation incident that 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.

- National Weather Service, who provides meteorological information to Indian Point Energy Center in the event that the onsite meteorological tower or monitoring instrumentation becomes inoperative.

<u>New York State Agencies</u>

- The agency responsible for emergency planning is the New York State Office of Emergency Management (NYSOEM). 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 Comprehensive Emergency Plan, Radiological Hazards Annex for Fixed Nuclear Facilities. Notification to the State of emergency conditions would be as indicated in Part 2, Section E.

- New York State has Emergency Operation Centers in Albany, Westchester and other areas in the state. All of the state EOCs are equipped with communication capability.

<u>County Offices of Disaster and Emergency Services/Emergency Management</u>

The four (4) counties located within the 10 mile Emergency Planning Zone (EPZ) that are involved in emergency response activities at the Indian Point Energy Center Site include:

- Westchester County, in which Indian Point Energy Center is located;

- Rockland County, on the west side of the Hudson River across from Indian Point Energy Center;

- Orange County, on the west side of the Hudson River, north of the plant. The closest boundaries of Orange County are approximately four (4) miles from Indian Point Energy Center.

- Putnam County, on the east side of the Hudson River, north of the plant. The closest boundaries of Putnam County are approximately four (4) miles from Indian Point Energy Center.

Each county has an Office of Emergency Management. The Director of each of these offices, or their designee, will act as the County Emergency Operations Manager in the County. Bergen County is a host county that assists Rockland County in the event of an evacuation of the general public. The city of Peekskill takes direction from Westchester County and has its own Warning Point and Emergency Operation Center.

Emergency Operations Centers are where county managers 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 Energy Center would be as described in Part 2, Section E.

b. During an emergency condition at an Alert, Site Area Emergency, or General Emergency level, the Indian Point ERO replaces the normal plant organization. Indian Point Energy Center concept of operations is to utilize the entire station staff and if needed the entire company (Entergy) resources to protect the health and safety of the public and station personnel during an emergency at the site. Part 2, Section B outlines the organizations established.

c. Figure A-1 illustrates the interrelationships of the organizations involved with emergency planning for Indian Point Energy Center.

d. The Shift Manager (or the Control Room Supervisor in his/her absence) is in charge of the Indian Point Energy Center emergency response until relieved by another qualified ED who is then in charge of the entire IPEC ERO.

e. Continuously manned communication points have been identified for all agencies involved in the planning effort.

2. <u>State and Local Functions and Responsibilities</u>

The State, and local counties have Emergency Response Plans that specify the responsibilities and functions for the major agencies, departments, and key individuals of their emergency response organizations. This information is located in their respective Plans.

Along with the State of New York, the States of Connecticut, New Jersey and Pennsylvania are within the boundaries of the Emergency Planning Ingestion Pathway 50-mile radius. The specific response of these states is found in their respective Emergency Response Plans.

3. Agreements in Planning Effort

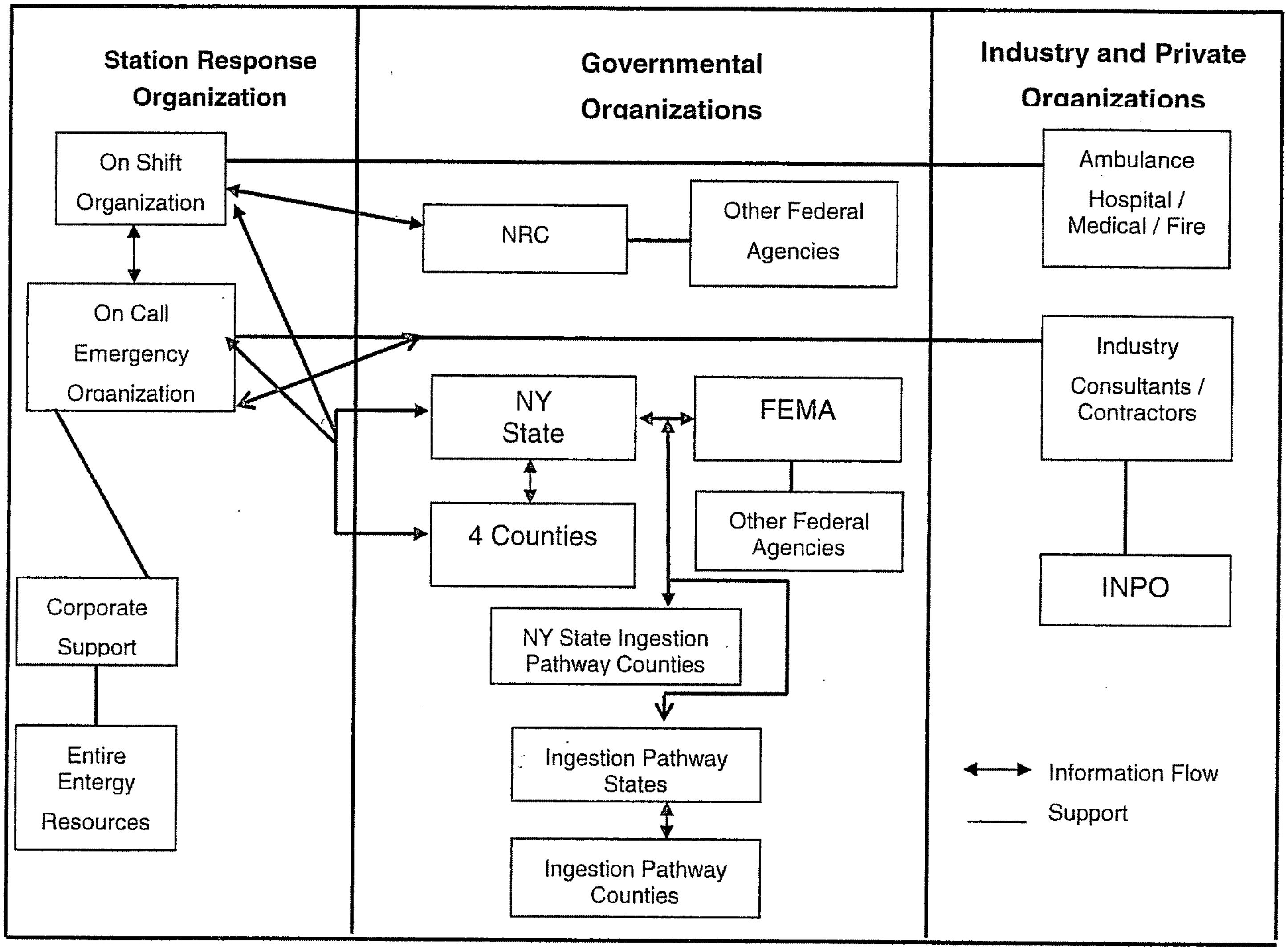
Agreements establishing the concept of operations developed between IPEC and other support organizations having an emergency response role within the Indian Point Emergency Planning Zones (including hospitals and medical transportation) are provided in Appendix 2, "Letters of Agreement." These agreements identify the emergency measures to be provided and the mutually accepted criteria for implementation. Federal, State, and local agencies that have response functions covered by laws, regulations, or executive orders have developed plans to meet these functions. These approved Plans serve as written agreements for agencies response to an incident at Indian Point Energy Center. A contract/purchase order with a private contractor/business is considered acceptable in lieu of a Letter of Agreement for the specified duration of the contract.

4. Continuous Coverage

The Indian Point ERO has sufficient numbers of qualified, trained personnel to provide the capability of continuous (24-hour) operations. The Manager of Emergency Preparedness administers programs to ensure availability of resources in the event of an emergency. The ED has the authority and is responsible for assuring continuity of resources (technical, administrative, and material) in the event of the activation of the Indian Point ERO.

Figure A-1

Emergency Response Organizations Interrelationships



Notes:

1. Until the On-Call ERO is in place the Shift Manager (or Control Room Supervisor if Shift Manager is unavailable) has the responsibility and duty to notify Federal, State and Local governmental authorities and request any assistance needed to protect the public and station personnel.

2. Once the On Call ERO is in place, the ED, located in the EOF, has overall responsibility and authority to direct the Entergy emergency response and request outside assistance as needed.

Part 2: PLANNING STANDARDS AND CRITERIA

Section B: Station Emergency Response Organization

This section describes the Indian Point ERO, their key positions and associated responsibilities. It outlines the staffing requirements, which provide initial emergency response actions and provisions for timely augmentation of on-shift personnel when required. It also describes interfaces among Indian Point Energy Center response personnel and specifies offsite support available to respond to the site.

Table B-1, outlines the minimum staffing for emergency response required to be on-shift and other key responders capable of responding within 60 minutes of a declared emergency to support the on-shift organization.

1. Indian Point Emergency Response Organization Assignments:

   Figure B-1.1 illustrates the staffing for the normal on-shift complement. Members of the on-shift organization are trained on their responsibilities and duties in the event of an emergency, and are capable of performing initial emergency response actions. Figures B-1.2a-d illustrate the full ERO. The full ERO will be activated at an Alert, Site Area Emergency or General Emergency.

   a. Normal Plant Organization

      The normal Indian Point Energy Center staff and operational organization is detailed in Site Administrative Procedures. Figure B-1.3 shows an overview of the normal station organization at Indian Point Energy Center.

      Each Unit's normal watch organization [Figure B-1.1] functions twenty-four [24] hours per day, seven [7] days per week. The minimum on-shift staffing is shown in Table B-1 and includes 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 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] Field Support Supervisor or Shift Technical Advisor performs in an advisory capacity to the Shift Manager. This position is not required during cold shutdown;

One [1] SRO is assigned as Fire Brigade Leader (FBL) for both units in accordance with the Fire Protection Program Plan;

Six [6] Nuclear Plant Operators at Unit 2 and five [5] at Unit 3 who perform plant operations, minor maintenance and monitoring under the direction of the Control Room Supervisor. One [1] Unit 2 NPO is assigned to Unit 1 and Safe Shutdown (SSD), and one NPO is the communicator for notifications for both units;

One [1] Radiation Protection Technician and one [1] Chemistry Technician perform radiation monitoring, surveillance, decontamination, and water chemistry as necessary at each unit. The Radiation Protection Technician can perform emergency duties at Unit 2 and/or Unit 3 during emergencies.

The watch organization is augmented during normal working hours Monday through Friday by the Indian Point Energy Center Management and Operations Staff (shown in Figure B.1-3) which is organized to lend expertise to the watch force.

The Security organization maintains site security and guards' access to the plant and controlled areas at all times working under the direction of the Shift Manager and the Security Shift Supervisor.

The Shift Manager (Control Room Supervisor in the absence of the Shift Manager) has 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 full Emergency Response Organization and notify offsite support and government agencies.

b. <u>On call Emergency Response Organization</u>

The ERO is established to assure that a sufficient number of appropriately qualified personnel are available each day, 24 hours a day to deal with any emergency situation.

During an event or emergency at Indian Point Energy Center, the initial phase of the response is conducted by the normal shift complement onsite. The Watch Force, depicted in Figure B-1.1, satisfies the NUREG-0654 requirements for on-shift personnel and on-shift staffing in accordance with guidance of NRC's NSIR/DPR-ISG-01 interim staff guidance and NEI 10-05 Assessment of On-Shift Emergency Response Organization Staffing and Capabilities. An analysis of the IPEC On-Shift staffing was conducted and a final analysis report was issued. The analysis report is available as a separate document. The analysis resulted in a total of twenty-six persons on-shift.

Table B-1 presents, in tabular form, the minimum staffing requirements of on-shift personnel and the additional personnel capable of augmenting the on-shift organization within 60 minutes.

Those personnel identified to augment the Watch Force within 60 minutes of the declaration of an Alert or higher are part of the on-call ERO. These personnel are notified by an electronic notification system and public address announcements, and are immediately available during normal working hours. These personnel are notified by an electronic notification system during non-working hours. An alternate notification system using an automated telephone notification process is used in the event that the normal electronic notification system is unavailable.

The activation phase consists of ERO activation. This includes the normal watch and personnel needed to staff the Emergency Operations Facility (EOF), the Technical Support Center (TSC), the Operations Support Center (OSC) and the Joint Information Center (JIC). This occurs at an Alert classification or higher. A partial or complete ERO activation may be implemented at a NUE classification.

The ERO is capable of performing those activities necessary to:

(1) Maintain 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,

(3) Establish and maintain communications with authorities responsible for implementing offsite emergency measures,

(4) Conduct a coordinated emergency public information program, and

(5) Conduct long-term emergency response activities.

Activation of the ERO gives the ED full access to the resources of Entergy. In addition to the above listed facilities, corporate resources are made available as needed to support the onsite ERO.

Figures B-1.2a-d illustrate the Indian Point ERO. Personnel who will fill the positions identified are listed in an Emergency Telephone Directory.

2. <u>Authority Over Indian Point Emergency Response Organization:</u>

The Shift Manager (or the Control Room Supervisor in the event that the Shift Manager is unavailable), acting as the ED, has the authority to declare an emergency, immediately takes charge of the emergency response effort and is responsible for offsite dose assessment until relieved by another qualified ED. He/she activates the ERO as necessary and continues to direct the emergency response until relieved by another qualified ED.

The relieving ED/Plant Operations Manager (POM) 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. The POM holds this position until the on-call ED arrives. Overall control of the Onsite ERO is maintained by the Emergency Plant Manager (EPM) in the TSC. After command and control is transferred to the ED in the EOF/AEOF, it remains there until the event is terminated. In the event that the ED becomes unavailable or personnel at the EOF are required to transfer to the AEOF, command and control may be transferred to the CCR until such time as a new ED assumes command and control or the ED assumes command and control upon arrival at the AEOF.

Although the ERO described in this section of the Plan fulfills the regulatory requirements for emergency response, it may be altered by the ED. This alteration would be based on the needs within the ERO during an actual event.

3. Succession to Emergency Director:

The duties and responsibilities of the ED are initially assumed by the Shift Manager (CR Supervisor in his/her absence). When the EOF becomes operational, the on-call ED relieves the Shift Manager of ED responsibilities, and overall command and control of the emergency is transferred to the EOF. The Plant Operations Manager (POM) relieves the on-shift ED until such time as the EOF is operational. The POM must remain in the Control Room.

The position of on-call ED is normally staffed by high level station management personnel.

4. Emergency Director Responsibilities:

The ED 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 EDs are designated in an Emergency Telephone Directory. The ED is stationed in the EOF during an Alert, Site Area Emergency or General Emergency and is the interface between the onsite and offsite authorities. He/she has the responsibility and authority to provide Protective Action Recommendations (PARs) to the authorities responsible for implementing offsite emergency measures.

Specific responsibilities of the ED include:

- Declares and upgrades the emergency as warranted and initiates recovery phase when appropriate (non-delegable);
- Reviews and approves notifications to the State and Local authorities (non-delegable);
- Recommend protective actions for the general public to offsite authorities (non-delegable);
- Authorization of Emergency Exposures and issuance of KI to Entergy personnel outside the Protected Area;
- Establish communications with the emergency response facilities 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 JIC;
- 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 evaluations with the State and Counties;
- Relate all of these actions to the remainder of the emergency response organizations;
- Release of non-essential personnel from the site; and
- Approves information to the public prior to the JIC activation.

The ED is assisted in these activities by the entire ERO. Although the ED may delegate some of these responsibilities, he/she may not delegate the responsibility to classify events or for the decision to notify authorities and recommend offsite protective actions.

5. Key Position Responsibilities and Emergency Functions

In addition to the key positions and functions listed below, Table B-5, Emergency Response Organization Functions, gives an overview of the ERO position functions.

a. Emergency Plant Manager (EPM)

The EPM reports directly to the ED. He/she directs and coordinates the operational aspects of the In-Plant ERO. He/she assures proper coordination and direction of the efforts of each element of the In-Plant ERO in returning the plant to and maintaining it in a safe and stable condition. The EPM is located in the TSC. Specific responsibilities include:

- Directing actions to mitigate the accident;
- Directing the in-plant radiological monitoring;
- Authorization of emergency exposure limits and issuance of KI to Entergy personnel inside the Protected Area;
- Authorizing the mobilization of search and rescue teams;
- Directing and maintaining accountability within the protected area fence; and
- Assuring that all emergency personnel within the protected area fence take adequate protective measures.

b. Emergency Operations Facility (EOF) Manager

The EOF Manager reports directly to the ED. Specific responsibilities of the EOF Manager include:

- Coordination of Entergy's emergency response efforts outside the Protected Area Fence;
- Assist the ED in the interpretation of offsite radiological assessments for emergency classifications and Protective Action Recommendations in terms of both real-time measurements and projected radiological exposures;

- Ensure proper communications between the Indian Point ERO and offsite response organizations; and
- Assist offsite authorities responding to Entergy facilities.

c. Company Spokesperson

The Company Spokesperson reports directly to the JIC Manager. Specific responsibilities of the Company Spokesperson include:

With assistance from the JIC Manager, coordination of Entergy's public information response efforts;

- Act as the official Entergy representative to the media; and
- Interface with other response agencies' Public Information Officers.

d. Summary of ERO Functions

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.

1) Technical Support

Technical support is performed in the TSC under the direction of the TSC Manager. It is the central facility for the accumulation and re-transmittal of plant parameters;

Specific functions of the TSC 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 ED apprised of plant conditions; and
- Interfacing with NRC personnel in the TSC.

Personnel from the plant's engineering departments are assigned to these functions. In addition personnel with operational experience are assigned to perform operational accident assessment activities in support of the watch personnel handling the in-plant accident conditions.

2) Plant Operations and Assessment of Operational Aspects

While overall direction of in-plant operations is the responsibility of the Plant Operations 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.

3) Notification/Communication

The Control Room communication links with offsite authorities are available each day 24-hours a day. The initial notification of offsite authorities and ERO personnel is initiated by the Shift Manager and/or Control Room communicator. Communications with offsite authorities are maintained from the Control Room until the ED takes over the responsibility at the EOF. A communicator is designated at the EOF to establish/maintain communication links.

4) Radiological Accident Assessment (In-Plant)

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

5) Radiological Accident Assessment (Out-of-Plant and Offsite)

The expertise for evaluating the radiological consequence of the accident is provided by the Dose Assessors and the Offsite Team Coordinator who function directly under authority of the Radiological Assessment Coordinator (RAC). These individuals ensure that sufficient monitoring activities are instituted, evaluate and assess the results and apprise the RAC of all activities, results , and recommendations. Offsite radiological monitoring is provided by responding Radiation Protection Personnel or individuals trained as Offsite Monitoring Team members. These same personnel also provide radiological monitoring outside the Protected Area.

6) Repair and Corrective Actions

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

Maintenance mechanics, I&C Technicians and operations personnel (NPOs) who respond to the OSC perform repair and corrective actions directed by the OSC Manager.

7) Protective Actions (In-Plant)

The Watch Radiation Protection Technician is normally responsible for radiation protection in-plant. They are immediately available under the direction of the Shift Manager during the first 60 minutes. When the TSC and OSC become operational, Radiation Protection personnel are directed by personnel staffing those facilities.

8) Firefighting

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

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/POM or EPM and the rest of the onsite area which is handled by the ED. The Shift Manager using available personnel onsite until the other emergency response facilities are activated, if required, would initially direct search and rescue operations.

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

10) Security Site Access Control and Personnel Accountability

Overall Security response is coordinated in the Incident Command Post (ICP). IPEC Security Management may be assisted by the NY State Police.

Plant security and site access control are the responsibility of the Security Shift Supervisor and the Security Force, with backup assistance available from the Local Law Enforcement Agency (LLEA) as the situation demands.

Personnel accountability during an Alert, Site Area Emergency or a General Emergency is the responsibility of the TSC Security Coordinator. Emergency Plan Implementing Procedures outline the steps that are used to account for all personnel including employees having emergency assignments, visitors and contractors who may be within the Protected Area.

11) Information Dissemination

To assure that only factual and consistent information is released; statements concerning the emergency are the responsibility of Indian Point Energy Center communications personnel and/or individuals assigned to the JIC. A Press Release Writer is available on call 24 hours a day and is responsible for interfacing with the news media for release of any public statements prior to the JIC being operational.

The JIC Manager is 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 Press Release Writer and the JIC Manager have access to all necessary information, either directly available to them or available through the onsite ERO. A Public Information Liaison reports to the EOF with the initial augmentation of the watch force to facilitate information flow regarding the emergency to the JIC Technical Advisor. The ED prior to the activation of the JIC approves information that is used to notify the public. Once the JIC is operational, the JIC Press Release Writer prepares the press release, and once approved by the ED, disseminates the information to the public.

6. Indian Point Emergency Response Organization Block Diagram:

Figures B-1.1, B-1.2a thru B-1.2d illustrate the positions of the Indian Point ERO and supporting positions. Positions are assigned to interface with Federal, State, and local authorities. Sections B.4 & B.5 discuss specific responsibilities and the interrelationships for key positions. Table B-5 gives a brief description of the functions performed by most ERO positions. Implementing procedures provide details on ERO activities and may identify additional assignments. Also, ERO Managers are responsible for ensuring adequate personnel are available to carry out emergency functions.

7. Entergy Corporate Emergency Response:

Company personnel augment, as necessary the onsite staff in the performance of certain functions required to cope with an emergency. The Admin & Logistics Coordinator and/or the Corporate Duty Manager coordinates corporate support into the ERO once the on call ERO is activated. With the full activation of the ERO, Entergy is capable of continuous (24 hour) operations for a protracted period. The ED will ensure the continuity of resources (technical, administrative and logistics) to support the emergency response.

8. Private Industry Support:

a. Laboratory Services

The availability of laboratory/analytical services used by Entergy Nuclear has been ensured.

b. Additional Technical Assistance

If the need for additional technical assistance is identified, this may be obtained by the TSC Manager and the ED. Assistance of this type could include that from the NSSS Supplier (Westinghouse), architect engineer and consultants. A copy of the letter of agreement with Westinghouse is referenced in Appendix 2. Other assistance is also available using existing contracts, i.e.: Radiation Protection support.

Institute of Nuclear Power Operations (INPO): Experience has shown that a utility may need resources beyond in-house capabilities for the recovery from a nuclear plant emergency. One of the roles of INPO is to assist affected utilities by quickly applying the resources of the nuclear industry to meet the needs of an emergency. INPO has an emergency response plan that enables it to provide assistance to the affected utility in locating sources of emergency personnel, equipment and operational analysis.

American Nuclear Insurers (ANI): In the event of an extraordinary nuclear occurrence (as defined in the Price Anderson Law) ANI has plans prepared to provide prompt emergency funding to affected members of the public. ANI emergency assistance arrangements contemplate the mobilization and dispatch of emergency claims teams to directly dispense emergency assistance funds to affected members of the public.

9. Offsite Emergency Assistance:

The availability of local support services to assist the emergency forces has been ascertained and agreement letters from each organization in this section have been solicited. These letters are referenced in Appendix 2. All support, including support during hostile action events, is provided utilizing the National Incident Management System (NIMS) tool called the Incident Command System (ICS).

a. Ambulance Service

Twenty-four (24) hour ambulance service is provided by the Verplanck Fire District Ambulance with mutual aid backup from other ambulance services. Mutual aid backup from other ambulance services provides for additional Emergency Medical Services (EMS), ambulances and EMS personnel. Onsite procedures contain instructions that cover the call for assistance and the handling of the ambulance service personnel. Radio communication exists between the ambulance and local hospitals.

b. Medical

Onsite procedures contain instructions, which 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.

c. Hospitals

The New York – Presbyterian / Hudson Valley Hospital at Peekskill / Cortlandt has agreed to accept patients from the Indian Point Energy Center site who have been injured, contaminated or irradiated. The hospital provides facilities such as an emergency room, a laboratory, a radiology department and a nuclear medicine department.

The Phelps Memorial Hospital Center, Sleepy Hollow, New York has agreed to serve as the backup hospital.

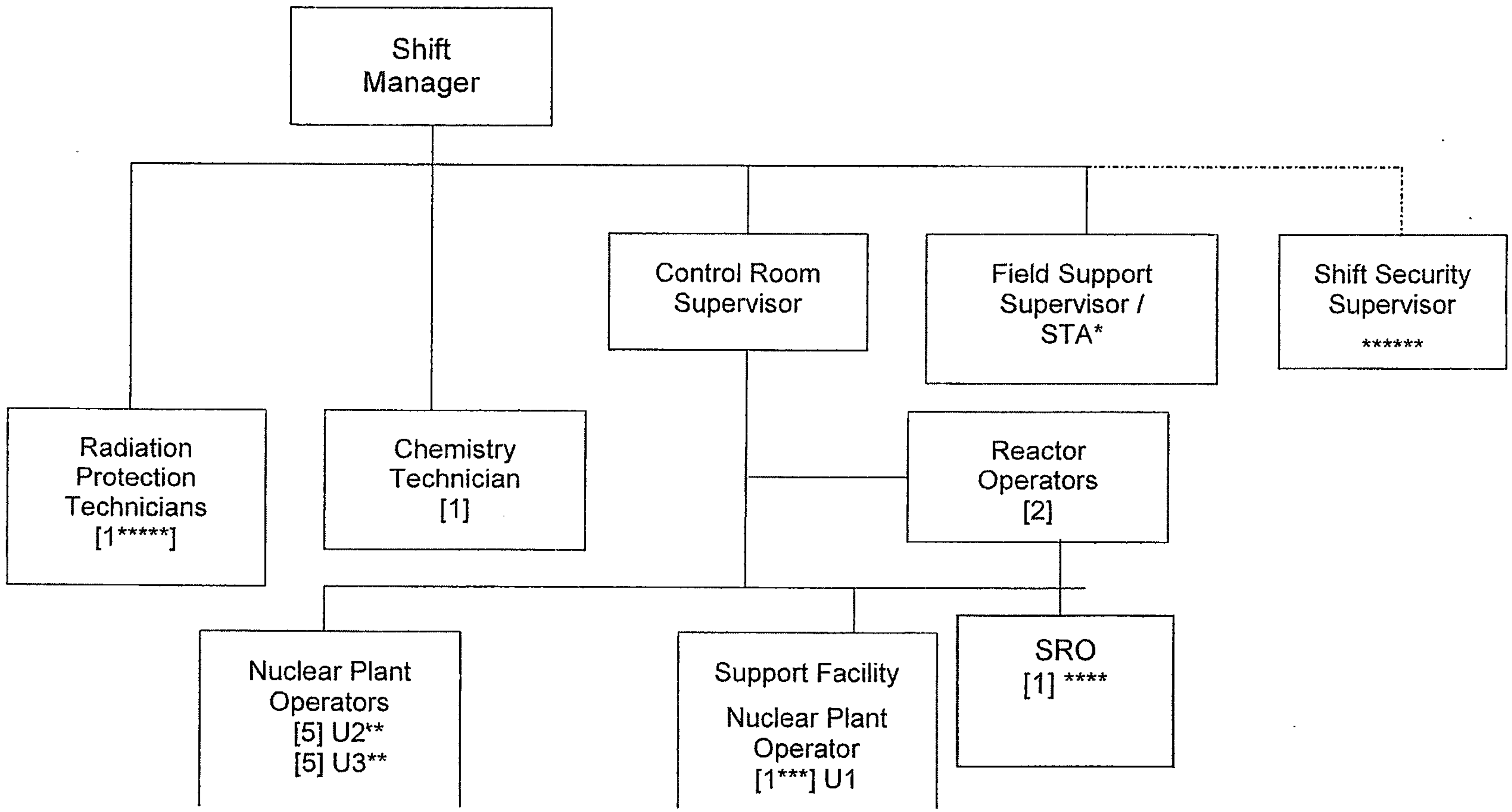
d. Law Enforcement

When notified that assistance is required, IPEC Security will notify the New York State Police which is the lead LLEA. As the situation demands, the Westchester County Police serve as the back-up to the State Police to provide timely reinforcement. The handling of security matters including those involving hostile action for the Indian Point Energy Center site is covered in the Security Safeguards Contingency Plan and Incident Response Plan.

e. Fire

Offsite firefighting support is provided by the Verplanck, Buchanan, and/or Montrose Fire Departments, as resources permit, with mutual aid backup from other fire departments. Mutual aid for fire response, fire apparatus, and firefighter resources is described in the Westchester County Fire Mutual Aid Plan.

Figure B-1.1 Indian Point Energy Center Station Watch Organization per Unit



*Consistent with NUREG-0737 and Technical Specifications, the Field Support Supervisor / Shift Technical Advisor is not required on shift during cold shutdown conditions.

** One NPO would be the communicator and make notifications for both units

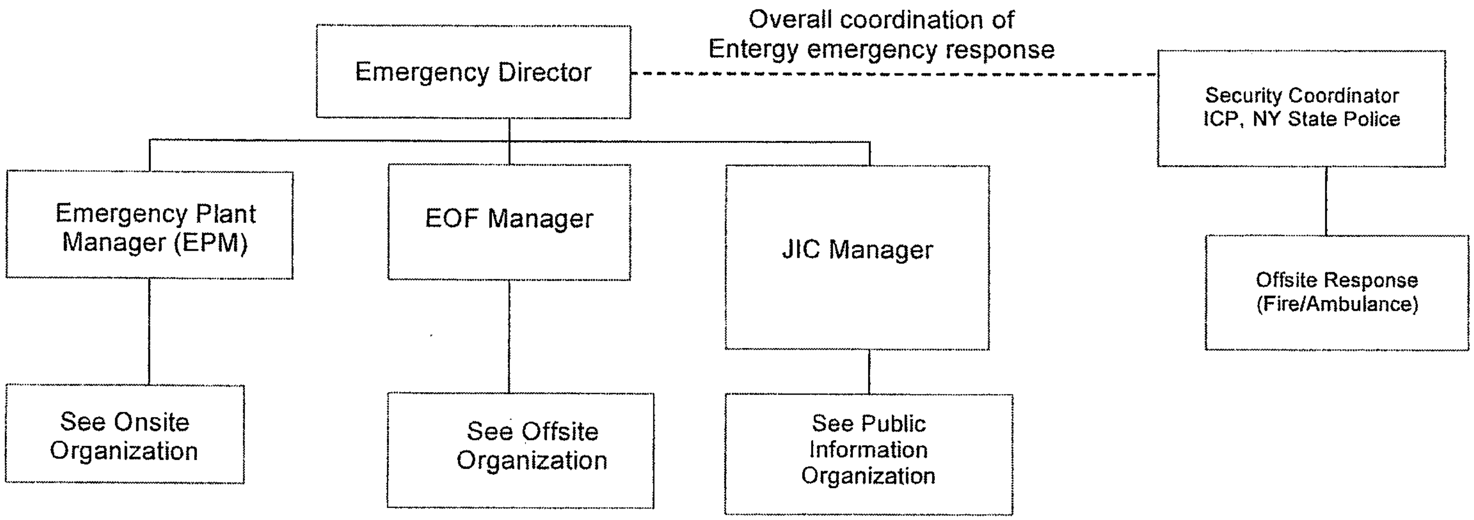
*** Unit 2 has additional NPO who maintains watch on Unit 1 systems

**** The SRO would serve as FBL for both units in accordance with the Fire Protection Program Plan

***** This RP Technician would assist at affected unit if needed

******There is one SSS for both units in accordance with the Security Contingency Plan.

Figure B-1.2a Emergency Response Organization – Major Areas



- Overall coordination of onsite response
- Safety of onsite personnel
- Advise ED on plant status, radiological conditions and plant related EALs
- Security Interface

- Coordination of Entergy offsite response
- Safety of offsite Entergy personnel
- Advise ED on offsite radiological conditions and related EALs
- Assist ED in interfacing with offsite authorities

- Overall coordination of Entergy Public Information response
- Act as representative to the media
- Keep ED informed of any Public Information concerns

- Overall coordination of Security response
- Coordinate Offsite responders such as Fire & Ambulance

Figure B-1.2b Emergency Response Organization – Onsite

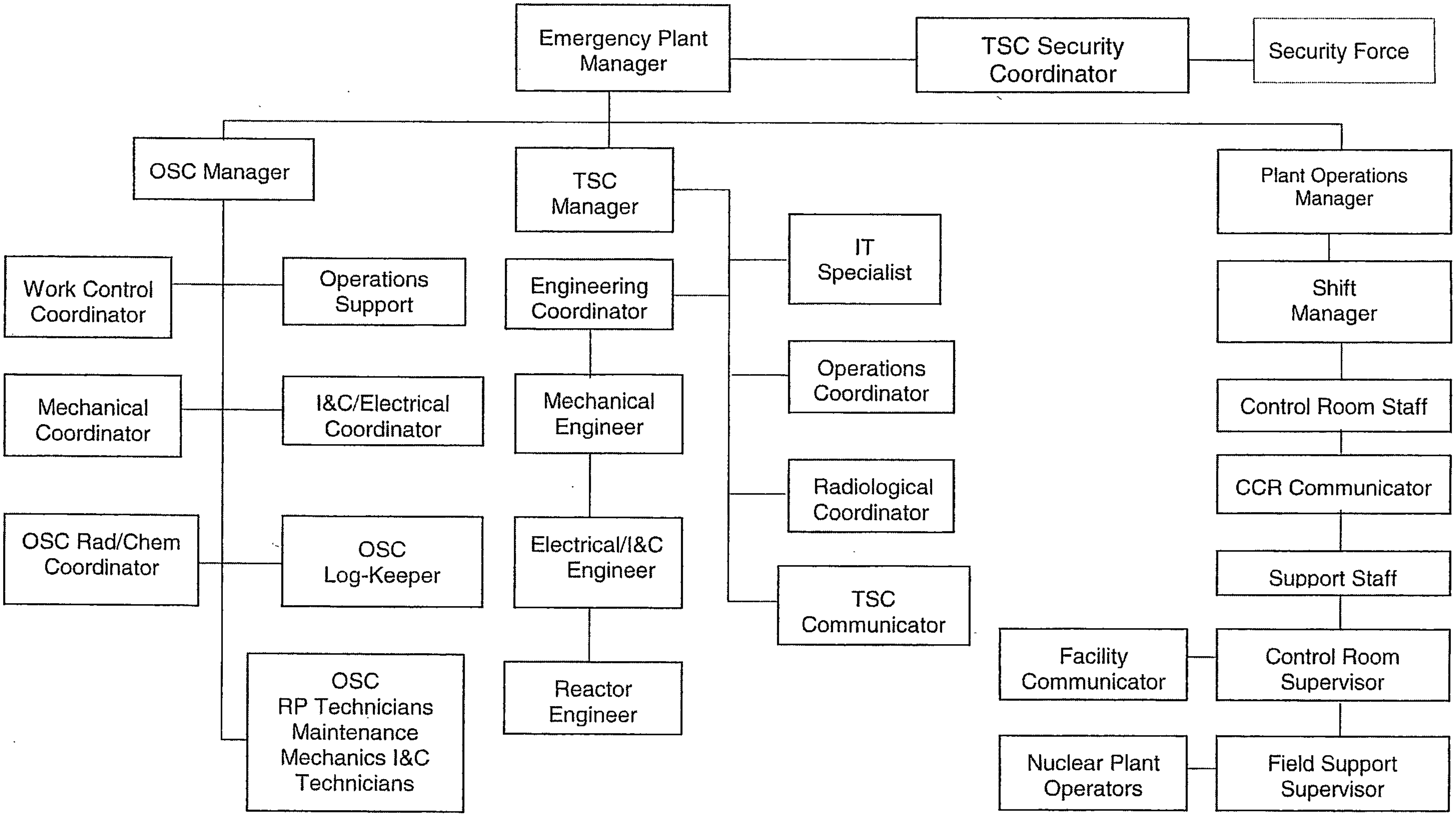


Figure B-1.2c Emergency Response Organization – EOF

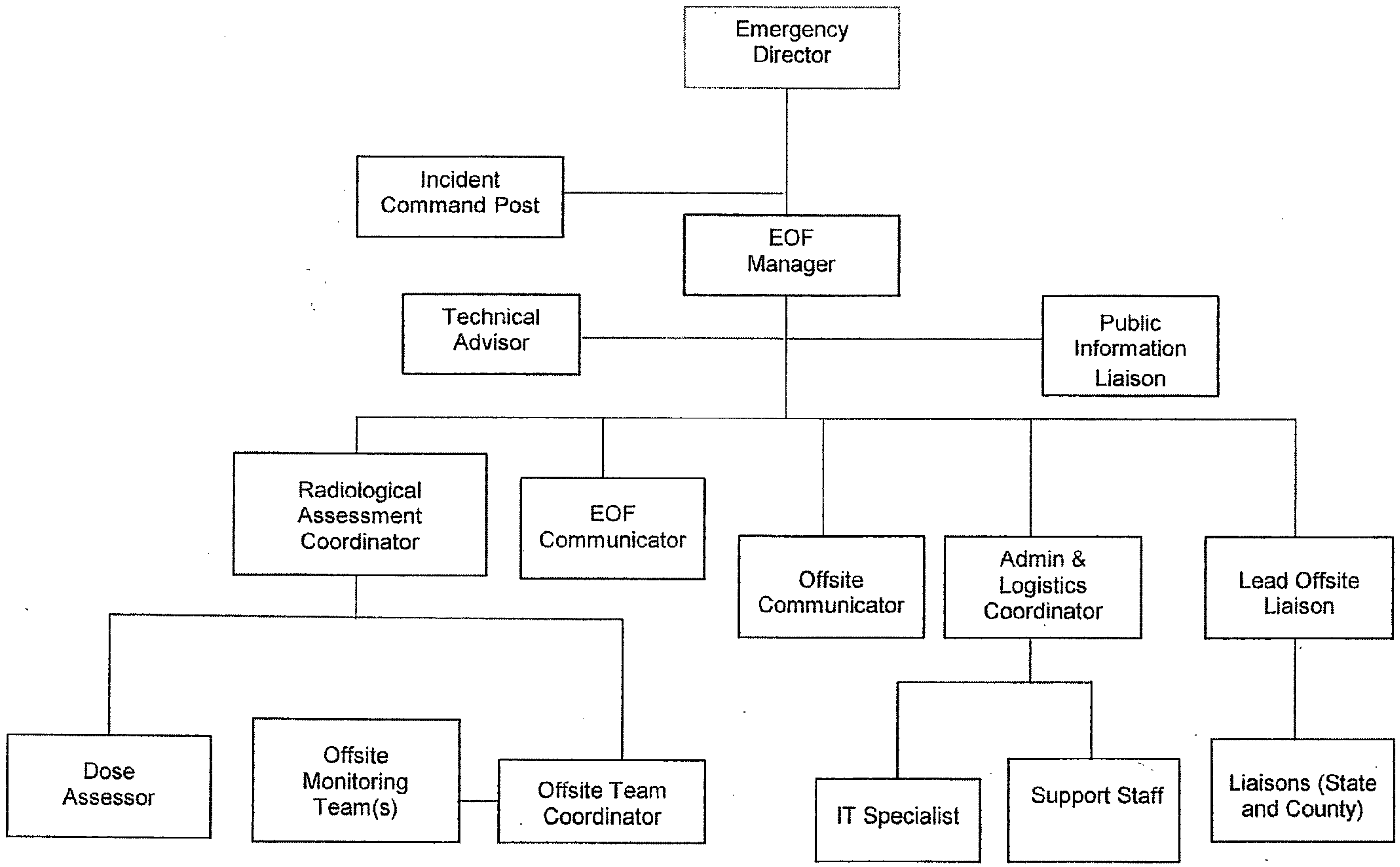
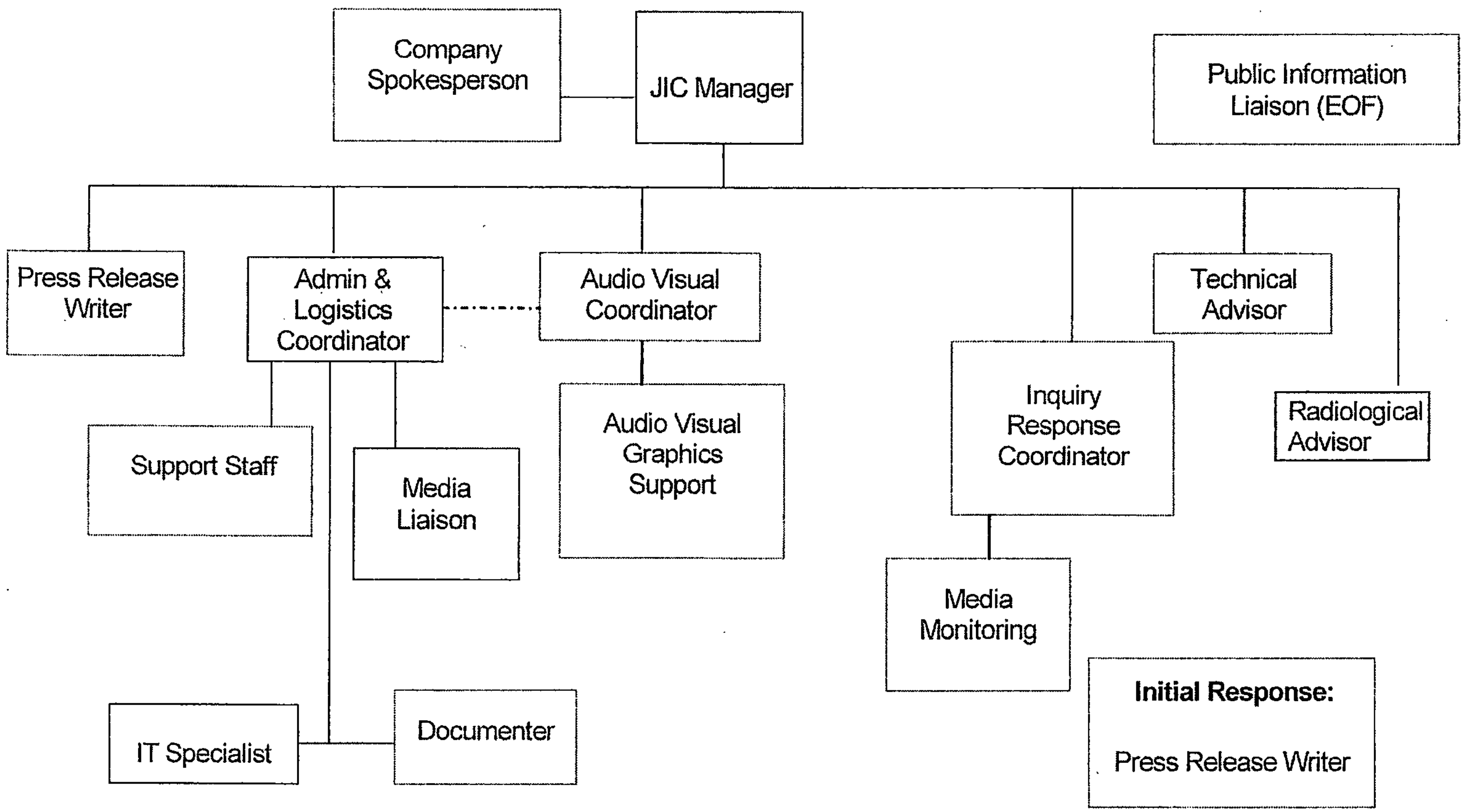


Figure B-1.2d Emergency Response Organization – Public Information



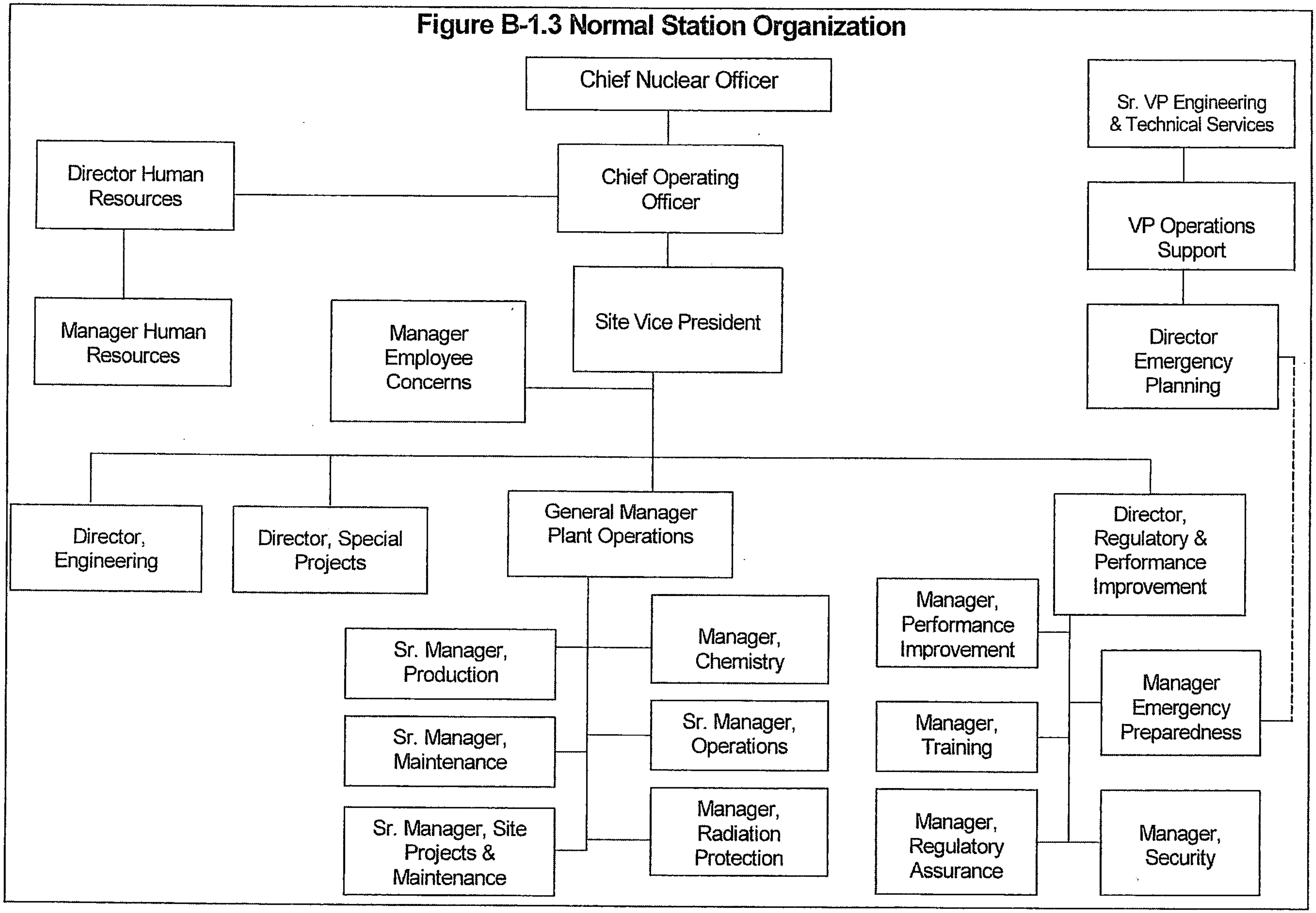


Figure B-1.3 Normal Station Organization
Chief Nuclear Officer
Sr. VP Engineering & Technical Services
Director Human Resources
Chief Operating Officer
VP Operations Support
Manager Human Resources
Manager Employee Concerns
Site Vice President
Director Emergency Planning
Director, Engineering
Director, Special Projects
General Manager Plant Operations
Director, Regulatory & Performance Improvement
Manager, Performance Improvement
Sr. Manager, Production
Manager, Chemistry
Manager Emergency Preparedness
Sr. Manager, Maintenance
Sr. Manager, Operations
Manager, Training
Manager, Radiation Protection
Manager, Regulatory Assurance
Manager, Security
Sr. Manager, Site Projects & Maintenance

TABLE B – 1 Comparison of NUREG – 0654 to Indian Point Energy Center

NUREG – 0654					Indian Point Energy Center ERO Staffing					Notes
Position No.	Position Title or Expertise / Major Task	On Shift	30 Min.	60 Min.	ERO Position, or Expertise or Job Title	On Shift U 2	On Shift U 3	On Shift U 1	60 Min.	[1] [2]
Plant Operations and Assessment										
1	Shift Supervisor (SRO)	1	--	--	Shift Manager	1	1	0	--	
2	Shift Foreman (SRO)	1	--	--	Control Room Supervisor	1	1	0	--	
3	Control Room Operators	2	--	--	Reactor Operators or Field Support Supervisor	2	2	0	--	[3]
4	Auxiliary Operators	2	--	--	Nuclear Plant Operators	5	4	1	--	[12] [13]
Emergency Direction and Control (Emergency Coordinator)					**Emergency Director**					
5	Shift Technical Advisor, Shift Supervisor or designated facility manager	1	--	--	Shift Manager or Control Room Supervisor	1	1	0	--	[4] [10]
Notification / Communication					**Communicator**					
6	Communicator – notify licensee, State, Local and Federal personnel and maintain communication	1	1	2	Nuclear Plant Operator provides notifications for both units	0	1		--	[5]
					Offsite Communicator plus				1	
					Any two of the following: Offsite Team Coordinator Control Room Communicator TSC Communicator				2	
Radiological Accident Assessment and Support of Operational Accident Assessment										
7	Senior Manager – EOF Director			1	Emergency Director or EOF Manager	--			1	
8	Senior Health Physics (HP) Expertise – Offsite Dose Assessment	--	1	--	Radiological Assessment Coordinator	--			1	

TABLE B – 1 Comparison of NUREG – 0654 to Indian Point Energy Center

NUREG – 0654					Indian Point Energy Center ERO Staffing					Notes
Position No.	Position Title or Expertise / Major Task	On Shift	30 Min.	60 Min.	ERO Position, or Expertise or Job Title	On Shift			60 Min.	[1] [2]
						U 2	U 3	U 1		
9	Offsite Surveys	--	2	2	Two Teams of Field Monitors	--			4	[6]
10	Onsite (out-of-plant) Surveys	--	1	1	RP Technicians	--			2	
11	RP Technicians	1	1	1	RP Technicians	1	1	0	2	[11]
12	Rad / Chem Technicians	1	--	1	Chemistry Technicians	1	1	0	1	
Plant System Engineering, Repair and Corrective Action										
13	Shift Technical Advisor	1	--	--	Field Support Supervisor or Shift Technical Advisor	1	1	0	--	
14	Core / Thermal Hydraulics	--	1	--	Reactor Engineer	--			1	
15	Electrical	--	--	1	Electrical Engineer	--			1	
16	Mechanical	--	--	1	Mechanical Engineer	--			1	
17	Mechanical Maintenance / Radwaste Operator	1 --	-- --	1 1	Mechanical Maintenance	1	0		2	[7] [10]
18	Electrical Maintenance	1	1	1	Electrical Maintenance	0	1		2	[8] [10]
19	Instrument & Control Technician	--	1	--	Instrument & Control Technician	--			1	
Protective Actions (In-Plant)										
20	RP Technicians	2	2	2	RP Technicians or other qualified personnel	2			4	[9] [10]

TABLE B – 1 Comparison of NUREG – 0654 to Indian Point Energy Center

NUREG – 0654					Indian Point Energy Center ERO Staffing					Notes
Position No.	Position Title or Expertise	On Shift	30 Min.	60 Min.	ERO Position, or Expertise or Job Title	On U 2	On U 3	On U 1	60 Min.	[1] [2]
Fire Fighting										
21	Fire Brigade	Fire Brigade per TS	Local Support		Fire Brigade	0	1	0	Local Support	[13] [14]
Rescue Operations and First Aid										
22	Rescue – First Aid	2	Local Support		Rescue – First Aid	2			Local Support	[10]
Site Access Control and Personnel Accountability										
23	Security Personnel	Per Security Plan			Security Personnel	Per Security Plan				

Totals		10	11	15		12	13	1	26	

(a) Per NUREG-0654, May be provided by shift personnel assigned other functions

(b) On-shift staffing is in accord with guidance of NRC's NSIR/DPR-ISG-01 Interim Staff Guidance and NEI 10-05 Assessment of On-Shift Emergency Response Organization Staffing and Capabilities.

TABLE B – 1 Comparison of NUREG – 0654 to Indian Point Energy Center

Note:

[1] For Emergency Response Organization purposes resources may be shared between units. The unaffected unit in operation must maintain a Control Room Supervisor, one Reactor Operator and one Nuclear Plant Operator. All other shift positions may be shared. Appropriate cross-training is required.

[2] NUREG-0654, 30 minute and 60 minute response capabilities are combined into the 60-minute response capability for Indian Point Energy Center, as per originally approved Emergency Plan for both Unit 2 and Unit 3.

[3] The assessment function may be performed by the Field Support Supervisor

[4] The Emergency Coordinator (Emergency Director) position is initially filled by the Shift Manager or Control Room Supervisor. He is relieved of this duty by the Plant Operations Manager (POM) or the EOF Emergency Director who are one-hour responders.

[5] IPEC has a designated Communicator on shift (one Nuclear Plant Operator or qualified designee) for both units and an Offsite Communicator in the EOF as a required one-hour responder. The on shift communicator has been counted in the Unit 3 total, but can be provided by either unit. The additional two communicators are filled by the following: TSC Communicator and Offsite Team Coordinator – EOF.

[6] Offsite survey teams are filled by Offsite Monitoring Teams

[7] The repair and corrective action function would initially be performed by nuclear plant operators for minor mechanical maintenance activities. Two additional maintenance mechanics who are one hour responders would troubleshoot and correct equipment malfunctions designated in NUREG-0654 for Mechanical Maintenance / Radwaste Operator.

[8] The repair and corrective action function would initially be performed by nuclear plant operators for minor electrical maintenance activities. Two additional electrical maintenance mechanics who are one-hour responders would troubleshoot and correct equipment malfunctions.

[9] On shift and other available qualified personnel and the unaffected unit RP Technicians can fulfill the function for basic in-plant radiation protection activities. Four additional RP Technicians or other qualified personnel are required as one-hour responders.

[10] In accordance with NUREG-0654, this function may be provided by shift personnel assigned other functions.

[11] Credit for one RP Technician may be taken for the opposite Unit on-shift RP Technician

[12] One (1) Unit 1 NPO is designated for SSD.

[13] The Fire Brigade is staffed per the Fire Protection Program Plan

[14] One (1) SRO designated FBL. This is a person on shift qualified as FBL. This person has been counted in the Unit 3 total, but can come from either unit.

Table B-5 - Emergency Response Organization Functions

Position / Assigned Location	Reports To	Major Functions
Control Room (CR)		
Shift Manager	POM	Acts as ED until relieved.
Control Room Supervisor (CRS)	Shift Manger	Immediate supervision of plant operations
Field Support Supervisor/Shift Technical Advisor	Shift Manager	Provide technical support to operations shift
Reactor Operator (RO)[s]	CRS	Control Room operations / communications
Nuclear Plant Operator (NPO)[s] (unit 1 only)	CRS	Operates Unit 1 and support equipment
Nuclear Plant Operator (NPO)[s] (Nuclear, Conventional, Roving)	CRS	Operates equipment outside the control room, minor maintenance
Offsite (CCR) Communicator	CRS	Communications with outside organizations
Support Staff	Shift Manager	Provide plant data to TSC
Watch Chemistry Technician (OSC when activated)	Shift Manager	Provide chemistry support as needed, water chemistry
Watch Radiation Protection (RP) Technician (OSC when activated)	Shift Manager	Provide RP support as needed, rad monitoring, decon and surveillance
Facility Communicator	Shift Manager	Provides data to the other emergency response facilities
Plant Operations Manager (POM)	EPM	Relieves the SM as ED and acts as ED until relieved by the ED in the EOF. Manages emergency response operations activities in the Control Room and keeps the EPM informed of plant status and response activities. Advises ED on classification issues and other operational concerns.
Command Guard House (CGH)		
Security Shift Supervisor (SSS)	SM / POM	Supervises Security Force and acts as Lead Accountability Officer
Security Guard[s]	SSS	Provide physical control of plant areas, assist in accountability and search and rescue.

Table B-5 - Emergency Response Organization Functions

Position / Assigned Location	Reports To	Major Functions.
Emergency Operations Facility (EOF)		
Emergency Director (ED)		Overall Direction of Entergy Emergency Response
EOF Manager	ED	Manages Entergy Offsite response activities
Technical Advisor	EOF Manager	Provide technical advice to ED and track EALs
Radiological Assessment Coordinator	EOF Manager	Directs offsite radiological assessment and control efforts
Dose Assessor	RAC	Leads dose assessment activities
Offsite Team Coordinator	RAC	Coordinates Field Monitoring Team Activities
Offsite Monitoring Teams	Offsite Team Coordinator	Perform Environmental Monitoring and Sampling outside the Protected Area
Admin and Logistics Coordinator	EOF Manager	Coordinate Entergy corporate support to the onsite Emergency Response Organization and provide logistics support to ERO
Support Staff	EOF Manager / Admin & Logistics Coordinator	Provide support to EOF Staff
IT Specialist	EOF Manager / Admin & Logistics Coordinator	Assist EOF Staff in operation of EOF Equipment
Offsite Communicator	EOF Manager	Communicate with offsite emergency organizations
Public Information Liaison	EOF Manager	Provide information to JIC
Lead Offsite Liaison	EOF Manager	Liaison to Offsite Representatives arriving at the EOF and coordinates information flow to State and County Liaisons located at offsite EOCs
County & State Liaisons (may be located at offsite EOCs)	Lead Offsite Liaison	Assist offsite authorities in coordinating emergency response.
Incident Command Post	ED	Coordinate overall security response; interface with local law enforcement.
EOF Communicator	EOF Manager	Communicates with other ERFs

Table B-5 - Emergency Response Organization Functions

Position / Assigned Location	Reports To	Major Function
Operations Support Center (OSC)		
Operations Support Center (OSC) Manager	EPM	Manages repair and assessment activities of team sent into the plant.
Work Control Coordinator	OSC Manager	Assemble, brief, dispatch, track and debrief OSC teams sent out from the OSC
OSC Rad/Chem Coordinator	OSC Manger	Coordinate radiological controls inside the Protected Area and assist in coordination of chemistry sampling
Mechanical Coordinator	OSC Manager	Coordinate Maintenance activities
I&C/Electrical Coordinator	OSC Manager	Coordinate I&C activities
Operations Support	OSC Manager	Coordinate Operations support to the CCR
Radiation Protection Technicians	Rad/Chem Coordinator	Perform radiological surveys, sampling and analysis as needed, provide RP coverage for OSC operations
Chemistry Technician	Rad/Chem Coordinator	Perform chemistry sampling and analysis as needed, assist in OSC operations
Maintenance Mechanic(s)	Maintenance Coordinator	Perform mechanical repairs and assessment activities as needed
Instrument & Control (I&C) Technician(s)	I&C Coordinator	Perform I&C repairs and assessment activities as needed
OSC Operators	Operations Support	Operate plant systems as directed by Operations Support in an SAE or GE. Assist OSC teams in repair and assessment activities.
OSC Log-Keeper	OSC Manager	Coordinate Accountability with Security Coordinator and as necessary verify/set up equipment. Provide support as needed.

Table B-5 - Emergency Response Organization Functions

Position / Assigned Location	Reports To	Major Functions
Technical Support Center (TSC)		
Emergency Plant Manager (EPM)	ED	Manage emergency response activities inside the Protected Area and keep the ED informed of plant status and response activities.
Technical Support Center (TSC) Manager	EPM	Manage technical assessment activities.
Engineering Coordinator	TSC MGR	Coordinate TSC Engineering Assessment Activities
Reactor Engineer	Engineering Coordinator	Perform Core Physics Assessments and assist EPM in implementation of Severe Accident Management Guidelines
Mechanical Engineer	Engineering Coordinator	Perform Mechanical Engineering Assessments
Electrical / I&C Engineer	Engineering Coordinator	Perform Electrical / I&C Engineering Assessments
Operations Coordinator	TSC MGR	Perform Operations Engineering Assessments
TSC Radiological Coordinator	TSC MGR	Radiological Oversight
IT Specialist	TSC MGR	ERDS Activation/Verification and maintain IT equipment (computers, phones) operational.
TSC Security Coordinator	TSC MGR	Direct Physical Security
TSC Communicator	TSC MGR	Perform TSC communications as needed

Table B-5 - Emergency Response Organization Functions

Position / Assigned Location	Reports To	Major Functions
Joint Information Center (JIC)		
Company Spokesperson	JIC Manager	Act as official spokesperson for Entergy, coordinate public information with other Public Information Officers
JIC Manager	ED	Manage operations of the Joint Information Center
Technical Advisor	JIC Manager	Provide technical expertise to JIC Staff
Admin & Logistics Coordinator	JIC Manager	Maintains access control to the JIC. Ensures distribution of press releases.
Documenter	JIC Admin & Logistics Coordinator	Maintain facility log on WebEOC. Ensure timeliness of facility briefings.
IT Specialist	JIC Admin & Logistics Coordinator	Assist JIC Staff with computer hardware and software use
Audiovisual Coordinator	JIC Manager	Manages Audio/Video operations
Support Staff	Admin & Logistics Coordinator	Provide support to JIC Personnel
Press Release Writer	JIC Manager	Writes News Releases
Radiological Advisor	JIC Manager	Provides radiological information from the EOF to the JIC staff
Inquiry Response Coordinator	JIC Manager	Interacts with New York State and Counties on information and rumors
Media Monitoring	Inquiry response Coordinator	Monitor media for rumors and items to be addressed in news releases or media briefings
Media Liaison	Admin & Logistics Coordinator	Acts as Entergy's interface for media present at the JIC
Audio Visual Graphics Support	Audio Visual Coordinator	Supports A/V equipment and graphics at the JIC

Part 2: PLANNING STANDARDS AND CRITERIA

Section C: Emergency Response Support and Resources

This section describes the provisions for requesting and effectively utilizing support resources and for accommodating State and local staff at the Indian Point Energy Center Emergency Operations Facility (EOF).

1. Federal Response Support and Resources

   Assistance is available from Federal agencies through the Federal Radiological Emergency Response Plan (FRERP). The primary Federal agencies that provide assistance to the State and Indian Point Energy Center, respectively, are the Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC). Other Federal agencies, through FRERP, provide assistance to the State and Local Authorities in an emergency.

   a. Sections A and B of this Plan identify the specific ERO positions by title who are authorized to request Federal assistance.

   b. Federal agencies that may provide assistance in direct support of Indian Point Energy Center in the event of an accident are identified in Section A of this plan. If needed, Federal resources are made available to Indian Point Energy Center in an expeditious and timely manner.

   c. Each Indian Point Energy Center emergency response facility has the equipment and communications capability necessary for a continuous high level of response, interaction and communication among key personnel during emergency conditions. The Technical Support Center (TSC) is able to accommodate NRC representatives. A conference/working area has been provided for their use. The EOF/AEOF has space to accommodate NRC representatives as well as representatives from DHS/FEMA, State and key local authorities.

      In addition to Indian Point Energy Center facilities and equipment, State and local facilities and equipment are available to support the Federal response.

2. Liaisons

   a. The NRC, DHS/FEMA, State, and local authorities may dispatch representatives to the EOF/AEOF where accommodations have been provided.

   b. At the Alert level and above, Entergy Offsite Liaisons are dispatched to the State and local government EOCs to act as communications liaisons and to provide clarification of emergency response information.

3. Radiological Laboratories

In addition to Indian Point Energy Center's radiological assessment facilities, contracted services may be utilized to analyze inplant and offsite environmental samples. Outside analytical assistance may be requested from State and Federal agencies and other licensees if the offsite radiological monitoring and environmental sampling operation exceeds the capacity of the Indian Point Energy Center capabilities.

The availability of commercial laboratory/analytical services used by Entergy facilities has been ensured.

4. Other Assistance

Contracted services are available and may be used in support of an emergency response at the Indian Point Energy Center. The availability of services has been ascertained and agreement letters are listed in Appendix 2.

Though not a typical contracted service, the Institute of Nuclear Power Operation (INPO) is able to provide:

- Assistance in locating sources of emergency manpower and equipment;
- Access to an organization of industry experts who could advise the utility on technical matters, and;
- Analysis of operational aspects of the incident.

Additional facilities, organizations and individuals as listed in the Emergency Telephone Directory (ETD), are available and may be used in support of emergency response.

Part 2: PLANNING STANDARDS AND CRITERIA

Section D: Emergency Classification System

This section describes the classification and emergency action level scheme used to determine the minimum response to an abnormal event at the Station. This scheme is based on Indian Point Energy Center Units 2 & 3 systems, effluent parameters and operating procedures. The initial response of Federal, State and local agencies is dependent upon information provided by the Indian Point ERO. Indian Point Energy Center emergency planning personnel work closely with State and local agencies to ensure consistency in classification schemes and procedural interfaces.

Indian Point Energy Center maintains the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an emergency action level has been exceeded and promptly declares the emergency condition as soon as possible following identification of the appropriate emergency classification level.

1. Emergency Classification:

   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 classifications increase in overall severity from Notification of Unusual Event (least severe), Alert, Site Area Emergency, General Emergency (most severe).

   These mutually exclusive classifications cover the postulated spectrum of potential and actual emergencies. Each classification is associated with a particular set of immediate actions. Each classification is characterized by certain initiating symptoms or events called Emergency Action Levels (EALs). These action levels include specific sets of plant parameters (i.e., instrument indications, system status, etc.) or events that are used to determine the appropriate emergency classification. A brief explanation of the four classification levels follows:

   Notification of Unusual Event (NUE)

   A Notification of Unusual Event classification is used to denote events that are in progress or have occurred, which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.

This is the least severe of the four (4) classifications. The purpose of this classification is primarily notification. These notifications provide for (1) assurance that the first step in any response later found to be necessary has been carried out, (2) bringing the operating staff to a state of readiness, and (3) providing systematic handling of unusual events information and decision making.

The Shift Manager/ED will ensure:

a) Notification of State and local offsite authorities within 15 minutes of classifying the event;

b) Required Station Management and the NRC are informed of the nature of the unusual condition;

c) Optional augmentation of on-shift resources as needed, which may include full or partial staffing of the Technical Support Center, Operations Support Center, Emergency Operations Facility and/or the Joint Information Center;

d) Continued assessment and response as necessary;

e) Escalation to a more severe class, if appropriate;

OR

f) Close out with verbal summary to offsite authorities followed by written summary within 24 hours.

State and local offsite authorities would, as directed by their respective Emergency Plans:

a) Provide fire or security assistance if requested;

b) Escalate to a more severe class, if appropriate;

OR

c) Standby until a verbal closeout.

Alert

An Alert classification indicates events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of Hostile Action. Any releases are expected to be limited to small fractions of the EPA PAG exposure levels.

The purpose of the Alert is to (1) ensure 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 on plant status and parameters. Where radiological releases to the environment have occurred, it is possible that the site boundary doses will exceed 10 mRem Total Effective Dose Equivalent (TEDE) or 10 mRem/hr external exposure rate.

The Shift Manager/ED will ensure:

a) Initiation of activation of the ERO which results in the staffing of the Technical Support Center, Operations Support Center, Emergency Operations Facility and the Joint Information Center;

b) Notification of State and local offsite authorities within 15 minutes of classifying the event;

c) Prompt notification of the NRC (not to exceed one hour);

d) Continued assessment and response as necessary;

e) Dispatch of field monitoring teams and establish associated communications, as necessary;

f) Periodic plant status updates are provided to offsite authorities (approximately every 30 minutes or period agreed upon with offsite authorities);

g) Meteorological assessments are provided to offsite authorities and, if any releases are occurring, dose estimates for actual release;

h) Escalation to a more severe class, if appropriate;

OR

i) Close out in emergency class by verbal discussion with offsite authorities followed by written summary within eight (8) hours of entering recovery after an Alert or higher classified event.

State and local offsite authorities would, as directed by their respective Emergency Plans:

a) Provide fire or security assistance if requested;

b) Augment resources by activating EOC 's;

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

d) Alert key emergency personnel to standby status including monitoring teams and associated communications;

e) Provide confirmatory offsite radiation monitoring and ingestion pathway dose projections if actual releases substantially exceed technical specification limits;

f) Maintain Alert status until verbal closeout or escalation.

Site Area Emergency (SAE)

A Site Area Emergency indicates events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public, or Hostile Action that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to, equipment needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.

The purpose of the Site Area Emergency declaration is to (1) ensure that response centers are manned, (2) ensure that monitoring teams are dispatched, (3) ensure 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 possible that the site boundary doses will exceed 100 mRem Total Effective Dose Equivalent (TEDE), 500 mRem CDE Thyroid, 100 mRem/hr external exposure rate, or 500 mRem/hr Thyroid Exposure Rate (for one hour of inhalation).

The Shift Manager/ED will ensure:

a) Initiation of activation of the ERO which results in the staffing of the Technical Support Center, Operations Support Center, Emergency Operations Facility and the Joint Information Center;

b) Notification of State and local offsite authorities within 15 minutes of classifying the event;

c) Prompt notification of the NRC (not to exceed one hour);

d) Continued assessment and response as necessary;

e) Dispatch of field monitoring teams and establish associated communications;

f) An individual provides for plant status updates to offsite authorities and periodic news media briefings (perhaps joint with offsite authorities);

g) Senior technical and management staff on-site are made available for consultation with NRC and State on a periodic basis;

h) Meteorological and dose estimates are provided to offsite authorities for actual releases via a dedicated individual or automated data transmission;

i) Release and dose projections based on available plant condition information and foreseeable contingencies are provided to appropriate agencies;

j) Accountability process is initiated;

k) Escalation to General Emergency class, if appropriate;

OR

l) Close out by briefing of offsite authorities at Emergency Operations Facility and by phone followed by written summary within eight (8) hours of close.

State and local offsite authorities would as directed by their respective Emergency Plans:

a) Provide any assistance requested;

b) If sheltering near the site is desirable, activate public notification system;

c) Provide public within at least ten miles with periodic updates on emergency status;

d) Augment resources by activating EOC's and any other primary response centers;

e) Dispatch key emergency personnel including monitoring teams and establish associated communications;

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

g) Provide offsite monitoring results to licensee, DOE and others and jointly assess them;

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

i) Recommend placing milk animals within 2 miles on stored feed and assess the need to extend the distance;

j) Provide media briefings, perhaps with a licensee;

k) Maintain Site Area Emergency status until closeout or escalation.

General Emergency (GE)

A General Emergency indicates events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or Hostile Action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels beyond the site boundary.

The purpose of the General Emergency is to (1) initiate 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 possible that the site boundary doses could exceed 1000 mRem Total Effective Dose Equivalent (TEDE) and 5000 mRem CDE Thyroid, 1000 mRem/hr External Exposure Rate, or 5000 mRem/hr Thyroid Exposure Rate (for one hour of inhalation).

The Shift Manager/ED will ensure:

a) Initiation of activation of the ERO which would staff the Technical Support Center, Operations Support Center, Emergency Operations Facility and the Joint Information Center;

b) Notification of State and local offsite authorities within 15 minutes of classifying the event;

c) A recommendation is made, as a minimum, sheltering or evacuation for 2 mile radius and 5 miles downwind and assess need to extend distances; consider advisability of evacuation (projected time available vs. Evacuation Time Estimates);

d) Prompt notification of the NRC (not to exceed one hour);

e) Continued Assessment and response as necessary;

f) Dispatch of field monitoring teams and associated communications;

g) An individual is provided for plant status updates to offsite authorities and periodic news media briefings (perhaps joint with offsite authorities);

h) Senior technical and management staff on-site are made available for consultation with NRC and State on a periodic basis;

i) Meteorological and dose estimates are provided to offsite authorities for actual releases;

j) Release and dose projections based on available plant condition information and foreseeable contingencies are performed and provided to offsite authorities;

k) Accountability process is initiated;

l) Close out by briefing of offsite authorities at Emergency Operations Facility and by phone followed by written summary within eight hours of closeout.

State and local offsite authorities would as directed by their respective Emergency Plans:

a) Provide any assistance requested;

b) Activate immediate public notification of emergency status and provide public periodic updates;

c) Augment resources by activating EOC's and any other primary response centers;

d) Dispatch key emergency personnel including monitoring teams and establish associated communications;

e) Dispatch other emergency personnel to duty stations within 5 mile radius and alert all others to standby status;

f) Provide offsite monitoring results to licensee, DOE and others and jointly assess them;

g) Continuously assess information from licensee and offsite monitoring teams with regard to changes to protective actions;

h) Recommend placing milk animals within 10 miles on stored feed and assess need to extend distance;

i) Provide news media briefings, perhaps with a licensee;

j) Maintain General Emergency status until closeout.

Classification Downgrading

The Indian Point Energy Center policy on Classification downgrading is as follows:

All events once declared shall remain in effect until: 1. such time as conditions warrant termination of the event and entry into the Recovery Phase or 2. the event is re-classified at a higher level.

2. Emergency Action Levels:

The postulated accidents analyzed in each units' Final Safety Analysis Report (FSAR), the example initiating conditions found in NEI 99-01 REV 5 "Methodology for Development of Emergency Action Levels" were evaluated to establish an emergency classification and emergency action level scheme. NEI 99-01 REV 5 has been accepted by the NRC as an alternative to NUREG-0654-REV 1.

This classification scheme is presented in six categories of EALs, which show the parameters for establishing each emergency classification.

The specific instruments, parameters or equipment statuses that identify the overall severity of the emergency condition and the actions to be taken by the facility staff are identified in the Plan Implementing Procedures. The Emergency Action Levels (EALs) are grouped into six categories to simplify their presentation and promote a rapid understanding by their users. (See Table D-1 for a description of each of the EAL initiating conditions for each EAL category).

These categories are:

(1) Abnormal Rad Release/Rad Effluent

(2) Hazards

(3) ISFSI

(4) Systems

(5) Fission Product Barriers

(6) Cold Shutdown/Refueling System Malfunction

Table D-1, Summary of IPEC EAL Initiating Conditions, provides a description of the initiating conditions associated with the above categories which would cause the Plan to be implemented. Detailed emergency action levels are provided in a Plan Implementing Procedure and an associated EAL Technical Bases Administrative Procedure.

3. Offsite Classification Systems:

Indian Point Energy Center works with the State of New York and local authorities to ensure consistency between classification schemes. The content of the Emergency Action Levels is reviewed with the State and local authorities on an annual basis.

4. Offsite Emergency Procedures:

Indian Point Energy Center works with the State of New York and local authorities to ensure that procedures are in place that provide for emergency actions to be taken which are consistent with the protective actions recommended by Indian Point Energy Center accounting for local offsite conditions that exist at the time of the emergency.

Table D-1

SUMMARY OF IPEC EAL INITIATING CONDITIONS

Category A – Abnormal Radiation Levels/Radiological Effluent

This category encompasses the spectrum of potential uncontrolled radionuclide releases via liquid or gaseous effluents for all modes of operation. It also includes other incidents related to high levels of radioactivity, but which may not result in a release to the environment. Potential sources of radionuclide releases are from the Primary Auxiliary Building (PAB), Vapor Containment (VC) and Fuel Storage Building (FSB). Appropriate monitoring is provided for potential gaseous and liquid release paths. The ICs within this category are keyed to Radiation Monitoring System (RMS) indications, radiological survey results and offsite dose assessment calculations.

The initiating conditions within this category are as follows:

UNUSUAL EVENT

1. Any release of gaseous or liquid radioactivity to the environment > 2 times the radiological effluent ODCM limits for ≥ 60 minutes.

2. Unplanned rise in plant radiation levels.

ALERT

1. Any release of gaseous or liquid radioactivity to the environment that exceeds significant multiples of the Offsite Dose Calculation Manual (ODCM) limits for 15 minutes or longer.

2. Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel

3. Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.

SITE AREA EMERGENCY

1. Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release.

GENERAL EMERGENCY

1. Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY H - Hazards

This category encompasses the spectrum of man-caused or non-naturally occurring hazards that jeopardize the level of safety of the plant in all modes of operation. The ICs are keyed to offsite notifications or personal observation and assessment.

This category also encompasses the spectrum of naturally occurring events that jeopardize the level of safety of the plant. The ICs are keyed to specific instrument indications, offsite notifications or personal observation and assessment.

This category also encompasses the spectrum of security infractions as addressed in the Security Contingency Plan. The ICs are keyed to notification from the security force or another credible source of a site specific credible threat.

This category is the location for the miscellaneous ICs that are provided to allow for Emergency Director judgment classifications.

The initiating conditions within this category are as follows:

UNUSUAL EVENT

1. Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant.
2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.
3. Fire within the Protected Area not extinguished within 15 minutes of detection or explosion within the Protected Area.
4. Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations.
5. Natural or destructive phenomena affecting the Protected Area.

ALERT

1. Hostile Action within the Owner Controlled Area or airborne attack threat.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY H - Hazards and Other Conditions Affecting Plant Safety (Cont'd)

2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

3. Control Room evacuation has been initiated.

4. Fire or Explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown.

5. Access to a vital area is prohibited due to release of toxic, corrosive, asphyxiant or flammable gases which jeopardizes operation of systems required to maintain safe operations or safely shutdown the reactor

6. Natural or destructive phenomena affecting Vital Areas.

SITE AREA EMERGENCY

1. Hostile Action within the Protected Area.

2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.

3. Control Room evacuation has been initiated and plant control cannot be established.

GENERAL EMERGENCY

1. Hostile Action resulting in loss of physical control of the facility.

2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY E – ISFSI Malfunction

This category addresses events of sufficient magnitude that a loaded spent fuel dry cask storage confinement boundary is damaged or violated.

UNUSUAL EVENT

1. Damage to a loaded cask confinement boundary.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY S – System Malfunction

This category encompasses the spectrum of events related to the reactor and its supporting systems that may occur in the power operations, startup, hot standby and hot shutdown operating modes. In general, the ICs relate to equipment or system malfunctions or failures. The ICs include RCS leakage, loss of Control Room instrument indications and failure of the Reactor Protection System as well as those events dealing with power losses. This category also includes inadvertent criticality and loss of decay heat removal capability ICs.

The initiating conditions within this category are as follows:

UNUSUAL EVENT

3. Loss of all offsite AC power to emergency buses for 15 minutes or longer.

4. Unplanned loss of safety system annunciation or indication in the control room for 15 minutes or longer.

5. RCS Leakage.

4. Loss of all onsite or offsite communications capabilities.

5. Fuel clad degradation.

6. Inadvertent criticality.

7. Inability to reach required shutdown within Technical Specification limits

ALERT

1. AC power capability to safeguards buses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in loss of all AC power to safeguard buses.

2. Automatic trip fails to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY S – System Malfunction (Continued)

3. Unplanned loss of safety system annunciation or indication in the control room with either (1) a significant transient in progress, or (2) compensatory indicators unavailable.

SITE AREA EMERGENCY

1. Loss of all offsite power and loss of all onsite AC power to safeguards buses for 15 minutes or longer.

2. Automatic trip fails to shut down the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor

3. Loss of all vital DC power for 15 minutes or longer.

4. Inability to monitor a significant transient in progress.

GENERAL EMERGENCY

1. Prolonged loss of all offsite and all onsite AC power to safeguards buses.

2. Automatic trip and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY F – Fission Product Barrier Degradation

This category addresses losses and potential losses of the three fission product barriers – fuel clad, RCS and containment. The category is designed for events in the power operations, startup, hot standby and hot shutdown modes of operation.

The initiating conditions within this category are as follows:

UNUSUAL EVENT

1. Any loss or any potential loss of Containment.

ALERT

1. Any loss or any potential loss of either Fuel Clad or RCS

SITE AREA EMERGENCY

1. Loss or potential loss of any two barriers.

GENERAL EMERGENCY

1. Loss of any two barriers and loss or potential loss of the third barrier.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY C – Cold Shutdown/Refueling System Malfunction

This category encompasses the spectrum of events related to the reactor and its supporting systems that may occur in the shutdown and refueling modes. These include RCS leakage and loss of reactor vessel inventory events as well as those events dealing with power losses.

This category also encompasses events that directly affect the integrity of the reactor core when in cold shutdown or refueling. This includes inadvertent criticality and loss of decay heat removal capability.

The initiating conditions within this category are as follows:

UNUSUAL EVENT

1. RCS leakage.

2. Unplanned loss of reactor vessel inventory.

3. Unplanned loss of decay heat removal capability with irradiated fuel in the reactor vessel.

4. AC power capability to safeguards buses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in loss of all AC power to safeguards buses

5. Loss of required DC power for 15 minutes or longer

6. Inadvertent criticality.

7. Loss of all onsite or offsite communications capabilities.

ALERT

1. Loss of reactor vessel inventory.

2. Inability to maintain plant in cold shutdown.

3. Loss of all offsite and all onsite AC power to safeguards buses for 15 minutes or longer.

TABLE D-1 (Continued)
SUMMARY OF IPEC EAL INITIATING CONDITIONS

CATEGORY C – Cold Shutdown/Refueling System Malfunction (Cont'd)

SITE AREA EMERGENCY

1. Loss of reactor vessel inventory affecting core decay heat removal capability.

GENERAL EMERGENCY

1. Loss of reactor vessel inventory affecting fuel clad integrity with Containment challenged.

Part 2: PLANNING STANDARDS AND CRITERIA

Section E: Notification Methods and Procedures

This section describes the notification of State and local response organizations and Indian Point Energy Center emergency response personnel. It outlines the content of initial and follow-up messages to response organizations within the Indian Point Energy Center (Units 1, 2 & 3) Plume Exposure Pathway Emergency Planning Zone (EPZ).

1. Response Organization Notification:

   Indian Point Energy Center, in cooperation with State and local authorities, has established mutually agreeable methods for notification of response organizations consistent with the emergency classification and action level scheme. Notification methods to offsite agencies include a means of verification or authentication such as the use of dedicated communications networks or providing call back verification phone numbers.

   Emergency events that involve both Units (2&3) (i.e., tornado or earthquake) and when the classification for each Unit is the same, shall be reported as affecting both Units.

   In situations when both Units are affected by emergency events, but the events are not related or the classification for each Unit is different, notification will be made for the highest classification. Clarification of the relationship between the classification levels determined for the Units should be provided in the periodic updates.

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

   a. Notification of Unusual Event

      1) A Notification of Unusual Event is declared by the Shift Manager (or Control Room Supervisor if the SM is unavailable) if any Unusual Event threshold listed in Section D (Table D-1) is met or exceeded.

      2) Depending on the particular circumstances of the situation, the Control Room Operator under the Shift Manager's direction alerts the affected Unit's personnel and non-affected Unit's Control Room personnel and gives instructions regarding the event, using the public address system, the telephone or by an alternate method. Distinctive sounding signals are used to announce fire alarms or site emergencies.

      3) Depending on the particular circumstance of the situation, the Shift Manager has the discretion to activate all or a portion of the ERO. During normal working hours, the necessary personnel are available in the plant and are contacted by Public Address System, an electronic notification system or alternate methods. During off-hours, individuals can be contacted at their homes by telephone or electronic notification system. ERO member telephone numbers are in the

Emergency Telephone Directory available in the Control Rooms and Emergency Response Facilities.

4) Immediate Notification (within 15 minutes) 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, and the West Point Military Police Desk using the Radiological Emergency Communications System (RECS) phone (primary method) or backup methods: Local Government Radio (LGR) or commercial phone lines. The New York State Warning Point relays the information to the New York State Department of Health.

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

6) Individuals from Corporate Headquarters are notified by phone or other electronic notification system.

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

b. <u>Alert</u>

1) An Alert is declared by the Shift Manager (or Control Room Supervisor if the SM is unavailable) in the event an Alert threshold listed in Section D (Table D-1) is met or exceeded. If the EOF is Operational, this function would be performed by the ED.

2) Notification of site personnel is accomplished by the Control Room Operators initiating the site assembly alarm and/or via public address announcements. In addition, the affected unit's Control Room Operators also contact the unaffected unit's Control Room personnel.

3) In the case of a fire, additional notification in the form of a distinctive siren is also provided. The Shift Manager or designee would request, by phone, outside assistance from local support services as necessary.

4) The Shift Manager initiates the activation of the Emergency Operations Facility, Technical Support Center, Operations Support Center and Joint Information Center. During normal working hours, the necessary personnel are available in the plant and are contacted by the Public Address System or electronic notification system. During off-hours, individuals can be contacted at their homes by telephone or electronic notification system. ERO member telephone numbers are in the Emergency Telephone Directory available in the Control Rooms and Emergency Response Facilities.

5) Immediate Notification (within 15 minutes) of an Alert is made by the Shift Manager or his designee to the New York State, Westchester, Rockland, Putnam, Orange County, and Peekskill Warning Points and West Point Military Police Desk using the Radiological Emergency Communications System (RECS) phone (primary method) or backup methods: Local Government Radio (LGR) or commercial phone lines. The New York State Warning Point relays the information to the New York State Department of Health.

6) Nuclear Regulatory Commission's Operations Center is notified using the Emergency Notification System (ENS) or commercial phone lines.

7) Individuals from Corporate Headquarters are notified by phone or other electronic notification system.

8) If there is a radiological release involved with the event, the Shift Manager/ED or his designee will provide information on the release to the offsite authorities.

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

c. <u>Site Area Emergency</u>

1) A Site Area Emergency is declared by the Shift Manager (or Control Room Supervisor if the SM is unavailable) in the event a Site Area Emergency threshold listed in Section D (Table D-1) is met or exceeded. If the EOF is Operational, this function would be performed by the ED.

2) Notification of site personnel is accomplished by the Control Room Operator initiating the site assembly alarm or use of the Public Address System. Accountability of personnel located within the Protected Area is performed. In addition, the affected unit's Control Room Operators also contact the unaffected unit's Control Room personnel.

3) The activation of emergency personnel to staff the Emergency Operations Facility, Technical Support Center, Operational Support Center and Joint Information Center is initiated by the Shift Manager. The minimum organization is described in Section B. During normal working hours, the necessary personnel are available in the plant and are contacted by the Public Address System, or electronic notification system. During off-hours, individuals can be contacted at their homes by telephone or electronic notification system. ERO member telephone numbers are in the Emergency Telephone Directory available in the Control Rooms and Emergency Response Facilities.

4) Individuals from Corporate Headquarters are notified by phone or other electronic notification system.

5) Immediate Notification (within 15 minutes) of a Site Area Emergency is made by the Shift Manager/ED or his designee to the New York State, Westchester, Rockland, Putnam and Orange County and Peekskill Warning Points, and the West Point Military Police Desk using the Radiological Emergency Communications System (RECS) phone (primary method) or backup methods: Local Government Radio (LGR) or commercial phone lines. The New York State

Warning Point relays the information to the New York State Department of Health.

6) Nuclear Regulatory Commission's Operations Center is notified using the Emergency Notification System (ENS) or commercial phone lines.

7) After arrival of ERO personnel, dedicated individuals would be assigned to provide plant status and meteorological and dose estimates for actual and projected releases.

8) If there is a radiological release involved with the event, the Shift Manager/ED or his designee shall provide information on the release to the offsite authorities.

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

d. General Emergency

1) A General Emergency is declared by the Shift Manager (or Control Room Supervisor if the SM is unavailable) in the event a General Emergency threshold listed in Section D (Table D-1) is met or exceeded. If the EOF is Operational, this function would be performed by the ED.

2) The activation of the emergency organization, the notification of offsite authorities, Station Personnel, Corporate Headquarters is the same as described in Section E.1.c for a Site Area Emergency – with the addition of a Protective Action Recommendation being given.

2. Notification and Mobilization of Emergency Response Personnel:

At the Unusual Event classification, select portions of the Indian Point ERO are notified and can be activated at the discretion of the Shift Manager.

At the Alert, Site Area Emergency, or General Emergency classification level, notification and activation of all onsite ERO positions and related facilities is required. Based on the event, the ED would de-activate some positions or call in additional personnel as required.

Onsite personnel are notified of the declaration, escalation or termination of an emergency. An announcement is made from the Control Room over the plant public address system. In addition to the public address system, electronic notification system or alternate methods are used to notify the ERO.

NOTE: NUREG-0654 Criterion II.B.5 states that the "licensee must be able to augment on-shift capabilities within a short period after declaration of an emergency". The time frames for rapid augmentation of a nuclear power plant staff in the event of an emergency are not rigid inviolate requirements but rather goals. It is Entergy's intent to expend its best efforts to meet the augmentation criteria goals regarding staffing Emergency Response Facilities with sufficiently skilled individuals capable of handling an emergency. Both the NRC and Entergy realize that due to diversity of normal residential patterns for the stations' staff, possible adverse weather conditions and road congestion, these time frames might be exceeded. These time frames may also be exceeded during a Security event.

ERO members who are away from the site when an event is declared are notified via an electronic notification system and/or phone calls. An automated notification system makes individual calls to members of the ERO. Once notified, ERO members respond to their assigned facilities immediately.

Mobilization of federal, state, and local response organizations is performed in accordance with their applicable emergency plan and procedures. At a minimum, mobilization of federal response organizations and activation of state and county EOCs is expected to occur at the declaration of an Alert.

The state and local authorities are responsible for the process of notification of their personnel and the general public.

3. Initial Notification:

An Initial Notification using Part I of the New York State Radiological Emergency Data Form shall be used to transmit information to appropriate State and local agencies within fifteen (15) minutes of any of the following:

- A classification is made;
- The classification changes;
- A change in radioactive release condition;
- A change in the downwind sector when a release is potential or occurring;
- A change is made in Protective Action Recommendations; and
- Additional information is available which may affect a change in the State or local protective action response.

The initial emergency message form includes information about:

a) authenticity, i.e. "This is NOT an Exercise (Drill)" or "This is an Exercise (Drill)";

b) identity of caller and receiver of call;

c) emergency classification;

d) emergency action level identification and whether a release is in progress;

e) wind direction, speed and stability class;

f) recommended protective measures if necessary;

g) the date and time of classification and notification.

In a General Emergency, the notification includes, at a minimum, a recommendation for sheltering or evacuation of the general public within the two (2) mile radius of Indian Point Energy Center and five (5) miles downwind, and implement the NY State KI plan. All remaining areas should monitor the Emergency Alert System (EAS).

4. Follow-up Messages:

The ED ensures communications are maintained with the offsite authorities through periodic follow-up messages. Follow-up message should be provided approximately every 30 minutes or on agreed upon intervals established with the offsite authorities. The follow-up messages include the following, as appropriate:

a. Location of incident, name and telephone number of caller;

b. Date and time of incident;

c. Class of Emergency. (Unusual Event, Alert, Site Area Emergency or General Emergency);

d. Type of actual or potential radiological release (airborne, waterborne, surface spill);

e. Whether or not [estimate of quantity of] radioactive material has been released or is being released;

f. Radiological release information, including estimates of the relative quantities and concentrations of noble gases, halogens, and particulates;

g. Meteorological conditions at appropriate levels (wind speed, direction to and from, stability);

h. Actual or projected dose rates at the site boundary, projected integrated dose at site boundary;

i. Projected dose rates and integrated dose at the Site Boundary and at 2, 5, and 10 miles;

j. Estimates of any surface contamination if applicable;

k. Recommended emergency actions, including protective measures;

l. Prognosis for worsening or improvement.

5. State and Local Information Dissemination:

State and local government organizations, in cooperation with Indian Point Energy Center personnel, have established a system for disseminating appropriate information to the public. The system includes notification through appropriate broadcast media, e.g. the Emergency Alert System (EAS).

6. Notification of the Public:

The State and local government organizations have the capability for providing an alert signal (sirens) to their population within fifteen (15) minutes following the decision to take a protective action.

The public Alert Notification System (ANS) is operated by local government agencies and maintained by Entergy. The design of the ANS includes backup power capability in accordance with NRC Order EA-05-190, dated January 31, 2006 (Section IV.II: A1 – A5 and B1 – B3). In cooperation with offsite agencies, Entergy personnel test the system periodically. System testing and preventive maintenance requirements include those specified in Section IV.II: A6 and C4 – C5 of the Order. Any system discrepancies are promptly repaired.

The public Alert Notification System (ANS) is composed of 172 sirens and the RECS phone for the US Military Academy. These are supplemented with individual alerting devices for residences and special facilities in EPZ areas where acoustic coverage is reduced.

The sirens are electronic. They are activated from each County EOC or Warning Point via simultaneous radio and TCP/IP signals. The county EOCs and Warning Points and IPEC have the same capability for siren activation.

The system design consists of 172 sirens with a distribution as follows:

- Westchester - 77
- Rockland - 56
- Orange - 23
- Putnam - 16

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

- Bi-weekly silent test – intended to check computer equipment, radio transmitter/repeater and siren receiver.
- Quarterly growl test – intended to test the siren sub-system from receiver antenna to siren (satisfies the requirement of the bi-weekly silent test).
- Annual activation test – intended to test the actuation and operation of the siren system (satisfies the requirements of the bi-weekly silent test) at full volume for a period of approximately 3 – 5 minutes.

Tone Alert Radios are distributed within the 10-mile EPZ to supplement siren alerting for residents and special facilities in EPZ areas where acoustic coverage is reduced or when requested. On an annual basis, guidance is provided on the use and testing of the tone alert radios.

Given that automated dialing is an accepted method that can be selected to provide primary alerting in accordance with FEMA-REP-10 guidance in consultation with New York State, Westchester, Rockland, Orange and Putnam Counties, the plan is to use "*automated dialing*" capability as the back-up method of alert and notification in the case of a siren failure.

7. Messages to the Public:

The State has developed draft messages for the Emergency Alert System (EAS) that are intended for the public. These draft messages are included as part of the State plan and contain instructions with regard to specific protective actions to be taken by occupants and visitors of affected areas.

Messages to the public are also provided via the Media. These messages are coordinated by licensee, Federal, State and local representatives at the Joint Information Center.

Part 2: PLANNING STANDARDS AND CRITERIA

Section F: Emergency Communications

This section describes the emergency communications equipment available to support the Indian Point Energy Center (IPEC) ERO. It outlines the available communications equipment to:

- Notify the Indian Point ERO
- Provide Initial Notification to governmental agencies;
- Communicate among the Indian Point Emergency Response Facilities and field teams;
- Communicate with the Nuclear Regulatory Commission (NRC) and other Federal, State, and local response agencies;
- Communicate with hospitals, ambulances, and other agencies providing offsite assistance to Indian Point Energy Center.

This section further outlines the program for insuring that the communications equipment is tested on a regular schedule, and that methods are in place to ensure rapid and reliable repair of any equipment found not operational.

1. Description of Primary 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, Operations Support Center personnel, Joint Information Center personnel, monitoring teams, security forces and Corporate Management.

Public Address Systems

The Public Address Systems are designed for paging within the Units (1, 2 and 3) from the Units' Control Rooms. 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. These systems are used to call personnel and announce emergencies in the Indian Point Energy Center Protected Area(s).

In the event the Public Address Systems are not operational, alternate methods of notification will be used.

Telephone Exchanges

Normal telephone communication service includes Private Branch (PBX), Commercial and/or Federal Telephone System (FTS) exchanges in the Control Rooms, Emergency Operations Facility (EOF), Technical Support Center (TSC), Operations Support Center (OSC), Joint Information Center (JIC), Incident Command Post (ICP), Corporate Headquarters, Alternate Emergency Operations Facility (AEOF) and Alternative Technical Support Center / Operational Support Center (Alternative TSC/OSC).

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 NRC. This system has extensions at the Control Rooms, Technical Support Center, Emergency Operations Facility and Alternate Emergency Operations Facility. Additional FTS2000 lines are available in the Emergency Operations Facility for NRC personnel responding to the Site.

Direct Line Phones

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

- The Radiological Emergency Communication System (RECS) with phones in the Control Rooms and the Emergency Operations Facility is the primary means for Indian Point Energy Center personnel to simultaneously notify the State and County Warning Points, Emergency Operations Centers, West Point and the City of Peekskill of an emergency. This system is staffed twenty-four hours per day in the Control Rooms, State, County, City of Peekskill and West Point Warning Points. IPEC Implementing Procedures and State and County Warning Point procedures detail the operation of this system and their respective organization responses.

Figure F-1.1 depicts RECS.

- Dedicated ringing phones connect the Technical Support Center/Operations Support Center with the Control Rooms and the Emergency Operations Facility/Alternate EOF.

- An Executive Hotline has been established between the EOF and the State and County Emergency Operations Centers that provides for a dedicated link between state and local officials and the ED once the EOF has taken command and control of Entergy's emergency response.

Radio Systems

A two-channel radio system is available for communication between the emergency facilities and individuals onsite. One channel is assigned for each unit to communicate with individuals performing tasks within the plant.

An additional radio channel is available for communications with the Field Monitoring Teams.

The Security Force connecting the Command Guard Houses with all guard posts uses a security radio system.

The Local Government Radio (LGR) is installed in the Control Rooms and Emergency Operations Facilities to be used as backup to the Radiological Emergency Communications System (RECS) phone. Figure F-1.2 depicts the LGR system.

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

Electronic Notification System

A commercial electronic notification service is used for contacting personnel at the start of an emergency. When activated by station personnel, the notification service transmits a message via various communications pathways to all ERO personnel to report to their assigned ERO facilities.

Computer Systems

The Emergency Response Data System (ERDS) is a computer link from Indian Point Energy Center to the NRC Operations Center that displays key plant data. ERDS will be available at an Alert or higher classification.

Other computer systems have been established to display plant data and meteorological data in the onsite and offsite Emergency Response Facilities.

Additional Communications:

Indian Point Emergency Response Facilities are equipped to communicate with state and county Emergency Operations Centers once the ERO are in place.

a. The Nuclear Regulatory Commission is Indian Point's primary point of contact for communications with the Federal ERO. (See Figure F-1.3 for types of communications systems used.)

b. The communications described in this section provide for adequate communications between Indian Point Emergency Response Facilities. Implementing Procedures provide guidance for the ERO to establish and maintain proper communications throughout an event at Indian Point Energy Center.

c. Section E.2 describes the provisions for alerting and activating the ERO.

d. Procedures are in place for the ERO to continuously provide information to the NRC as requested.

Medical Communications:

Indian Point Energy Center establishes communications with the primary medical supplier, New York-Presbyterian/Hudson Valley Hospital, Peekskill/Cortlandt, and if needed the backup hospital, Phelps Memorial Hospital Center, Sleepy Hollow, via commercial telephone that is accessed by station personnel either via commercial onsite telephone or by an Indian Point Energy Center telephone system. The Unit 2 Control Room, by calling 911, obtains direct ambulance dispatch. The Dispatcher provides for a coordinated communications link to the ambulances responding to Indian Point Energy Center or transporting personnel from the Station.

Communications Drills and Testing:

Communications drills between Indian Point Energy Center and State and local governments are conducted in accordance with criteria contained in Section N.2. Also, Indian Point Energy Center personnel conduct monthly and quarterly surveillances to determine the working condition and availability of critical communications equipment. This surveillance includes a check of the units' operability and general condition. Deficiencies are identified and reported for prompt corrective action.

Figure F-1.1 Radiological Emergency Communications System

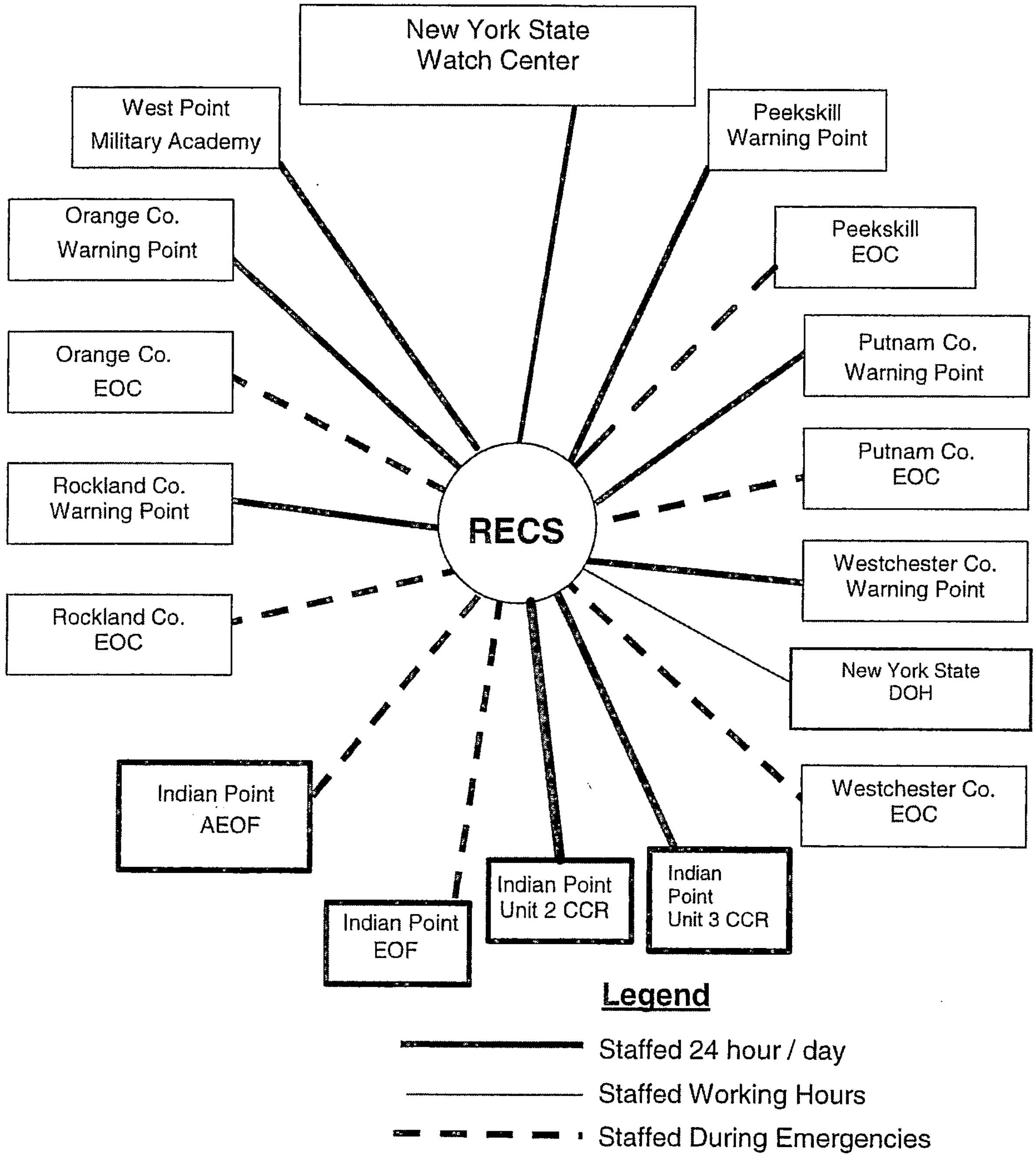
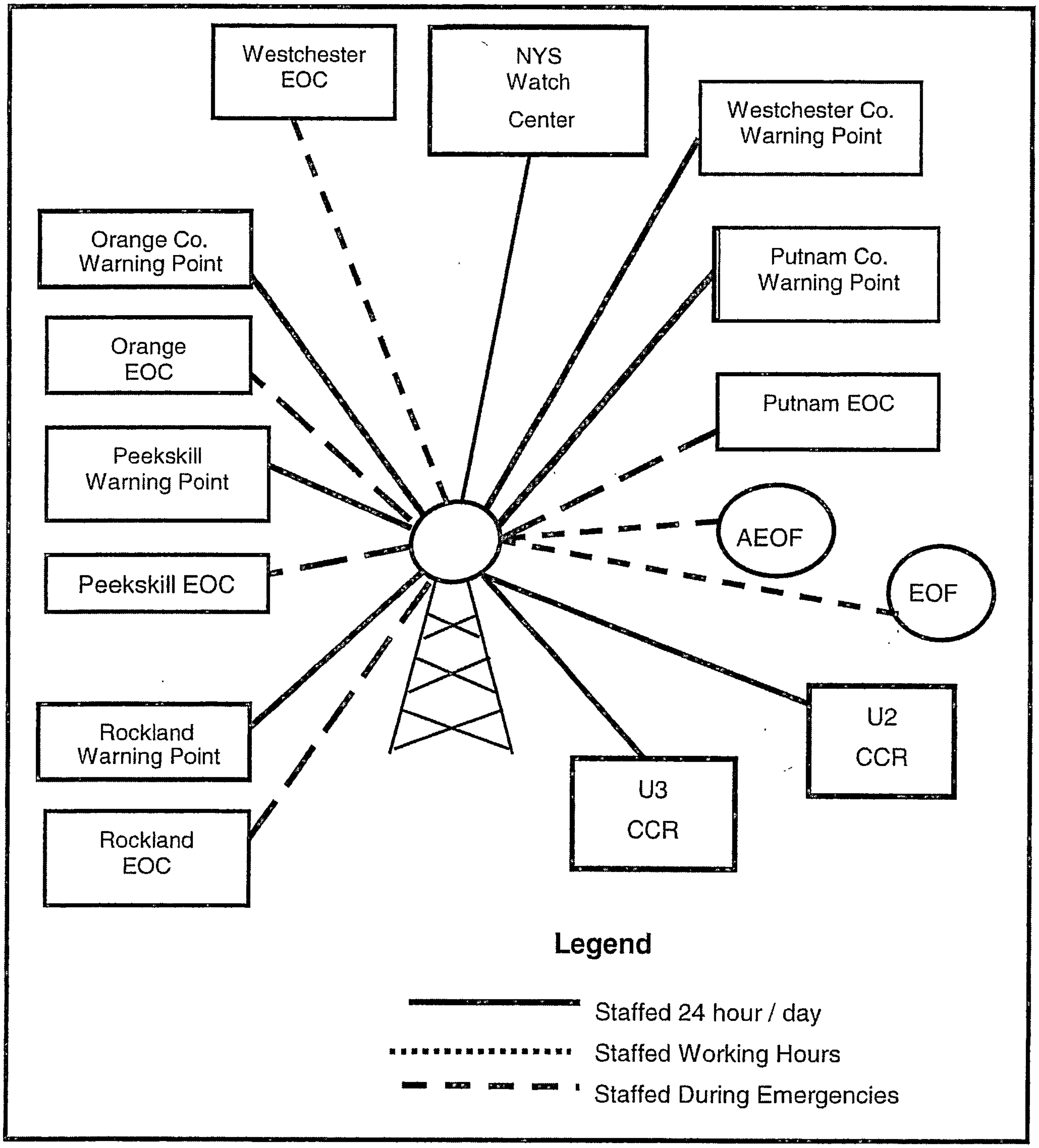
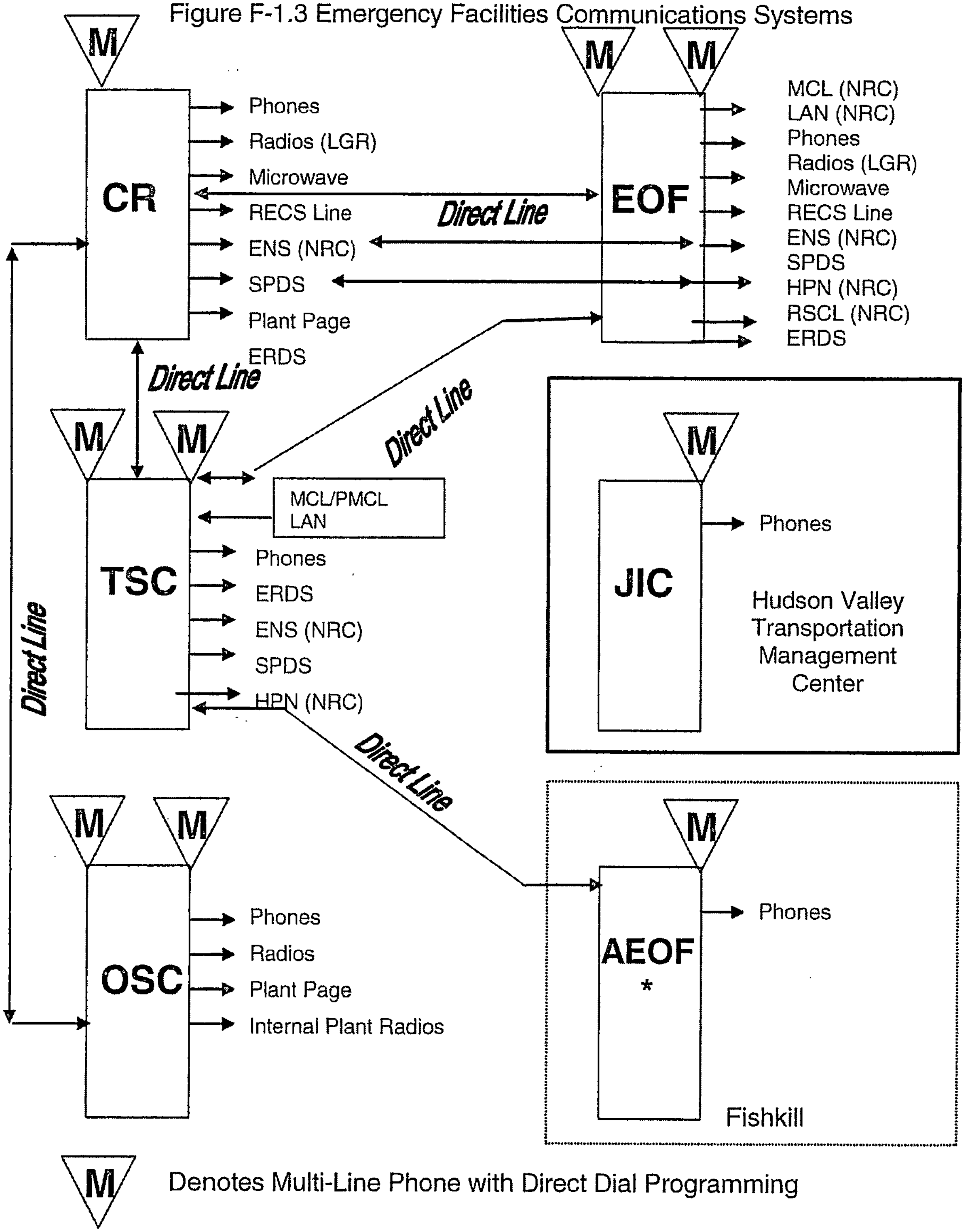


Figure F-1.2 Local Government Radio System



Indian Point Energy Center Emergency Plan
Typical Indian Point Communications Paths

Figure F-1.3 Emergency Facilities Communications Systems



* When the AEOF is activated in the Fishkill Office, it has similar communications capabilities as the EOF.

Part 2: PLANNING STANDARDS AND CRITERIA

Section G: Public Education and Information

This section describes the Indian Point Energy Center public education and information program. It outlines the methods for distributing public information materials on an annual basis and describes how the public is informed in the event of an emergency.

1. Public Information Publication:

   Entergy, New York State and the counties of Westchester, Orange, Rockland and Putnam, are responsible for the periodic dissemination of educational information to the public within the 10-mile Emergency Planning Zone (EPZ).

   County-specific emergency planning educational booklets are provided to the public. The booklets contain public safety information about emergencies at Indian Point Energy Center and what the public may be asked to do in an emergency. The booklets are mailed to each household and business within the 10-mile EPZ.

   Updated booklets will be distributed annually.

   The booklet contents include, but are not limited to:

   a. Educational information on radiation;

   b. The types of events which require public notifications;

   c. State and county contacts for additional information;

   d. Instructions for the members of the public with special needs;

   e. Definitions of protective measures, written descriptions of emergency bus routes, locations of reception centers, steps to follow when sheltering or evacuating;

2. Public Education Materials:

   Additionally, an advertisement containing specific information is prepared and inserted into telephone books. Siren information stickers/posters are distributed to provide information for the transient population.

   These materials instruct the public to tune their radios or television to an Emergency Alert System station when they hear the Alert Notification System (sirens). The materials identify the local radio and television stations which the public should tune into to receive emergency-related information.

   Distribution of materials, updated as necessary, will be conducted annually.

3. Joint Information Center

a. The Joint Information Center (JIC) is the official distribution point for the coordinated release of information from the four counties of Westchester, Rockland, Putnam and Orange, the State of New York, and Entergy's Indian Point Energy Center. The JIC is located outside the plume exposure emergency planning zone at the Hudson Valley Transportation Management Center, 200 Bradhurst Avenue in Hawthorne, NY.

The JIC's primary functions are to:

- Provide information to the media, through briefings or written statements on plant conditions and on emergency response actions being taken to protect the public.
- Ensure that the public receives credible, accurate and timely information, and to identify and correct rumors or misinformation through coordinated public inquiry functions, as well as via coordinated media referral and media monitoring response operations.
- Support further distribution of Emergency Alert System (EAS) emergency advisories to the public in the 10-mile Emergency Planning Zone (EPZ).

b. The JIC can accommodate federal, state and local government representatives as well as news media representatives. State and local government representatives can all access the JIC through virtual connections such as video or teleconference capabilities.

c. The JIC is equipped to support all activities including video conferencing computers, fax machines and copiers.

d. JIC procedures allow Entergy JIC staff to disseminate information to the media at the Unusual Event classification or prior to activation of the JIC at higher classifications.

4. Coordination of Public Information

a. The Entergy Company Spokesperson is the primary spokesperson for Entergy during an emergency. The Company Spokesperson has direct access to all necessary information.

b. The JIC is staffed by federal and state emergency management agencies and Entergy personnel to assure timely exchange and coordination of information. County emergency management representatives participate in the JIC and exchange and coordinate information through video, teleconferencing and web link. Representatives coordinate information prior to distributing news releases and prior to news briefings. Press releases are reviewed by appropriate law enforcement agencies during hostile action events.

c. Call Centers respond to public inquiries. Entergy, NYS, and each county respond to news media calls. It also monitors media reports through Internet websites. Rumors or misinformation are identified during an emergency by phone and media monitoring teams. Reports of misinformation or rumors are forwarded to the JIC staff for appropriate response.

5. Media Orientation

Entergy in cooperation with NYS 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.

NYS typically issues a media advisory annually informing the media of Licensee, State, and County Websites that provide information on Emergency Planning, Radiation, and Indian Point Energy Center.

Part 2: PLANNING STANDARDS AND CRITERIA

Section H: Emergency Facilities and Equipment

This section describes the emergency facilities and equipment used by the Indian Point Emergency Response Organizations. It outlines the facilities and equipment requirements that aid in the timely and accurate response by the Indian Point Emergency Response Organizations. It also describes the surveillance programs used to monitor and insure that these facilities and equipment are maintained in a high degree of constant readiness.

The emergency response activities of the Plan are distributed among the functions of the following Emergency Response Facilities (ERF):

- Control Rooms (Unit 2 & Unit 3)
- Technical Support Center (joint facility)
- Operations Support Center (joint facility)
- Emergency Operations Facility (joint facility)
- Alternate Emergency Operating Facility (joint facility)
- Joint Information Center (joint facility)
- Alternative Technical Support Center / Operations Support Center (joint facility)

Each facility has procedures, staff, accommodations, equipment, services and supplies for implementing its function.

1. In-Plant Emergency Response Facilities

   Control Rooms (CR)

   Each unit's control room contains the necessary instrumentation for operating the plant under normal and accident conditions. Control Room personnel make the initial declaration and classification of an emergency and perform activities of other Emergency Response Facilities until those facilities are 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 CR.

   Once the entire ERO is operational, if required, additional positions are assigned to the CR. These individuals assure plant parameter data is available to the TSC/OSC and provide other emergency communications as necessary.

   Overall management of the emergency response lies with the Shift Manager in the CR until it is accepted by either another qualified ED in the CR, (Plant Operations Manager) or the ED located in the EOF. Meteorological, plant parameter, offsite radiation monitor, and survey data are available for accident assessment, emergency classification and protective action recommendations. Telephone and radio services are available to alert and notify government authorities of emergencies and recommend protective action.

Technical Support Center (TSC)

The Indian Point Energy Center TSC is in the Unit 1 Superheater Building, 53' elevation across the hall from the Unit 2 CR.

In the event that the TSC becomes uninhabitable, Emergency Planning Implementing Procedures provide details on how to relocate TSC personnel.

The primary functions of the TSC include providing:

- Plant management and technical support to the reactor operating personnel in the Control Room (CR) and
- Information on plant events and conditions, including plant parameter data, to the ED in the EOF.

The TSC is operational with minimum staff within 60 minutes after a declaration of an Alert, SAE, or GE. Activation of the ERO at an NUE is discretionary. In declaring the facility operational the manager should consider that the staff is appropriate to the need, that equipment is set up and that the facility is available to assume/perform the emergency functions assigned to the TSC.

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, and NRC Conference/workspace. The Ventilation System assures that the General Design Criterion 19 (GDC) exposure limits of 5 Rem whole body and 30 Rem thyroid, during the first 30 days of a Design Basis Accident (DBA) can be met.

Operations Support Center (OSC):

The Indian Point Energy Center, OSC is located in the Unit 1 Superheater Building, 53' elevation adjacent to the TSC.

The OSC is where survey, operations and repair teams are dispatched into areas of the plant and is the staging area for individuals who may be assigned to first aid, search, rescue, survey, repair and corrective action teams.

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

- Ongoing accountability of anyone dispatched from the OSC. The Control Room Supervisor or the Security Shift Supervisor tracks individuals who are assigned to the Control Room Watch or the Security Force respectively;
- Radiological exposure control for the individuals within the OSC and TSC and teams dispatched to the field.
- Mobilizing of individuals on the emergency roster needed to fill the positions in the OSC and other support personnel such as materials and warehouse personnel.

The OSC is operational with minimum staff within 60 minutes after a declaration of an Alert, SAE or GE. Activation of the ERO at an NUE is discretionary. In declaring the facility operational the manager should consider that the staff is appropriate to the need, that the equipment is set up and that the facility is available to assume/perform the emergency functions assigned to the OSC.

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

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

Radiological exposure controls for the OSC include monitoring conditions and relocation if necessary.

In the event the OSC becomes uninhabitable, Plan Implementing Procedures provide details on how to relocate OSC personnel.

2. Emergency Operations Facilities:

The EOF is located at the Indian Point Energy Center, just inside the Main Facility Gate on Broadway. Functions performed at the EOF include:

- Overall management of the Indian Point Energy Center emergency response;
- Accident assessment including environment samples, surveys and dose calculations;
- Alert and notification of Federal, State and local government authorities of plant events, conditions, emergency action levels, emergency classifications and dose projections;
- Protective action recommendations to State and Local government authorities for the population around the EPZ;
- Coordination with Federal, New York State and local government;
- Radiological exposure control for the individuals on-site outside of the Protected Area.

The EOF is operational with minimum staff within 60 minutes of a declaration of an Alert, SAE or GE. Activation of the ERO at a NUE is discretionary. In declaring the facility operational, the manager should consider that the staff is appropriate to the need, that the equipment is set up and that the facility is available to assume/perform the emergency functions assigned to the EOF. Accommodations are available for Federal, State and local government representatives.

The ED 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. Telephone and radio services are available to alert and notify government authorities of emergencies and recommend protective action.

There are two levels in the EOF facility. The Emergency Control Center (ECC), Dose Assessment Area, NRC Room, Electrical Equipment Room and Communications Equipment Room are on the lower level and the State, County and Administrative Support areas are on the upper level.

Alternate Emergency Operating Facilities (AEOF)

There is an alternate location for the EOF outside the plume exposure Emergency Planning Zone (EPZ). AEOF and EOF functions are similar.

The Alternate Emergency Operations Facility is located on the 2nd floor of 60 Merritt Boulevard, Fishkill, NY. Procedures, staff, accommodations, equipment, services and supplies for the AEOF are similar to those for the EOF including the capability to perform offsite notifications.

Entergy Regional Offices

Entergy provides support from the Corporate Headquarters and other Entergy sites. This office provides a common point of communication and coordination for the ED and the Indian Point ERO with the resources available through other corporate organizations.

3. Joint Information Center (JIC)

The JIC is located outside the plume exposure emergency planning zone at the Hudson Valley Transportation Management Center, 200 Bradhurst Avenue, Hawthorne, NY and provides a place for;

- Point of contact between the Entergy corporate spokesperson and the news media; and
- 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 JIC has accommodations for Federal, State and Local government representatives as well as representatives of the news media.

The JIC Manager manages Entergy activities at the JIC. The JIC has equipment to support the activities including video conferencing, telephones, facsimile and photocopiers. The JIC will be operational with minimum staff within 2 hours after a declaration of an Alert, SAE or GE. In declaring the facility operational the manager should consider that the staff is appropriate to the need, that equipment is set up and that the facility is available to assume/perform the emergency functions assigned to the JIC.

4. Alternative TSC/OSC

The Alternative TSC/OSC has communication capabilities for contacting the Control Room, plant security, EOF, and the AEOF, is available to serve as a staging area for augmented emergency response staff if the site is under threat of or experiencing hostile action. The Alternative TSC/OSC also has the capability for engineering assessment activities.

5. Offsite Emergency Operations Centers (EOC)

State and Local Agencies have established Emergency Operations Centers to direct their emergency response. The offsite EOCs are located as follows:

Orange County	Orange County Emergency Services Center, Goshen, NY
Putnam County	Putnam County Training and Operations Center, Carmel, NY
Rockland County	Fire Training Center, Pomona, NY
Westchester County	Transportation Management Center, Hawthorne, NY
NY State	Public Safety Building State Campus Building #22, Albany, NY

6. Activation and Staffing of Emergency Response Facilities

Entergy has in place plans and procedures to ensure the timely activation of its emergency response facilities. Facilities are activated then declared operational when facility managers determine they can perform required functions based on minimum staff and emergency conditions. The full staffing of the emergency facilities is described in Section B of this plan. Timely mobilization and activation of the ERO is described in Section E.1.

If the site is under threat of or experiencing hostile action that would prevent emergency responders from reaching the site, EOF Staff would be sent to activate the Alternate EOF. TSC, OSC and CR Staffs will be notified to report to a designated alternate facility. TSC/OSC/CR staffs will provide any possible assistance from this offsite staging area until such time as site access is restored.

7. Emergency Onsite Monitoring Systems

In addition to the extensive normal plant systems which continually monitor plant systems, the following systems are used for emergency assessment:

a. Seismic Monitoring Equipment

The seismic monitoring equipment at the Indian Point Energy Center Site is located in the Unit 3 Containment Building. The Unit 3 Control Room Operator transmits information from this equipment to the Unit 2 Control Room. The monitoring system consists of three peak shock recorders in a tri-axial mount at EL-46'-0" on the base mat; two 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 peak recording accelerographs, 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 digital tape recorders also located in the Control Room. The accelerographs on the base mat are wired to an alarm panel in the Unit 3 Control Room which produces an audible and a visual signal at an earthquake acceleration greater than 0.01g. If necessary, the magnetic clips from the peak recording accelerographs must be retrieved from inside containment to be further evaluated.

b. Radiological Monitors

A Radiological Monitoring System, consisting of fixed process (air, liquid or gas) monitors and area radiation monitors, are installed throughout each Unit with remote readouts and alarm indications in the Control Rooms. Key fixed radiation-monitoring equipment is identified in the U2 and U3 FSAR's.

In-plant Iodine Instrumentation

Measurement and analysis of airborne iodine concentrations within the station can be performed 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.

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.

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

Portable Survey Instruments

Counting equipment and supplies are available in emergency lockers. Administrative procedures describe type, locations and the amount of equipment available to the ERO.

c. 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 Rooms.

Process instrumentation inside containment provides required operating and assessment information after a loss of coolant accident or a steam-line break. This instrumentation includes:

- Pressurizer pressure channels
- Pressurizer level channels
- High-head flow channels

- Accumulator pressure channels
- Recirculation spray flow channels
- Recirculation sump level channels
- Containment sump level channels
- Residual heat loop flow channels

d. 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)
- Core exit thermal couples

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. Cold and/or hot leg wide range temperatures that are higher than the saturation temperature indicate degradation of core cooling.

e. Fire Detection

Heat and smoke detectors are located throughout the plant with alarms annunciated in the Control Rooms. A detailed description of the fire detection equipment is in the Fire Protection Program documents.

8. <u>Offsite Emergency Data Acquisition</u>

a. Alternate sources for geophysical data

If meteorological data is unavailable from the station's tower, information can be obtained from the following sources:

- Several internet sites provide meteorological data and may be accessed from Emergency Response Facilities
- 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. These sources can also be used for flood and drought conditions for the Hudson River.

b. Government agencies and other technical data resources are available to the Indian Point Energy Center staff regarding seismic monitoring of the Indian Point Energy Center vicinity.

c. Backup radiological monitoring equipment and assistance can be obtained from other utilities through INPO or the Department of Energy's Brookhaven Area Office. Letters of agreement for these services are referenced in Appendix 2 of this plan.

d. Environmental sample preparation and counting are available through the use of an offsite laboratory. The offsite laboratory contract is available through the Indian Point Energy Center contracts department.

9. Facilities and Equipment for Offsite Monitoring

a. Survey Vehicles

Indian Point Energy Center has survey vehicles, equipped with two-way radios, GPS units and cell phones. Offsite Monitoring Kits used in these vehicles include air samplers, sample counters, portable survey meters (including low-level radioiodine detection equipment with a minimum sensitivity of 1×10^{-7} µCi/cc), and personnel dosimeters are available for offsite monitoring. A more detailed list of equipment is available in the Plan Implementing Procedures.

During an emergency, the survey vehicles are sent to pre-selected locations within the EPZ. Laboratory facilities for personnel whole body counting and for environmental sample preparation and counting exist at the site.

b. 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. The Indian Point Radiological Environmental Monitoring Program is described in the Offsite Dose Calculation Manual (ODCM).

Backup facilities for the environmental sample preparation and counting are available by a contract with an offsite laboratory.

c. 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 a computer system at the Indian Point Energy Center that allows access to this information through the Meteorological, Radiological and Plant Data Acquisition System (MRPDAS). The information from these systems is available at all IPEC facilities through the Entergy computer network. This information is also available to offsite Emergency Operation Centers via MRPDAS through a secure internet portal to the Entergy computer network. Data from these fixed field measurement sites may be used to verify the travel path of a radiological release and to estimate whole body exposure rates offsite.

10. Meteorological Monitoring

The meteorological system at the Indian Point Energy Center 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.

The meteorological system at Indian Point Energy Center consists of three meteorological towers. The 122 meter primary meteorological tower has instrumentation consisting of wind speed, wind direction and temperature at multiple levels. The vertical temperature gradient is then used to determine atmospheric stability. A backup diesel generator equipped with an automatic power transfer switch is available in the event that the normal AC feed is lost.

Backup towers are also available onsite. These towers provide a single 10-meter elevation for wind speed and wind direction instrumentation only. Determination of atmospheric stability is determined from the standard deviation of the horizontal wind fluctuation (sigma-theta) over a 15-minute period.

Real-time wind speed and wind direction data are continuously monitored and recorded as 15-minute averages, with the data available through the Entergy computer network (MRPDAS). 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 also be obtained from the National Weather Service stations and other offsite meteorological facilities identified in Section H.8.

Real-time atmospheric transport and diffusion calculations are made using a computer system and peripherals.

11. Facility and Equipment Readiness

Emergency facilities and equipment are inspected and inventoried in accordance with departmental administrative procedures. The inspection includes an operational check of instruments and equipment. Equipment, supplies and parts that have a shelf life are identified, checked and replaced as necessary. Sufficient reserves of instruments/equipment are maintained to replace those that are removed from emergency kits or lockers for calibration or repair.

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

Dedicated communications equipment between Federal, State and local government agencies within the plume exposure pathway EPZ are checked periodically in accordance with Section N.2.

The results of tests, inventories, and inspections are submitted to the Emergency Planning Manager or designee for review. The Emergency Planning Manager or a designee is responsible for the evaluation of these results and assignment of corrective actions for deficiencies identified, if any.

Emergency Preparedness staffs will be informed of select system inoperability determinations resulting from any tests, inventories or inspections conducted on the systems, as the availability of these systems can have significant impact on the Emergency Plan.

12. Identification of Emergency Equipment and Supplies

Table H.1, Typical Emergency Equipment lists equipment that is typically provided for emergency response. Emergency Preparedness administrative procedures provide for details of specific type, location, content and are used to inventory emergency supplies.

13. Collection and Analysis of Field Monitoring Data

The Indian Point Energy Center is equipped to collect Offsite Monitoring data and samples. Sampling and analysis equipment is available to determine the activity of samples taken outside the Protected Area. Instrumentation and equipment utilized for sample activity determination is routinely calibrated to ensure timely availability. Emergency response personnel are in place to analyze samples and data to make decisions on protective action recommendations. Samples can be packaged and shipped to offsite laboratories for further analysis.

Table H-1: Typical Emergency Equipment

Emergency equipment and supplies are stored at various locations throughout the site for immediate use by emergency forces. The following is a listing of the types of equipment and supplies stored at various locations.

Protective Equipment:	-	Anti-Contamination Clothing
	-	Respirators
	-	Self-Contained Breathing Apparatus
	-	Potassium Iodide (KI)
	-	Breathing Air Stations
Radiological Monitoring Equipment:	-	Air Samplers
	-	Ionization Chamber Survey Instruments
	-	G-M Friskers
	-	Iodine Counters
	-	Dosimetry
	-	Maps and Overlays
Communication Equipment:	-	Telephones and outside lines
	-	Various dedicated lines specific for the purpose of warning: RECS, ENS/HPN, Plant Alarms and Public Address System
	-	Various direct lines
	-	Radios IPEC onsite, offsite channels, and Local Government)
	-	Fax machines
	-	Log Books/EP-Forms
Emergency Supplies:	-	First Aid Kits
	-	Stretchers / Blankets
	-	Resuscitators
	-	Backboards / Splints
	-	Cervical collars

Part 2: PLANNING STANDARDS AND CRITERIA

Section I: Accident Assessment

To effectively coordinate and direct all facets of the response to an emergency situation at Indian Point Energy Center, diligent accident assessment efforts are required throughout the emergency. All four emergency classifications have similar assessment methods; however, each classification requires a greater magnitude of assessment effort dependent upon the plant symptoms and/or initiating event(s).

In the case of a Notification of Unusual Event, the assessment and coordination of efforts are handled through the Control Room, with additional support as identified by the Shift Manager. During Alert, Site Area and General Emergencies the Technical Support Center, Operations Support Center, Joint Information 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 Operations Support Center assists with in field inspections of plant equipment. The Emergency Operations Facility personnel continue the evaluation of offsite consequences started by the Shift Manager. The Joint Information Center provides interface with the public. The Emergency Operations Facility, when activated, maintains contact with the Control Room and contact with the offsite agencies, and then provides an overview of the assessment actions taken at various classifications levels as follows:

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.

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 Entergy's Engineering Departments in evaluating data; and make personnel 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. Radiation Protection personnel could be sent into the affected plant area to make observations and evaluate radiation levels.

Alert

For emergency situations that are classified as Alerts, the Shift Manager/ED 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 or Plant Operations Manager, acting as the ED at the start of the emergency, and the on call ED after taking over control at the Emergency Operations Facility, will continually direct assessment of the relative condition of the three fission product barriers and radiological conditions onsite and offsite.

During Alerts with radiological concerns, radiological assessment actions are initiated as described under the Site Area Emergency and General Emergency part of this section.

Site Area Emergency and General Emergency

For emergency situations that are classified as Site Area Emergencies or General Emergencies, the Shift Manager/ED 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 Dose Assessment Computer Programs or by using an Implementing Procedure which includes determining a source term, release rate, radioactive airborne concentrations in the environment and projected exposure 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, Air Ejector Monitor or the Main Steam Line Monitors. Should the plant vent monitors read off-scale or be inoperable, contact field measurements are taken 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 radioactive airborne concentrations in the environment are determined first by calculation and then by actual measurement. The calculations are done by computer or by hand, utilizing the Implementing Procedures:
    - 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 computer program or Implementing Procedure, corresponding to the current meteorological data.
    - 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.

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 ED. The area within a 10-mile EPZ is divided into 16 equal 22½° sectors. In each sector, Dosimetry of Legal Record (DLR) has been installed at strategic locations.

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

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

Radioactive contamination assessment is performed after a release is terminated. The ongoing Indian Point Radiological Environmental Monitoring Program described in the Offsite Dose Calculation Manual (ODCM) is utilized to determine the extent of contamination.

Radiological assessment personnel in accordance with an Implementing Procedure calculate total population dose. This calculation and others utilize established demographic information in combination with the DLR, bioassays, and projected dose distributions to obtain total population exposure within the 10-mile EPZ.

1. <u>Plant Parameters and Corresponding Emergency Classification</u>

   a. Plant system and effluent parameter values are utilized in the determination of accident severity and subsequent emergency classification. Environmental and meteorological events are also determining factors in emergency classification.

   b. An emergency condition can be the result of just one parameter or condition change, or the combination of several. The specific symptoms, parameter values or events for each level of emergency classification are detailed in the Implementing Procedures.

   c. In order to adequately assess the emergency condition, each emergency facility has the necessary equipment and instrumentation installed to make available essential plant information on a continuous basis. The types of instrumentation and equipment capabilities available for each emergency facility are described in Section H of the Plan.

2. Onsite Accident Assessment Capabilities

In addition to normal plant monitoring systems and procedures, the following systems are provided for accident assessment:

a. Sampling System

Plant design includes the capability to sample the reactor coolant system, the discharge of the recirculation and residual heat removal pumps, and the containment atmosphere.

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

b. Area Radiation & Process Radiation Monitors

Indian Point Energy Center has Area Radiation Monitors (ARM) for the direct measurement of inplant exposure rates and Process Radiation Monitors (PRM) for the measurement of noble gas and radioactive iodine concentrations in plant effluents. The ARM readings allow inplant exposure rate determinations to be made remotely without requiring local hand-held meter surveys. This information may be used, initially, to aid in the determination of plant area accessibility. The Process Radiation Monitors provide an immediate indication of a radiological release of effluents. The Process Radiation Monitor readings can be used as an input into the dose assessment computer programs that display the projected whole body and child thyroid exposures to the populace in the plume exposure pathway.

c. Containment Radiation Monitors and Hydrogen Monitor

Containment Radiation Monitors and/or Hydrogen Monitors along with Core Exit Thermocouples may provide an early indication of core damage. These monitor readings are utilized as a method for core damage determination. This is accomplished through use of established procedures based on Pressurized Water Reactor Owners Group guidance. The core damage estimate obtained from the procedures may also be used to confirm the core damage results obtained through isotopic analysis. These monitors also allow for the evaluation of a potential radiological release.

3. Release Source Term Determination

a. The potential for release of radioactive material and the magnitude of the release can be assessed through use of the Containment Radiation Monitors and Process Monitors. The Containment Monitoring System readings can be used to estimate the percentage of core damage and establish the total number of curies available for release.

b. If a liquid or gaseous release occurs, the routine or high range process monitors will indicate the release rate. If the release is from an unmonitored point, technicians will take grab samples to be analyzed.

Radiation monitors are located as described in the U2 & U3 FSARs. The readings obtained from these monitors are converted to actual release rates through the use of computer programs.

4. Effluent Monitor Data and Dose Assessment:

The correlation between effluent monitor data and onsite and offsite exposure rates is accomplished through use of the dose assessment computer codes. These programs allow for the direct input of effluent monitor and meteorological data. The computer will generate release rates, projected dose rates and doses to the whole body and thyroid as well as downwind noble gas and particulate concentrations via the plume exposure pathway. The computer software also has the capability of performing multiple accident dose assessment involving simultaneous releases from one or both of the Indian Point Energy Center units. Dose projections may also be performed without the use of a computer through a series of hand calculations. Indian Point Energy Center uses ground releases to conduct dose assessment.

Entergy has procured and installed computer based systems, which are capable of:

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

b. 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;

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

d. Providing simultaneous real-time meteorological data for estimation of transport and diffusion estimates of a release in the vicinity of the site. This information is available to the licensee, offsite emergency response organizations and the NRC Staff, via telephone computer access;

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

5. Meteorological Information:

Meteorological data is available from the station meteorological tower. The data available includes wind speed, wind direction, stability class (Pasquill). This data is utilized by the licensee, locals, State and other Federal Agencies to provide near real-time predictions of the atmospheric effluent transport and diffusion. Section H.10 provides more details on the Meteorological Monitoring System.

6. Unmonitored Release:

During an actual release via an unmonitored flow path or in situations in which effluent monitors are either off scale or inoperative, dose projections can be made through the use of actual sample data and/or field monitor team readings.

7. Offsite Monitoring:

In the event of an airborne or liquid release, the station maintains the resources and capabilities to take air, soil, water, and vegetation samples as well as to directly measure gamma dose rates. Samples are taken at locations specified by the Radiological Assessment Coordinator. Environmental measurements are utilized as an aid in the determination of protective and recovery actions for the general public.

A Reuter Stokes Radiation Monitoring System consisting of a network of monitors is installed in each of the 16 sectors around the Indian Point Energy Center Site at a distance of 0.5 to 2.5 miles. These devices will continuously telemeter, via radio, radiation level readings to a computer system, which can be accessed in the EOF, AEOF, IPEC Central Control Rooms and local and State EOCs.

Dosimetry of Legal Record (DLR) - DLR's are deployed in three (3) rings at approximately 2, 5 and 10 miles from the site. DLR's are sensitive to Gamma radiation and are gathered and read periodically. There are approximately 57 DLR's distributed within the 10 mile Emergency Planning Zone for Indian Point Energy Center.

Air Samplers are deployed at a number of the sampling sites. They are constantly in operation and pass ambient air through a series of filters that are capable of trapping radioactive iodine and other radioisotopes in the air. The filters are periodically removed by Entergy personnel and sent to be analyzed.

8. Offsite Monitoring Teams:

Offsite Monitoring Teams are available at an Alert or higher classification to make rapid assessments of the actual or potential magnitude and location of any radiological hazards from the liquid or gaseous release pathways. These teams are composed of two individuals qualified to perform radiological monitoring.

Monitoring teams establish and maintain direct radio or phone communications with the Emergency Operations Facility (EOF). An Offsite Team Coordinator in the EOF controls the teams. The teams locate and monitor the radioactive plume while taking air samples as directed.

Offsite teams utilize portable equipment during an emergency to gather data from any of the sixty-one predesignated emergency sampling locations around the Indian Point Energy Center Site. Large-scale maps showing the locations are in the Control Room and Emergency Operations Facility (EOF) or AEOF, for use by the ED. Readings taken by these teams are relayed back to the site via radio or phone communications.

Monitoring Team Kits containing necessities including the following radiological equipment are 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 activated charcoal or silver zeolite filter. The filters remove and absorb radioisotopes from the air.

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

d. Equipment for personnel protection such as gloves for use in radiation environments.

e. Support equipment and supplies.

Survey data from monitoring teams is used to define affected areas, verify or modify dose projections and protective action recommendations, and assess the extent and significance of a release.

9. Iodine Monitoring:

Offsite Monitoring Teams collect air samples while in the plume exposure pathway. The teams carry procedures and equipment for sampling and measuring radioiodine concentrations in air as low as 1.0E-7 micro curies per cubic centimeter in the presence of noble gases.

10. Dose Estimates:

Specific Implementing Procedures exist for the correlation of air activity levels to dose rate for key isotopes. Provisions have been established for estimating integrated dose from the projected and actual dose rates and for the comparison of these estimates with the protective action guides.

11. State Monitoring Capabilities:

The State of New York has the ability to dispatch its own offsite monitoring teams to conduct ingestion pathway monitoring. The state also has the ability and resources to coordinate with Federal and licensee monitoring teams to compare sample results.

Part 2: PLANNING STANDARDS AND CRITERIA

Section J: Protective Response

Protective response consists of emergency actions taken during or after an emergency situation, which are intended to minimize or eliminate hazards to the health and safety of the public and/or Station personnel. A range of protective actions has been developed for emergency workers and the general public in the plume exposure pathway Emergency Planning Zone (EPZ). Additionally, guidelines have been established to aid in choosing protective actions during an emergency that are consistent with federal guidance. Entergy is responsible for onsite protective actions, while the responsibility for offsite protective actions rests with the State of New York, local authorities and other offsite response agencies.

1. Notification of Onsite Personnel:

   a. For all emergency classifications, all station personnel, contractors, visitors and Owner Controlled Area (OCA) badged personnel are notified of an emergency by the public address system, distinct audio signals (air raid alert, fire, site assembly or containment evacuation alarms) and/or alternate methods. Announcements include the emergency classification and response actions to be taken by site personnel.

      The Public Address System(s) are designed for paging persons within the site Protected Area from the Control Rooms. Personnel have the ability to talk to the Control Rooms 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.

   b. Visitors within the Protected Area are escorted at all times by badged personnel who will ensure that the visitor takes the proper actions for the event.

   c. Contract personnel who have un-escorted access to the Protected Area must complete Plant Access Training that includes instructions for actions to be taken during an emergency.

   d. Accountability of persons within the Site Boundary but outside the Protected Area is not required. However, the Security Force will ensure that individuals in the Owner Controlled Area (including individuals with OCA badges) are notified as necessary of any emergency and the response actions to be taken.

2. Evacuation Locations:

   Assembly areas and evacuation routes are specified in the Emergency Planning Implementing Procedures. Depending on meteorological conditions, the Shift Manager/ED decides whether to release plant personnel and the appropriate evacuation routes. Inclement weather, high traffic density and specific radiological conditions and other hazards are considered in making this decision. The release of personnel is under the direction of the Shift Manager/ED. Personnel are released to go home or continue from the site to assembly areas using their own cars when practical or other transportation provided by Indian Point Energy Center.

3. Radiological Monitoring:

   Radiological monitoring of personnel, their possessions and their automobiles would be performed by Radiation Protection or trained monitoring personnel using instrumentation that is normally available or specifically assigned for this purpose. Personnel may be evacuated/released as part of the general public to offsite relocation centers designated by offsite authorities.

4. Assembly & Evacuation:

   Relocation outside the Protected Area and/or evacuation is the primary protective action anticipated for onsite personnel not having emergency response assignments. Non-essential personnel (personnel not assigned emergency response functions, contractors and visitors) are directed to assemble at pre-designated assembly areas at the Alert or higher classification. The primary assembly area is the Indian Point Energy Center Generation Support Building (GSB) and the Energy Education Center (EEC). The Indian Point Energy Center Training Center serves as the back-up assembly area and may be used during periods of high volume, such as an outage. Personnel assigned emergency response functions respond to their assigned emergency facilities.

   Assembly areas and evacuation routes are described in the Implementing Procedures. Assembly areas are located to assure that personnel are not in the path of the plume. Each assembly area has a telephone. The assembly areas (GSB and IPEC Training Building) are within the range of the plant paging system.

   Evacuation / release of non-essential Indian Point Energy Center personnel is initiated upon declaration of either a Site Area Emergency or General Emergency. The ED may release personnel at a lower classification.

5. Accountability:

   At the declaration of an Alert, all non-essential personnel are relocated from within the Protected Area. At a Site Area Emergency or General Emergency all individuals within the Protected Area are accounted for and the names of missing individuals are identified within 30 minutes of a declared emergency. Once established, accountability within the Protected Area is maintained throughout the course of the event, unless conditions allow suspension in the later stages of the event. Should missing personnel be identified, search and rescue operations are initiated. Accountability is coordinated between the OSC Manager and Security. The results are forwarded to the Emergency Plant Manager and/or ED.

   Accountability could be suspended if movement of personnel would place them in more danger than leaving them in place, such as outside weather conditions or security events.

   Personnel who are assembled outside the protected area are given further instructions. These instructions may include sheltering in place, evacuation or, individuals may be requested to assist the ERO in accident mitigation.

   If site evacuation is called for, Security will sweep all onsite areas outside the Protected Area and verify all personnel have evacuated or been released.

6. <u>Provisions for Onsite Personnel:</u>

The station maintains an inventory of respiratory protection equipment, anti-contamination clothing, and a supply of KI that is made available to emergency workers remaining onsite should conditions warrant.

a. Self-contained breathing apparatus (SCBAs) and full-face respirators are used as the primary method of respiratory protection in an emergency. Emergency response personnel use SCBAs in any environment involving exposure to high-level gaseous activity or oxygen deficient atmosphere, or where air quality is in doubt. In the presence of airborne particulates, emergency response personnel may be directed by Radiation Protection personnel to use full-face filter type respirators.

b. Anti-contamination clothing, located in the Operations Support Center (OSC) lockers, is available for use by onsite personnel entering areas of plant with known or unknown contamination.

c. The use of thyroid-blocking Potassium Iodide (KI) may be recommended at 5 Rem CDE child thyroid or when a General Emergency condition initiates the recommendation to State and Counties to implement KI Program. This is a lower value than specified by EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents". A supply of KI is maintained in the Emergency Response Facilities. Procedures are in place for the use of these agents by emergency response personnel. Administration of KI may be authorized only by the ED or by the Emergency Plant Manager.

d. Precautions shall be taken to prevent the contamination of drinking water and food supplies by using bottled water and packaged foods.

e. A range of protective actions to protect onsite personnel during hostile action is provided to ensure the continued ability to safely shut down the reactor and perform the functions of the emergency plan.

7. Protective Action Recommendations for the General Public:

Plant conditions, projected whole body gamma and thyroid doses, and/or field monitoring data are evaluated to develop protective action recommendations for the purpose of preventing or minimizing exposure to the general public. Protective action recommendations for the plume exposure pathway are based on the Environmental Protection Agency (EPA) Protective Action Guides (PAGs) discussed in EPA-400-R-92-001 - "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" and NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Guidance for Protective Action Strategies".

Protective action recommendations are made directly to the State and local agencies that are responsible for implementing protective actions for the general public within the plume exposure EPZ. The ED makes protective action recommendations.

Recommendations issued by Indian Point Energy Center at a General Emergency based on plant conditions include as a minimum, evacuation in the two (2) mile radius and five (5) miles downwind and advising the remainder of the EPZ population to monitor EAS messages for further direction. The Indian Point Entergy Center's rationale and methodology for plant-based and dose-based protective action recommendations has been coordinated with local and state response organizations as required by NUREG-0654, Supplement 3.

8. Evacuation Time Estimates:

An independent evacuation time study has been performed to provide estimates, of the time required to evacuate commercial, resident and transient populations (see Appendix 5).

9. Protective Measure Implementation:

State and local agencies are responsible for implementing offsite protective actions. These actions are included in the State and County Emergency Plans. Entergy is responsible for recommending offsite protective actions to the offsite authorities.

10. Factors Affecting Protective Measure Implementation

The State, and County emergency plans used to implement the protective measures for the plume exposure pathway take numerous factors into consideration. Among these considerations are:

a. Most of the evacuating population will travel in their own vehicles, leaving the EPZ via designated evacuation routes. Maps showing the evacuation routes, evacuation Protective Action Areas, reception centers in host areas, and congregate care centers have been developed as part of the state and local plans. Pre-selected sampling and monitoring points have also been identified.

b. The population distribution around Indian Point Energy Center is presented in the Evacuation Time Estimate.

c. Section E of this Plan describes how offsite agencies are notified in the event the Plan is activated. State and local agencies have the capability to notify all members of the transient and resident population within the plume exposure EPZ.

d. State and local organizations have the capability to protect those persons where mobility may be impaired due to such factors as institutional or other confinement. At the time of an emergency, transportation requirement of special needs persons (including mobility impaired) is verified. Mobility impaired will be notified of a protective action via the Emergency Alert System (EAS).

e. An adequate supply of potassium iodide (KI) is available for distribution by state and local organizations to special facility staff and patients/residents where immediate evacuation would be life threatening. Authority for use of radioprotective drugs rests with the NY Health Department.

f. State and local organization plans include the method by which decisions are made for administering radioprotective drugs to emergency workers. The distribution of radioprotective drugs to the general public has been authorized by the State. Each individual County's Emergency Plan addresses pre and post distribution of radioprotective drugs.

g. State and local organizations have the capability of providing a means of relocation for the general population. Most of the evacuating population will travel in their own vehicles, driving out of the EPZ using designated evacuation routes. Transportation dependent persons will be instructed through the Emergency Alert System (EAS) to go to a pickup point or bus route for transportation to a reception center.

h. State and local organizations are capable of providing reception centers in host areas that are beyond the boundaries of the plume exposure pathway emergency-planning zone.

i. Projected traffic capacities have been determined for evacuation routes under emergency conditions. Section 4 of the Evacuation Time Estimate provides discussion regarding capacity.

j. Federal, State and local organizations have the responsibility for the control of access to evacuated areas. Personnel from New York State Police and local police departments' staff access control points. The New York Highway Department and local public works departments provide necessary equipment to support access control. The U. S. Coast guard would assist in patrolling the Hudson River areas.

k. Potential impediments to the use of evacuation routes and contingency measures for such impediments have been identified in local emergency plans.

l. Time estimates for evacuation of various groupings of Protective Action Areas have been performed, under various conditions for the plume exposure pathway emergency-planning zone.

m. The basis for dose driven protective action decisions by offsite authorities would include several of the above factors as well as the following considerations:

   - If projected doses exceed minimum EPA PAGs and timely evacuation is feasible, then evacuation is recommended. If timely evacuation is not feasible, (i.e. time required for mobilization, warning and evacuation transit is greater than time before plume arrival), then State authorities may direct sheltering in place.

- Additionally, if the sheltering dose exceeds the PAG but is less than the projected evacuation dose, then sheltering is considered. A shielding factor of 0.9 is conservatively assumed in the calculation of the sheltering dose. This factor (from SANDIA 77-1725) represents the shielding afforded by a wood frame house. The decision to shelter is the responsibility of the offsite authorities.

11. <u>Ingestion Pathway Protective Measures:</u>

The responsibility for specifying protective measures to be used for the ingestion pathway rests with the States of New York, Pennsylvania, Connecticut and New Jersey. These measures include the methods for protecting the public from consumption of contaminated water and foodstuffs.

12. <u>Monitoring of Evacuees:</u>

The State and local organizations have the capability to register and monitor evacuees at reception centers at host communities. This capability includes personnel and equipment capable of monitoring residents and transients evacuating from the plume exposure EPZ and arriving at the reception centers, in accordance with FEMA guidelines.

Part 2: PLANNING STANDARDS AND CRITERIA

Section K: Radiological Exposure Control

This section of the Plan describes the means for controlling emergency worker radiological exposures during an emergency, as well as the measures that are used by Entergy to provide necessary assistance to persons injured or exposed to radiation and/or radioactive materials. Exposure guidelines in this section are consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides, EPA 400-R-92-001.

The general guideline for emergency personnel exposure will be to keep it as low as reasonably achievable.

1. Emergency Exposure Guidelines:

   Radiation exposure in an emergency is controlled taking every reasonable effort to minimize exposure. However, circumstances may warrant exposure in excess of 10CFR20 limits. Saving a life, measures to circumvent substantial exposures to the general public, or the prevention of damage to critical equipment may be sufficient cause for above normal exposures. The following are the exposure guidelines for emergency activities:

Dose Limit (Rem TEDE)	Activity	Condition
0-5*	All	Personnel may be kept within normal 10 CFR 20 occupational limits during declared emergencies or an emergency exposure up to 5 Rem TEDE may be authorized for members of the ERO.
5 - 10	Protecting critical infrastructure necessary for public welfare	Lower dose not practicable. Must be authorized on individual bases.
10 - 25	Lifesaving or protection of large populations	Lower dose not practicable. Must be authorized on individual bases.
> 25	Lifesaving or protection of large populations	Only on a voluntary basis to persons fully aware of the risks involved. Must be authorized on individual bases.
* Limit dose to the lens of the eye and dose to any other organ (including skin and body extremities) to 10CFR20.1201 limits unless higher doses are evaluated and authorized on individual bases.		

Any emergency response action requiring greater exposure than 25 Rem should be limited to only volunteers. Individuals over forty-five years of age are considered first. Females who declare pregnancy are restricted to 10CFR20.1208 limits.

2. <u>Emergency Radiological Control Program:</u>

The Radiological Assessment Coordinator (EOF) and the Rad/Chem Coordinator (OSC) ensure that proper personnel radiological monitoring equipment is provided for all personnel during emergency conditions, that exposure accountability is maintained, and that personnel are not allowed to enter known or potential high radiation areas unless their exposure has been properly evaluated. Plan Implementing Procedures detail the emergency radiological controls utilized during emergencies. Radiation protection guidelines during emergencies include the following:

- Persons undertaking any emergency operation in which the dose will exceed 25 Rem TEDE should do so only on a voluntary basis and with full awareness of the risks involved including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.
- In the context of the emergency limits, exposure of workers that is incurred for the protection of critical infrastructure, lifesaving or protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.
- Exposure accountability is maintained and proper personnel radiological monitoring equipment is provided for all personnel during emergency conditions.
- Access to high radiation areas is only permitted with prior approval of the applicable Radiation Assessment Coordinator (EOF) or Rad/Chem Coordinator (OSC), and personnel are not allowed to enter known or potential high radiation areas unless their exposure has been properly evaluated.
- Periodic habitability surveys of emergency facilities are performed during an emergency. If the facility is determined to be uninhabitable, the facility is evacuated in order to prevent or minimize exposure to radiation and radioactive materials. Alternate assembly areas are established, as necessary, to relocate and monitor evacuated personnel.

Potassium Iodide (KI) shall be used in accordance with New York State Policy for issuance of KI. If the risk of using KI outweighs the benefit, KI may not be issued. KI is stored in onsite Emergency Response Facilities.

3. Personnel Monitoring

   a. If abnormal radiological conditions exist outside the Radiologically Control Area (RCA), exposure to emergency response personnel not issued Dosimetry of Legal Record (DLR) badges will be tracked by use of surveys and time spent in radiation areas.

   b. Workers who would be expected to enter the RCA are trained and issued DLR badges. In addition to these badges, dosimetry devices will be issued, high range or electronic dosimeters and/or alarming self-indicating dosimetry, are used to monitor emergency workers exposure during an accident. The capability exists for the emergency processing of DLRs on a 24-hour per day basis, if necessary. Emergency workers are instructed to read self-indicating dosimeters frequently, and DLRs may be processed with increased periodicity.

   c. Emergency worker dose records are maintained in accordance with one or more Plan Implementing Procedures and Radiation Protection Procedures.

4. Non-Entergy Personnel Exposure Authorization:

   The responsibility for authorizing non-Entergy emergency workers (i.e. State and local agency emergency workers such as Fire Department, Police or Medical teams sent to the site) to receive exposures in excess of the EPA Emergency Worker Protective Action Guides rests with the respective State and local organizations.

5. Decontamination and First Aid

   a. Normal contamination control limits apply in emergency conditions. However, these limits may be modified by Rad/Chem Coordinator or the Radiological Assessment Coordinator should conditions warrant.

   b. Decontamination materials and portable first-aid kits are stored within the Protected Area and at the EOF / Warehouse Complex. A personnel injury onsite involving possible radioactive contamination is initially treated by an on-shift first responder or EMT if available. Prompt attention is given to life endangering injuries such as extensive burns, serious wounds or fractures, in preference to decontamination. If the injury permits, all reasonable effort is made to decontaminate the individual prior to movement. If decontamination is impractical, the patient is covered in such a manner as to minimize the spread of contamination until medical aid can be obtained or the patient can be hospitalized.

The Verplanck Fire Department ambulance is the primary provider of prompt transportation of persons requiring medical attention from the station to area hospitals. This service is available on a 24-hour per day basis. For accidents involving contamination, if a Radiation Protection Technician (RP) is available, then one will be assigned to accompany the patient to the hospital to assist and advise ambulance and hospital personnel.

Patients requiring Emergency Room care, laboratory work, X-rays or lifesaving procedures are transported to the New York-Presbyterian/Hudson Valley Hospital (primary), to Phelps Memorial Hospital Center (backup) or another equipped medical facility. Hospital personnel have been trained and hospitals are equipped to handle radiologically contaminated or radiation injured individuals. Medical personnel may recommend transportation to other medical facilities equipped for long term or intensive care for radiation injuries. Radiation Protection personnel are available to assist medical personnel with decontamination, radiation exposure and contamination control.

6. Contamination Control Measures

   a. Areas in the plant found to be contaminated are isolated as restricted areas with appropriate radiological protection and access control as directed by the Rad/Chem Coordinator.

   b. In order to preclude the spread of contamination from restricted areas, all personnel and equipment are monitored for radioactive contamination prior to exiting the restricted areas. Contaminated personnel are decontaminated. Eating, drinking and smoking are prohibited in all Emergency Response facilities until such time as habitability surveys indicate that such activities are permissible.

   c. Restricted areas will be returned to normal use when contamination levels have been returned to acceptable levels.

7. Decontamination of Relocated Personnel:

   Non-essential onsite personnel are released from the Protected Area during an emergency, if radiological concerns occur. Radiation Protection personnel and/or portal monitors are used to monitor personnel released from the Protected Area and decontamination is performed, as needed. Existing and temporary facilities to limit contamination and exposure will be utilized and established at the site as necessary during an emergency situation. In the event that decontamination of onsite personnel locally is not possible, personnel will be sent to a county emergency worker personnel monitoring center for monitoring and decontamination. Provisions for extra clothing, as well as suitable decontaminates are available.

Part 2: PLANNING STANDARDS AND CRITERIA

Section L: Medical and Public Health Support

This section describes the Indian Point Energy Center's arrangements for medical services including contaminated injured individuals sent from the Station.

1. Hospital Services:

   The New York-Presbyterian/Hudson Valley Hospital in Cortlandt Manor has agreed to accept patients from the Indian Point Energy Center 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. A written agreement is referenced in Appendix 2.

   The Phelps Memorial Hospital Center, Sleepy Hollow, New York has agreed to serve as the backup hospital. A written agreement is referenced in Appendix 2.

   Station procedures contain directions that cover the request for medical assistance and the handling of patients. In the event that a patient should receive a massive radiation exposure, then Radiation Emergency Assistance Center/Training Site (REAC/TS), available 24 hrs/day, would be contacted for guidance. A written agreement is referenced in Appendix 2.

2. Onsite First Aid Capability:

   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.

   First Aid and Decontamination facilities for both units are located just beyond the Radiation Protection Control Points. These facilities consist of a stainless steel interior with decontamination table, showers and sinks draining into holdup tanks. These facilities contain general first aid equipment and medical supplies for treatment of injuries.

   A medical facility is located at the Indian Point Energy Center Training Center. General first aid equipment including bandages and dressings, splints, etc., is available as well as an examination area.

   First Aid Kits are located in several locations throughout the station.

3. Medical Service Facilities:

The State of New York maintains a list of public, private and military hospitals and other emergency medical facilities considered capable of providing medical support for any contaminated injured individuals. A medical consultant company which specializes in treatment of radiological related injuries is contracted to provide assistance if needed.

4. Medical Transportation:

Indian Point Energy Center has arranged with a local ambulance service for transporting victims of radiological accidents to medical support facilities.

Arrangements have been made for transporting injured, contaminated and irradiated personnel to the hospital via the Verplanck Fire District (Fire/Ambulance) that provides 24-hour services. Backup ambulance service is available through a mutual aid system. A written agreement is listed in Appendix 2. The Verplanck Fire District (Fire/Ambulance), or other backup ambulance agency, participates in annual medical emergency drills as described in Section N.

Part 2: PLANNING STANDARDS AND CRITERIA

Section M: Re-entry and Recovery Planning

This section describes the measures to be taken for re-entry into the areas of Indian Point Energy Center that have been evacuated as a result of an accident. It also outlines the Indian Point Recovery Organization and its concepts of operation.

1. Re-entry and Recovery:

Re-entry:

During an emergency, immediate actions are directed toward limiting the consequences of the accident, so as to afford maximum protection to Station personnel and the general public. Once corrective measures have been taken and effective control of the plant has been re-established, a more methodical approach to re-entry is taken. This Emergency Plan therefore divides re-entry into two separate categories:

- Re-entry during the emergency phase of an accident is performed to save a life, control a release of radioactive material, prevent further damage to plant equipment or restore plant equipment. If necessary, this category of re-entry may be performed using emergency exposure limits. Briefings and emergency forms, rather than written radiation protection procedures, operating procedures and maintenance procedures can be used when making these entries.

  The Shift Manager and/or the Control Room Supervisor direct re-entry activities prior to activation of the Emergency Facilities. Once the TSC/OSC has been activated, all re-entry activities conducted during the emergency are authorized by the Emergency Plant Manager (EPM) and coordinated through the Operations Support Center.

- Re-entry during the recovery phase is performed using normal exposure limits. Either normal procedures or procedures developed specifically for each re-entry are utilized.

  The Site Recovery Director or the station's normal management organization oversees the re-entry. Generally, site problems are addressed first to make the site tenable for workers; with a series of radiation surveys to establish accessibility and then steps are taken restore the station to normal operations.

  All data gathered from re-entry 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. A station nuclear safety/review committee reviews and approves recovery operations in accordance with its charter and the Technical Specifications.

Recovery:

Recovery is defined as those steps taken to return the plant to its pre-accident condition. 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 re-entry to affected areas.

The ED, after consulting with the EOF Manager, Company Spokesperson, the Emergency Plant Manager and the Plant Operations Manager, has the responsibility for determining when an emergency situation is stable and the station is ready to enter the recovery phase. Prior to terminating an emergency and entering the recovery phase, the following conditions are considered:

- Do conditions still meet an Emergency Action Level? If so, does it appear unlikely that conditions will deteriorate?
- Radioactive releases are under control and are no longer in excess of Technical Specification limits.
- The radioactive plume has dissipated and plume tracking is no longer required. The only environmental assessment activities in progress are those necessary to assess the extent of deposition resulting from passage of the plume.
- In-plant radiation levels are stable or decreasing, and acceptable, given the plant conditions.
- The potential for uncontrolled radioactive release is acceptably low.
- The reactor is in a stable shutdown condition and long-term core cooling is available and adequate. There is no foreseeable danger of losing heat removal capability
- Containment pressure is within Technical Specification limits.
- Any fire, flood, earthquake or similar emergency condition no longer exists.
- All required notifications have been made.
- Discussions have been held with Federal, State and local agencies and agreement has been reached to terminate the emergency.

- At an Alert or higher classification (non-transitory classification), the ERO is in place and emergency facilities are activated.
- Any contaminated injured person has been treated and/or transported to a medical care facility.
- Offsite conditions do not unreasonably limit access of outside support to the station.

It is not necessary that all conditions listed above be met; however, all items must be considered prior to entering the recovery phase. For example, it is possible after severe accidents that some conditions remain which exceed an Emergency Action Level, but entry into the recovery phase is appropriate.

2. Recovery Organization

Once the decision is made to enter the recovery phase, the extent of the staffing required for the Indian Point Recovery Organization is determined.

- For events of a minor nature, (i.e. for UNUSUAL EVENT classifications) the normal on shift organization is normally adequate to perform necessary recovery actions.
- For events where damage to the plant has been significant, but no offsite releases have occurred and/or protective actions were not performed, (i.e. for ALERT classifications) the Indian Point ERO, or portions thereof, should be adequate to perform the recovery tasks prior to returning to the normal Station organization.
- For events involving major damage to systems required maintaining safe shutdown of the plant and offsite radioactive releases have occurred, (i.e. for SITE AREA EMERGENCY or GENERAL EMERGENCY classifications) the Indian Point ERO, or portions thereof, and Corporate Emergency Center Manager is put in place.

The specific members of the Indian Point Recovery organization are selected based on the sequence of events that preceded the recovery activities as well as the requirements of the recovery phase. The basic framework of the Indian Point Recovery Organization is as follows:

a. The Corporate Emergency Center Manager reports to the Site Recovery Director and is responsible for:

   - Ensuring adequate corporate support to maintain Indian Point Energy Center (IPEC) units in a safe condition;
   - Overseeing development of corporate recovery issues dealing with support of the site;
   - Ensuring Site Recovery Director is aware of Entergy Corporate goals and expectations for recovery of IPEC after an event;
   - Ensuring adequate support to the site to carry out recovery activities.

b. The Site Recovery Director is charged with the responsibility for directing the activities of the Indian Point Recovery organization. These responsibilities include:

- Ensuring an Event Summary Report is prepared and transmitted to offsite authorities;

- Overseeing the development of and approving a Recovery Plan and any special recovery procedures. The Recovery Plan shall address both short term and long-term actions and provide guidance on when Recovery is to be terminated. A specific instruction for the development of a Recovery Plan is provided in an Implementing Procedure;

- Deactivating any of the Indian Point ERO that was retained to aid in recovery, in the appropriate manner. Depending upon the type of accident and the onsite and offsite effects of the accident, portions of the Indian Point ERO may remain in place after initiation of the recovery phase;

- Coordinating the integration of available Federal and State assistance into onsite recovery activities;

- Coordinating the integration of Indian Point Energy Center support with Federal, State and local authorities into required offsite recovery activities;

- Verifying and approving information released by the public information organization that pertains to the emergency or the recovery phase of the accident;

- Maintaining a record/log of specific recovery actions taken;

- Working with senior company management in providing for assistance to Entergy Employees affected by the event; and

- Determining when the recovery phase is terminated. Recovery will be terminated when actions identified in the Recovery Plan have been completed.

c. The Onsite Recovery Manager reports to the Site Recovery Director and is responsible for:

- Identifying and documenting issues relating to Recovery operations;

- Coordinating the development and implementation of the recovery plan and procedures;

- Directing all onsite activities in support of the recovery of Indian Point Energy Center;

- Designating other Indian Point Energy Center recovery positions required in support of onsite recovery activities; and

- Developing of a Root Cause Report.

The Plant Manager or a designated alternate will become the Onsite Recovery Manager.

d. The Offsite Recovery Manager reports to the Site Recovery Director and is responsible for:

- Offsite activities during the Recovery phase include assisting State and local authorities to survey, map and decontaminate areas necessary to return the general public evacuated from around the site;
- Providing liaison with offsite agencies and coordinating Indian Point Energy Center assistance for offsite recovery activities;
- Coordinating Indian Point Energy Center ingestion exposure pathway EPZ sampling activities and the development of an offsite accident analysis report;
- Developing a radiological release report; and
- Designating other Indian Point Energy Center recovery positions required in support of offsite recovery activities.

A member of Emergency Planning Department Management or a designated alternate will serve as the Offsite Recovery Manager.

e. The Company Spokesperson reports to the Site Recovery Director and is responsible for:

- Functioning as the official spokesperson to the press for Indian Point Energy Center on all matters relating to the accident or recovery;
- Coordinating non-Indian Point Energy Center public information groups (Federal, State, local, etc.);
- Coordinating media monitoring and rumor control; and
- Determining what public information portions of the Indian Point ERO will remain activated.

A senior Indian Point Energy Center management individual or a member of the company's Corporate Communications Department is designated as the Company Spokesperson.

The remainder of the Indian Point Recovery Organization is established and an initial recovery plan developed at the end of the emergency phase or just after entry into the recovery phase. Consideration is given to recovery activity needs and use of the normal Indian Point Energy Center organizations. Individual recovery supervisors may be designated in any or all of the following areas:

- Training
- Radiation Protection
- Chemistry
- Technical Support
- Engineering Support
- Quality Assurance
- Operations
- Security
- Maintenance
- Special Offsite Areas (Community Representatives, Environmental Samples, Investigations, etc.)

3. Recovery Phase Notifications:

When the decision is made to enter the recovery phase, all members of the Indian Point ERO are informed of the change. Additional Indian Point Energy Center personnel are instructed of their roles in relation to the Indian Point Recovery Organization and their responsibilities to the recovery effort.

4. Total Population Exposure:

A method has been developed for estimating the total population exposure resulting from the accident. Total population exposure calculations are performed during the recovery phase of an accident. Cumulative data are collected from Indian Point ERO records to estimate the source term. Data are obtained from offsite agencies to estimate the total exposed population. Environmental Dosimeter of Legal Record (DLRs), Bioassays, and continuing environmental monitoring results will be analyzed to provide additional data.

Part 2: PLANNING STANDARDS AND CRITERIA

Section N: Drill and Exercise Program

This section describes the Drill and Exercise Program that Entergy has implemented to:

- Verify the adequacy of the Indian Point Emergency Preparedness Program.
- Develop, maintain and evaluate the capabilities of the Indian Point ERO to respond to emergency conditions and safeguard the health and safety of Station personnel and the general public.
- Identify deficiencies in the Plan and the associated Procedures, or in the training of response personnel, and ensure that they are promptly corrected.
- Ensure the continued adequacy of emergency facilities, supplies and equipment, including communications networks.

1. Exercises

   a. Federally prescribed Exercises are conducted biennially, which involve implementation of the participants' emergency plan(s) and activation of major portions of participating emergency organizations. Where full participation by offsite agencies occurs, the sequence of events simulates an emergency that may result in the release or potential release of radioactivity to the offsite environs, sufficient in magnitude to warrant a response by offsite authorities. Offsite agencies involved in the planning effort for an emergency at the station shall be invited to participate at least every two years. For exercises involving only partial participation by these agencies, emphasis is placed on development and conduct of an exercise that is more operationally realistic. Players will be able, by implementing appropriate procedures and corrective actions, to determine the outcome of the scenario to a greater extent than when core damage and the release of radioactivity are prerequisites for demonstration of all objectives.

   b. Exercises provide an opportunity to evaluate the ability of participating organizations to implement a coordinated response to postulated emergency conditions. In accordance with the Indian Point Energy Center (IPEC) Eight-Year Exercise Cycle Plan (maintained in accordance with a fleet procedure), exercises are conducted to ensure that all major elements of the emergency plan and preparedness program are demonstrated. Exercises are scheduled to be conducted at different times of the year. An unannounced drill/exercise is included in the Eight-Year Exercise Cycle Plan.

2. Drills:

In addition to the exercises described above, IPEC conducts drills for the purpose of training, testing, developing and maintaining the proficiency of emergency responders. Drills and/or surveillance tests are conducted at the IPEC for the following:

a. Communication Drills or Surveillance Tests:

- <u>Monthly</u>: The Radiological Emergency Communication System (RECS) link between the Control Room, EOF/AEOF and the State and four county Warning Points will be tested.
- <u>Monthly</u>: The Emergency Notification System (ENS) with the NRC will be tested.
- <u>Quarterly</u>: The telephone links with Federal response organizations (i.e., Department of Energy Radiological Assistance Program) and local governments within the ingestion pathways will be tested. These links are normally tested by the State.
- <u>Quarterly</u>: The radio communication link between the Emergency Operations Facility, the Control Rooms and with the offsite survey team vehicles will be tested.
- <u>Quarterly:</u> The emergency communications links between facilities will be operationally checked (onsite and offsite facilities.)

Each of these drills or tests includes provisions to ensure that all participants in the test are able to understand the content of the messages (e.g. by requesting repeat-backs of information or verification of message transmittal forms).

Communications systems are also tested during the conduct of training drills and annual exercises. Any discrepancy is noted and actions are initiated to correct problems as soon as possible.

b. Fire Drills: Drills for the Indian Point Fire Brigade are conducted in accordance with Technical Specifications and Station procedures.

c. Medical Emergency Drills: a medical emergency involving a simulated contaminated individual whereby the operations personnel, the hospital, site first-aid team, radiation protection personnel and security force participate is conducted annually at each unit.

d. Radiological Monitoring Team Drills: Radiological Monitoring Team drills are conducted at least annually and include provisions for the collection and analysis of environmental sample media (e.g. water, snow, vegetation, soil, and air), and the monitoring of radiological conditions outside the IPEC Protected Area. These drills include provisions for communications and record keeping.

e. Radiation Protection Drills: At least semi-annually, drills are conducted which involve response to, and analysis of, simulated airborne samples with elevated levels of activity. These drills also involve direct measurements of radiation levels in the Station and may include collection and analysis of sample media (e.g., water, vegetation, soil and air) and provisions for communications and record keeping. Normal station Radiation Protection rules and procedures are followed and emergency Radiation Protection procedures will be simulated.

f. Augmentation Drills: At least semi-annually, drills are conducted to test the ability to augment the on-shift organization. These drills are conducted using the following methods:

- Activation of the automated calling systems for all ERO responders as described in Section B calling in their anticipated arrival times and phone callouts being performed.

- At least once, in the Eight Year Exercise Cycle Plan, a complete call out of ERO as described in Section B will be conducted with actual response to Emergency Response Facilities.

g. Combined Functional Drills: Periodically, drills are conducted to test the interface, coordination, communication, and operation of the onsite emergency facilities including at least two of the following facilities: EOF, TSC, OSC and Joint Information Center. Drills should be developed and conducted to maximize training to participants. Coaching, mentoring, breaks for discussion should all be used when appropriate to aid participants in preparing for an actual emergency.

3. <u>Conduct of Drills and Exercises:</u>

For each emergency preparedness exercise or drill conducted, a scenario package is developed. The information included in the scenario package is in accordance with Entergy Fleet Procedures which include at least the following information:

- The basic Objectives to be demonstrated during the drill or exercise.
- Date(s), time(s), and place(s) of postulated events,
- Scope of the drill or exercise and list of participating organizations,
- The simulated sequence of events and the estimated schedule for major events,
- Evaluation criteria should be provided as necessary to be used in determining the success of the drill or exercise,
- A narrative summary which includes at least the following information:
    - Events that are postulated to occur
    - Extent of simulation
    - Briefing materials to be provided to drill controllers and/or official observers and information on arrangements made for them.

Prior approval of Drill and Exercise Dates, by appropriate IPEC management is obtained for all drills and exercises conducted in support of the Emergency Preparedness Program.

4. Criteria and Evaluation:

Controllers/Observers are assigned to evaluate the drill or exercise performance. Following each drill or exercise, a critique is conducted to evaluate the ability of the participants to implement the Plan and procedures. Biennially, representatives from the NRC observe and evaluate an exercise including an evaluation of the licensee's ability to conduct an adequate self-critical critique. For full offsite participation exercises both the NRC and FEMA observe, evaluate, and critique.

5. Resolution of Drill and Exercise Findings:

The critique and evaluation process is used to identify areas of the IPEC Emergency Preparedness Program that require improvement. The Manager of Emergency Preparedness or his/her designee is responsible for evaluation of all recommendations and comments, entering required corrective actions into the Corrective Action Program and the determination regarding which of the items is to be incorporated into the Emergency Preparedness Program. Feedback is provided to participants through critiques, drill or exercise reports or during annual refresher training.

Part 2: PLANNING STANDARDS AND CRITERIA

Section O: Emergency Response Training

This section describes the emergency response training that is provided to those who may be called upon in an emergency. It outlines the training provided by Entergy to employees and offsite support personnel requiring site access.

1. Assurance of Training:

   Entergy assures the training of appropriate station personnel through implementation of an ERO Training program. Guidance is in place outlining how Initial and Continuing training of the ERO is completed. The required training for the Indian Point ERO positions that are defined in Section B of this Emergency Plan is described here.

   Offsite training is offered to support organizations (fire, ambulance, medical providers, law enforcement agencies, etc.) that may be called upon to provide assistance in the event of an emergency. The following outlines the training received by these organizations:

   a. Specialized training is offered to the offsite agencies (fire, ambulance, medical providers, law enforcement agencies, etc.) that may be called upon to provide onsite assistance in the event of an emergency:

      Training consists of the following:

      - Notification Process
      - Site Orientation
      - Basic Radiation Protection
      - Specific Interface

      These courses do not qualify offsite personnel for unescorted access. Escorts are provided to assist support personnel.

      This training may be provided by the Emergency Planning Department or by appropriate interfacing organizations such as Fire Protection, Security, Safety department and/or the Training Department. The Emergency Planning Department shall monitor training provided by other departments to ensure it meets requirements of this Plan. This requirement will normally be met by performing training observations.

   b. Indian Point Energy Center offers training support, as requested, for State and local agencies whose function is to provide assistance during an emergency at Indian Point Energy Center. Training is offered on an annual basis, or as needed. Training of offsite emergency response organizations is described in their respective radiological emergency plans.

2. Methods of Training

Members of the Indian Point ERO receive general and specialized classroom training as necessary, self-study and / or hands-on emergency response training.

Classroom training is used for initial qualifications as needed to provide individuals with basic knowledge needed to perform assigned functions.

Self-Study training is used for initial overview training and as refresher training for individuals to requalify to an ERO position.

Hands-on training is provided using one or more of the following methods:

- Familiarization Sessions: A familiarization session is an informal, organized tabletop discussion of predetermined objectives.
- Walk-Throughs: Consists of a facility walk-through to familiarize Indian Point ERO personnel with procedures, communications equipment and facility layout. Walk-throughs also provide the opportunity to discuss facility activities, responsibilities and procedures with an instructor.
- Drills: A drill is a supervised instruction period aimed at testing, developing and maintaining skills in a particular operation. Drills described in Section N of this Plan are a part of training. These drills allow each individual to demonstrate the ability to perform assigned emergency functions. During drills, on-the-spot correction of erroneous performance may be made and drill controllers or coaches/mentors will make a demonstration of the proper performance (may be during or subsequent to the drill in progress).

Exercises, drill evaluations and/or written tests are used to evaluate the effectiveness of the training accomplished. All key positions will be evaluated in a drill, exercise or tabletop prior to becoming qualified to fill the assigned position.

3. First Aid Response:

First Responder personnel are trained to respond to medical emergencies.

4. Indian Point ERO Training Program:

The Indian Point ERO personnel who are responsible for implementing this plan receive initial, specialized and annual continuing training. Training program details are maintained in Training Department Procedures.

State and local EOC personnel receive training as outlined in their respective plans. Entergy provides support as requested.

Indian Point Emergency Response Position assignments may be based upon an individual's normal daily function and area(s) of expertise. Position-specific training provides the individual with the skills and knowledge to satisfactorily perform emergency assignments. A computerized system is used to track initial/continuing training and drill/exercise participation.

New Indian Point ERO personnel receive an initial overview course which familiarizes them with the Plan by providing basic information in the following areas as well as specific information as delineated in the sections below:

- Planning Basis
- Emergency Classifications
- Indian Point ERO and Responsibilities
- Callout of Emergency Organization
- Emergency Response Facilities
- Communications Protocol/Emergency Public Information
- Offsite Organizations

Annual continuing training is provided to ensure personnel are informed of changes in the Plan, procedures, organization and facilities. Incumbents (except craft positions) are provided an operating experience reading assignment.

a. Personnel responsible for management of an Emergency (Shift Manager, ED, EOF Manager, Emergency Plant Manager / Plant Operations Manager / TSC Manager and OSC Manager)

   These positions receive specialized training in one or more of the following areas as applicable to their ERO responsibilities:

   - Emergency Classifications
   - Notifications
   - Protective Action Recommendations
   - Emergency Action Levels
   - Emergency Exposure Control
   - Command and Control Practices

b. Personnel Responsible for Accident Assessment:

The skills and knowledge required to perform plant stabilization and mitigation are a normal function of specific Nuclear Operations positions, as identified in Section B of this Plan. Power changes, planned and unplanned reactor shutdowns are handled on a normal operation basis. Subsequent plant stabilization and restoration is pursued utilizing normal operating procedures. Licensed Operators receive routine classroom and simulator training to ensure proficiency in this area.

Those Emergency Organization positions responsible for accident assessment, corrective actions, protective actions, and related activities receive position-specific training, to remove peripheral duties from the Nuclear Operations shift.

c. Radiological Monitoring Teams and Radiological Analysis Personnel

1. Offsite Radiological Monitoring: Offsite radiological monitoring is performed by trained individuals who provide samples and direct readings for dose assessment calculations.

   Offsite Monitoring Team members receive classroom and hands-on training in the following areas:

   - Equipment and Equipment Checks
   - Communications
   - Plume Tracking Techniques

2. Personnel Monitoring: Trained individuals who monitor Station personnel and their vehicles for contamination during an emergency perform personnel monitoring. This monitoring will normally be done by Radiation Protection Technicians who are qualified to do this type of monitoring as part of their normal job.

   If Non-Radiation Protection personnel are to be used as Personnel Monitoring Team members they shall receive classroom and hands-on training in the following areas:

   - Personnel Monitoring Equipment and Techniques
   - Radiological Survey Techniques
   - Contamination Control Techniques
   - Basic De-Contamination Techniques

3. Dose Assessment: Dose Assessment training includes the skills and knowledge necessary for calculation and interpretation of an offsite release and its impact on the environment under any meteorological condition. Individuals responsible for performing dose assessment are trained in the following areas:

   - Computerized and Manual Dose Assessment

- Protective Action Recommendations
- Radiological Monitoring Team Interface
- Protective Action Guidelines associated with offsite plume exposure doses
- Basic Meteorology

d. Police, Security and Fire Fighting Personnel

1. Local Police and Fire Fighting Personnel: The local Police and Fire Departments are invited to receive training as outlined in Part 1.a of this section of the Emergency Plan.
2. Security: Indian Point Emergency Security Response is based upon a normal daily security function that is to safeguard the site. Security personnel receive specialized training in the following areas:
   - Accountability
   - Evacuation
   - Search and Rescue
   - Emergency Response Facility Activation and Access Control
   - Radiation Protection for Security Outpost
3. Onsite Fire Fighting Personnel: Onsite fire fighting personnel are selected from Operations (or other on shift personnel) and receive their emergency response training as part of those groups in accordance with station Fire Protection Program documents.

e. Repair and Damage Control Teams: Operations, Maintenance, Radiation Protection and Chemistry personnel are trained as part of their normal job specific duties to respond to both normal and abnormal plant operations. Part of this training includes an overview of OSC operations and immediate response actions individuals are to take when notified of an emergency and activation of their assigned facilities.

Operations personnel are trained to recognize and to mitigate degrading conditions in the plant. Operations personnel are trained to mechanically and electrically isolate broken or malfunctioning equipment, to isolate fluid leaks and to minimize transients.

Maintenance / I&C personnel are trained to troubleshoot and to repair damaged or malfunctioning electrical, mechanical, or instrumentation systems as appropriate to their job classification.

Radiation Protection personnel are trained to assess the radiological hazards associated with equipment repair and instructs personnel as to the appropriate protective clothing requirements, respiratory protection requirements, time limits, and other protective actions specific to the conditions present.

f. First Aid and Rescue Personnel: First aid and rescue team members receive training as outlined in Part 3 of this section.

g. Local Support Service Personnel: Local support service personnel providing assistance during an emergency are invited to receive training as outline in Parts 1.a and 1.b of this section.

h. Communications Personnel: Indian Point ERO personnel receive training on communications protocol as a part of the initial Emergency Response Overview. Personnel using specialized communications equipment that is not part of their normal daily function receive initial and requalification training on the equipment. Personnel involved in notifications to offsite agencies receive specialized training in the notification process.

i. Personnel responsible for Recovery: ERO personnel receive training on the Recovery organization and their Recovery functions.

j. Drill/Exercise Evaluation Support: Controllers/Observers will be trained on their roles and responsibilities to support drill/exercise control and player evaluation.

5. <u>General, Initial and Annual Training Program Maintenance</u>

a. Plant Access Training: All personnel with unescorted access to the station's Protected Area receive orientation training. Plant Access Training provides initial training and annual requalification training on the basic elements of the Indian Point Emergency Plan for all personnel working at Indian Point Energy Center. These elements include:

- Station emergency alarms and their meaning
- Assembly areas
- Site evacuation procedures
- Special precautions and limitations during an emergency
- Purpose of the Indian Point Emergency Plan
- Role of the worker during emergency

b. Initial Training: Prior to becoming a qualified ERO member, personnel receive a first-time course that provides introductory knowledge to new members of the organization. Indian Point Energy Center provides initial emergency response overview and specific training to assigned ERO members as outlined in the ERO Training Program. Additionally, Indian Point Energy Center offers initial training to those offsite organizations that provide onsite support, as discussed in Part 1.a of this Section.

When an employee successfully completes the training requirements for an assigned emergency position, training is documented and the employee's name is placed on the ERO roster. The completed training documents certify that the individual is qualified to perform their emergency functions.

c. Requalification Training: Annual requalification training is provided to Indian Point ERO personnel. Requalification training consists of one or more of the following:

- Annual Requalification Evaluation
- Classroom or hands-on training addressing changes to the Indian Point ERO, facilities, procedures and equipment
- Drill participation

d. Update Training: In some cases, it may be necessary to provide additional training prior to the annual requalification training. Changes to this Plan, Indian Point ERO, procedures, facilities or equipment may require training in an effort to maintain a proficient Indian Point ERO.

Program changes or deficiencies identified during drills, exercises or audits may require training to be performed prior to annual requalification training. Emergency Preparedness management evaluates the impact of these changes or deficiencies upon the effectiveness of the organization. As a result of this evaluation process, one or more of the following may occur:

- Specialized Classroom Training
- Hands-On Training
- Required Reading
- Drills
- Memo (email) Notifications

Part 2: PLANNING STANDARDS AND CRITERIA

Section P: Responsibility for the Maintenance of the Planning Effort

This section describes the responsibilities for development, review distribution of the Plan and actions that must be performed to maintain the Indian Point Emergency Preparedness Program. It also outlines the criteria for ensuring that personnel who perform the planning are properly trained.

1. Emergency Planning Staff Training

   Emergency Planning Staff Members receive on-going training and experiences to maintain or improve their knowledge related to emergency planning. At least once each calendar year members of the Emergency Planning staff are involved in one of the following activities:

   - Training courses specific to emergency preparedness.
   - Training courses related to emergency preparedness management, such as problem solving, stress management or confrontation/media relations' courses.
   - Observation of or participation in drills and/or exercises at other utilities or stations.
   - Participation in industry review and evaluation programs.
   - Participation in regional or national emergency preparedness seminars, committees, workshops or forums.
   - Indian Point Energy Center (IPEC) Training courses in related areas, such as systems, operations, or radiological protection training.

2. Authority for Emergency Preparedness Effort:

   The Site Vice President has overall authority and responsibility for the Indian Point Emergency Preparedness Program. This includes the authority to provide the necessary resources to ensure the continuous state of readiness for the ERO.

   The General Manager Plant Operations (GMPO) is responsible for ensuring adequate staffing of the ERO.

3. Manager of Emergency Preparedness:

   Entergy has designated a site Manager of Emergency Preparedness who is responsible for the maintenance of the Indian Point Emergency Preparedness Program. In maintaining the program, the Manager of Emergency Preparedness ensures the following:

   - Development, maintenance and revision of the Plan and Implementing Procedures is accomplished in accordance with applicable regulations and industry standards.

- Development and maintenance of 50.54q evaluations of program changes.
- Adequate Entergy support is provided to ensure the maintenance of offsite emergency response plans and procedures for the State and the local communities involved in response to an incident at Indian Point Energy Center.
- Entergy adequately supports the training program for offsite response personnel.
- Development and maintenance of a strong working relationship with State and local authorities responsible for Emergency Preparedness.
- Consistency is maintained between this Plan and its implementing procedures and the Emergency Plans and procedures of the State and local authorities.
- Preparation for and conduct of the EP drill and exercise program, and that the program meets all regulations and guidelines of the NRC.
- Emergency Response Facilities are maintained in a constant state of readiness.
- Appropriate files are maintained to document the activities of the Emergency Preparedness Program as required by law and regulations.
- Work coordinated with the communications group in development and implementation of the Emergency Preparedness Program Public Information program.
- IPEC is appropriately represented at State and local meetings dealing with emergency preparedness matters.
- Preparation of reports to the NRC, FEMA and other agencies on emergency preparedness matters.
- The alert and notification systems are maintained and tested in accordance with approved procedures.
- Emergency Planning staff is involved in a program to maintain an adequate knowledge of state of the art planning techniques and the latest applications of emergency equipment and supplies.
- Emergency Planning staff provides technical assistance to other IPEC organizations in areas of emergency preparedness.
- Coordination of EP Self-Assessment, Audits and Inspections.
- Development of and coordination of the EP budget to ensure program integrity.
- Corrective actions identified during the conduct of Exercises, Drills, Training, Audits and Inspections are tracked using the station's corrective action program.

4. Indian Point Emergency Plan Revisions:

This Plan is reviewed and updated as necessary, on an annual basis. The annual update includes required changes identified during training, drills and exercises. The Manager of Emergency Preparedness is responsible for determining which recommended changes are incorporated into the Plan. Editorial changes to the Plan can be held until the annual Plan update. If no change to the Plan is required a memo to file shall be maintained to document annual review.

Revisions to the Plan that reduce the effectiveness of the Plan, when determined through the technical review process or other changes deemed appropriate by the Manager of Emergency Preparedness will be reviewed by the Onsite Safety Review Committee prior to implementation.

Changes to the Plan are made without NRC approval only if such changes do not reduce the effectiveness of the Plan, and the Plan as changed continues to meet the standards of 10CFR50.47 (b) and 10CFR50, Appendix E. This will be determined using the 50.54q review process. Proposed changes that reduce or have a potential to reduce the effectiveness of the approved Plan are not implemented without prior approval by the NRC.

Plan Implementing and Administrative Procedures shall be developed and revised concurrent with the Plan and reviewed in accordance with station procedures.

Technical reviews of the Plan and procedures shall be conducted in accordance with station procedures. The reviewer shall determine the need for cross-disciplinary reviews. Revisions to the Plan and Implementing Procedures shall be reviewed and approved by the Manager of Emergency Preparedness prior to implementation.

State and County personnel are provided the opportunity to review the Emergency Action Levels (EALs) annually and upon any changes made to the EALs.

5. Emergency Plan Distribution:

Controlled copies of the Plan and Implementing Procedures are issued to all appropriate locations onsite, as well as Nuclear Regulatory Commission. The State and Counties are provided with the Plan only. Verified copies may be used for position specific procedure sets used by the ERO. Procedure requirements include use of revision numbers and required page identifications (i.e. section of plan, revision number, etc.). Controlled copies of the EAL wall charts are issued to appropriate locations. The distribution of these wall charts is maintained by the Emergency Planning Department.

6. Supporting Emergency Response Plans:

   Other plans which support this Plan are:

   - Federal Radiological Emergency Response Plan
   - State of New York Radiological Emergency Response Plan
   - Westchester County Radiological Emergency Response Plan
   - Rockland County Radiological Emergency Response Plan
   - Orange County Radiological Emergency Response Plan
   - Putnam County Radiological Emergency Response Plan

   Each of these plans has associated Implementing Procedures.

7. Implementing and Supporting Procedures:

   Appendix 3 of this Plan contains a listing, by number and title, of those procedures that implement this Plan during an emergency. Administrative procedures that outline the steps taken to maintain the Indian Point Emergency Preparedness Program have been developed. The Implementing Procedures are reviewed biennially.

   Major revisions to the procedures are reviewed by the departments or ERO positions affected (i.e. departments or individuals to whom responsibilities are assigned or changed) prior to their approval. (NOTE: Only one individual qualified for a given position is required to review a procedure change and an ERO facility management position can review changes within his/her facility or functional area.) Implementing procedures are reviewed and approved in accordance with approved station procedures.

8. Cross Reference to Planning Criteria:

   The Plan is formatted in the same manner as NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in support of Nuclear Power Plants", Revision 1. This allows for ease in auditing evaluation criteria and eliminates the need for a cross-reference.

9. Review of Indian Point Emergency Preparedness Program: An assessment (audit) of the emergency preparedness program is performed by the Indian Point Nuclear Independent Oversight (NIOS) organization. The assessment will be performed either at intervals not to exceed 12 months or as necessary, based on an assessment by NIOS 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.

Results of this audit are submitted for review to the Site Vice President. The Manager of Emergency Preparedness ensures that any findings that deal with offsite interfaces are reviewed with the appropriate agencies. Records of the audit are maintained for at least five years.

On an annual basis, a report of the Emergency Planning activities for the year will be presented to the Onsite Safety Review Committee. Such activities include: Plan and procedure revisions, drill/exercise results, and audit/inspection results. Additional activities may be added as deemed appropriate by the Manager of Emergency Preparedness.

10. Maintenance of Emergency Telephone List

A phone list contains telephone numbers used by the ERO during an emergency. These numbers are verified and updated at least quarterly.

Appendix 1: References

References consulted in the writing of this Emergency Plan are listed in this section. With exception of regulatory requirements, inclusion of material on this list does not imply adherence to all criteria or guidance stated in each individual reference.

1. 10CFR50.47, Emergency Plans
2. 10CFR50 Appendix E, Emergency Planning and Preparedness for Production and Utilization Facilities
3. 10CFR20, Standards for Protection Against Radiation
4. Code of Federal Regulations, Title10, Chapter I Parts 70, 73, and 100.
5. Code of Federal Regulations, Title 33, Chapter I, Part 153.
6. Code of Federal Regulations, Title 40, Chapter I, Parts 110, 112, 116, 302 and 355.
7. Code of Federal Regulations, Title 44, Chapter I, Part 401.
8. Code of Federal Regulations, Title 49, Chapter I, Parts 171 and 172.
9. 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
10. NUREG-0696, Revision 1, Functional Criteria for Emergency Response Facilities
11. NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," Dec. 1978.
12. NUREG-0578, "TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations."
13. NUREG-0737, Clarification of TMI Action Plan Requirements, dated October 1980.
14. NUREG-0737, Supplement 1, Requirements for Emergency Response Capability, December 1982.
15. EPA 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents
16. "FEMA REP Program Manual"
17. Indian Point Energy Center Unit 1, 2 and 3 FSARs
18. Indian Point Energy Center Unit 1, 2 and 3 Tech Specs
19. USNRC Reg. Guide 1.101, "Emergency Planning & Preparedness for Nuclear Power Plants"
20. 10CFR50, Appendix R
21. SAND 77-1725, Public Protection Strategies for Potential Nuclear Reactor Accidents: Sheltering Concepts With Existing Public and Private Structures, February 1978
22. INPO Emergency Resources Manual

Appendix 1: References (cont.)

23. "Maintaining Emergency Preparedness Manual," dated November, 1987 INPO 87-019.
24. "Federal Bureau of Investigation and Nuclear Regulatory Commission Memorandum of Understanding for Cooperation Regarding Threat, Theft, or Sabotage in U.S. Nuclear Industry," Federal Register, Vol. 44, p. 75535, December 20, 1979.
25. "Voluntary Assistance Agreement By and Among Electric Utilities involved in Transportation of Nuclear Materials," dated November 1, 1980.
26. Comprehensive Environmental Response, Compensation and Liability Act of 1980.
27. Accidental Radioactive Contamination of Human Food and Animal Feeds; Recommendation for State and Local Agencies, Volume 47, No. 205, October 22, 1982.
28. American Nuclear Insurers Bulletin #5B (1981), "Accident Notification Procedures for Liability Insured's".
29. "Potassium Iodide as a Thyroid Blocking Agent in a Radiation Emergency: Final Recommendations on Use," Federal Register Vol. 47, No. 125, June 29, 1982.
30. INPO Coordination agreement on emergency information among USCEA, EPRI, INPO, NUMARC and their member utilities, dated April (1988).
31. Babcock and Wilcox Company, Post Accident Sample Offsite Analysis Program (1982).
32. ANI/MAELU Engineering Inspection Criteria For Nuclear Liability Insurance, Section 6.0, Rev. 1, "Emergency Planning."
33. NEI 99-01 Rev 5, "Methodology for Development of Emergency Action Levels"
34. USNRC Reg. Guide 1.23, Revision 1, "Meteorological Monitoring Programs for Nuclear Power Plants", March 2007
35. INPO 09-006 Guidelines for Training and Qualification of Emergency Response Organization Personnel
36. New York State Comprehensive Emergency Management Plan Radiological Hazards Annex for Fixed Nuclear Facilities
37. NUREG-0654 – FEMA – REP – 1, Revision.1, Supplement 3, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.
38. Westchester County Fire Mutual Aid Plan
39. IPEC Security Safeguards Contingency Plan and Incident Response Plan
40. NSIR/DPR – ISG-01 "Interim Staff Guidance – Emergency Planning For Nuclear Power Plants", ADAMS Accession No. ML113010523 pages 18 to 21.
41. 2014 IPEC ETE Addendum (KLD TR-557, dated October 17, 2014)

Appendix 2: Letters of Agreement

Copies of agreement letters for the offsite emergency response supporting organizations listed below are maintained in the Emergency Planning Department files.

1. Verplanck Fire District (Fire/Ambulance)
2. Buchanan Engine Co. No. 1, Inc.
3. New York-Presbyterian/Hudson Valley Hospital
4. Phelps Memorial Hospital Center
5. Department of Energy – Radiation Emergency Assistance
6. Westinghouse Electric Corporation
7. Institute of Nuclear Power Operations (INPO)
8. New York State Police
9. New York State Division of Homeland Security and Emergency Services
10. Department of Energy – Radiological Assistance Program Region 1 (Brookhaven)

As Letters of Agreement are received and updated they will be listed in this section. Regular updates that do not change the level of service do not require an EPLAN change unless they impact the planning standards. Letters listed in this section are the current letters as of the date of this revision.

The Letters of Agreements (LOAs) with outside support organizations and government agencies are reviewed and confirmed annually in accordance with NUREG 0654 P.4. These letters are updated as needed. Letters with no specific end date remain in effect until terminated in writing by either party. This has been agreed to by the applicable supporting agencies.

For hostile action based events, response is provided by Verplanck Fire District, Buchanan Engine Co. No. 1 Inc., and the New York State Police.

Appendix 3: Procedure Cross-Reference to Sections of the Plan

Emergency Plan Implementing Procedures to Plan Sections

Procedure ID Number	Subject Addressed	IPEC Emergency Plan Section(s)
IP-EP-115 EN-EP-900	Emergency Plan Forms	All
IP-EP-120	Emergency Classification	D, Table D-1
IP-EP-210 IP-EP-251 IP-EP-260 EN-EP-609 EN-EP-610 EN-EP-611 EN-EP-900	Emergency Management	A, B, Table B-1, B-7, C, Appendix 2
IP-EP-210	Control Room Augmentation	B, Table B-1
EN-EP-610	TSC Activation and Response	B, Table B-1, E, H, M
EN-EP-611	OSC Activation and Response	B, Table B-1, E, H, M
EN-EP-609	EOF Activation and Response	B, Table B-1, E, H, M
IP-EP-350 EN-EP-611	Radiation Protection, Emergency Exposure Controls and Response	J, K, L
IP-EP-240	Emergency Security Organization Activation and Response	B, Table B-1, E, O
IP-EP-241	Incident Command Post	B, Table B-1, E
IP-EP-310 IP-EP-340	Offsite Dose Assessment	I, Table B-1
IP-EP-330 IP-EP-340	Airborne Sample Analysis	C, Appendix 2, I
IP-EP-350	Emergency Contamination Control	K, L
IP-EP-360	Core Damage Assessment	I
IP-EP-410	Protective Action Recommendations	J
IP-EP-420	Use of Potassium Iodide by Indian Point Personnel During and Emergency	K.2

Procedure ID Number	Subject Addressed	IPEC Emergency Plan Section(s)
IP-EP-251 EN-EP-609	Alternate EOF Activation and Response	B, Table B-1, E, H, M
IP-EP-510	Data Equipment Operation	Table B-1, B.5, H
IP-EP-320 EN-EP-609	Offsite Monitoring Team Activation and Response	I
IP-EP-430 EN-EP-611	Evacuation/Accountability	J
IP-EP-430	Search and Rescue	J
EN-EP-613	Recovery	M
IP-EP-340 IP-EP-620	Estimating Total Population Exposure	I, M
IP-EP-260	Joint Information Center Procedure Set	B, G
EN-EP-613	Emergency Preparedness Corporate Support	A, B
EN-EP-311	Emergency Response Data System (ERDS)	Table B-1, H, I
IP-1052	Hazardous Waste Emergencies	Part I, Section C
IP-1055	Fire Emergency Response	Part I, Section C
0-AOP-SEC-2	Air Craft Threat	Part I, Section C

Emergency Planning Administrative Procedures to Plan Sections

The following procedures do not implement the Emergency Plan during emergencies, but do outline maintenance of the program as required by the applicable sections of the Plan.

Procedure ID Number	Subject Addressed	IPEC Emergency Plan Section(s)
IP-EP-AD1	Emergency Preparedness Department Organization and Responsibilities	P
IP-EP-AD2	Emergency Plan Controlled Documents	P
EN-TQ-110	Emergency Response Training Program	O
EN-TQ-110-01	Fleet E-Plan Training Course Summary	O
EN-EP-306	Drills and Exercises	N
EN-EP-307	Hostile Action Based Drills and Exercises	N
EN-EP-308	Emergency Planning Critiques	N
EN-FAP-EP-005	Emergency Preparedness Performance Indicator Program	N
IP-EP-AD6	Emergency Preparedness Department Facilities and Equipment Surveillances	E, F, H, I, J, N
EN-EP-310	Notifications Systems Testing and Maintenance	F, N
IP-EP-AD10	Offsite Emergency Preparedness Support	A, G, L, O
IP-EP-AD13	Emergency Action Levels Technical Basis Document	D, I, J
IPEP-AD-16	Emergency Planning Records	All
IP-EP-AD 17	Emergency Planning Equipment Administration	E, F, H, I, J
EN-EP-801	Emergency Response Organization	A, B, C
IP-EP-AD40	Equipment Important to Emergency Response	D, E, F, G, H, I, J

Procedure ID Number	Subject Addressed	IPEC Emergency Plan Section(s)
IP-EP-AD12 IP-EP-AD20 IP-EP-AD30 IP-EP-AD31 IP-EP-AD32 IP-EP-AD33 IP-EP-AD34 IP-EP-AD35 IP-EP-AD36 IP-EP-AD38 IP-EP-AD39 IP-EP-AD41	IPEC Alert Notification System	E, E.6

Appendix 4

Abbreviations, Acronyms and Definitions

Any abbreviation followed by a lower case "s" denotes the plural form of the term.

AC .... Alternating Current
AD .... Administrative Directive
AEOF .... Alternate Emergency Operations Facility
ALARA .... As Low As Reasonably Achievable
ANI .... American Nuclear Insurers
ANS .... Alert and Notification System
ANSI .... American National Standards Institute
ARM .... Area Radiation Monitor
Ci .... Curie
CDE .... Committed Dose Equivalent
cc .... cubic centimeter
CR .... Control Room
CFR .... Code of Federal Regulations
CEC .... Corporate Emergency Center
cm^2 .... square centimeter
Cs .... Cesium
DC .... direct current
DE .... Dose Equivalent
DHS .... Department of Homeland Security
DLR .... Dosimeter of Legal Record
DOE .... U. S. Department of Energy
DOT .... U. S. Department of Transportation
dpm .... disintegration per minute
EAL .... Emergency Action Level
EAS .... Emergency Alert System
ED .... Emergency Director
ENS .... (NRC) Emergency Notification System
EOC .... Emergency Operations Center
EOF .... Emergency Operations Facility
EOP .... Emergency Operating Procedure
EPA .... U. S. Environmental Protection Agency
EPZ .... Emergency Planning Zone
ERDS .... Emergency Response Data System
ERO .... Emergency Response Organization
ETD .... Emergency Telephone Directory
FEMA .... Federal Emergency Management Agency
FRERP .... Federal Radiological Emergency Response Plan

Appendix 4

Abbreviations, Acronyms and Definitions

FSAR .... Final Safety Analysis Report
Ge .... Germanium
GE .... General Emergency
GET .... General Employee Training
I .... Iodine
ICP .... Incident Command Post
I&C .... Instrument and Control
INPO .... Institute of Nuclear Power Operations
IP .... Implementing Procedure
IP1, IP2, or IP3 .... Indian Point Energy Center Unit 1, 2 or 3
IPEC .... Indian Point Energy Center
IPZ .... Ingestion Pathway Zone
IRAP .... Interagency Radiological Assistance Program
ISFSI .... Independent Spent Fuel Storage Installation
JIC .... Joint Information Center
KI .... Potassium Iodide
Kr .... Krypton
Li .... Lithium
LGR .... Local Government Radio
LOCA .... Loss of Coolant Accident
mR .... milliroentgen
MWt .... Megawatt Thermal
NRC .... U. S. Nuclear Regulatory Commission
NUE .... Notification of Unusual Event
NYSOEM .... NYS Office of Emergency Management
OSC .... Operations Support Center
OSRC .... On-Site Safety Review Committee
PAG .... Protective Action Guide
PAR .... Protective Action Recommendation
PASS .... Post Accident Sampling System
POM .... Plant Operations Manager
R .... roentgen
RACES .... Radio Amateur Civil Emergency Services
RCA .... Radiologically Controlled Area
RECS .... Radiological Emergency Communications System
RERP .... Radiological Emergency Response Plan
OMT .... Offsite Monitoring Team
RP .... Radiation Protection
SAE .... Site Area Emergency

Appendix 4

Abbreviations, Acronyms and Definitions

SCBA .... Self-Contained Breathing Apparatus
SM .... Shift Manager
SPDS .... Safety Parameter Display System
Sr .... Strontium
STA .... Shift Technical Advisor
TCP/IP .... Transfer Communication Protocol/Internet Protocol
TDD .... Telecommunications Device for the Deaf
TLD .... Thermoluminescent Dosimeter
TSC .... Technical Support Center
μCi .... microcuries
UFSAR .... Updated Final Safety Analysis Report
Xe .... Xenon

Appendix 4

Abbreviations, Acronyms and Definitions

Definitions

Accountability - The process used by the Onsite Emergency Organization to identify potentially missing and/or injured personnel within the Protected Area during an emergency. This process is accomplished within 30 minutes and is normally maintained throughout the event.

Activated – An order has been made to activate an emergency response facility, and the facility is in the process of being staffed.

Annual – Frequency of occurrence equal to once per calendar year, between January 1st and December 31st.

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 that provides the Unit 2 and Unit 3 Control Rooms with remote monitoring capabilities.

Assembly – The process of relocating onsite personnel, during an emergency to a pre-designated location. Generally speaking all onsite personnel who do NOT have an emergency response assignment (non-essential personnel) relocate to an "Assembly Area." Those onsite personnel who are assigned emergency response functions (essential personnel) respond to their assigned emergency facility.

Assembly Area – A pre-designated area to which non-essential personnel relocate during an emergency. The primary Assembly Areas at IPEC are the Generation Support Building (GSB) and the Energy Education Center (EEC). The back-up Assembly Area, normally used only during periods of high personnel volume (e.g. outage), is the Indian Point Energy Center Training Center.

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.

Biennial – Frequency of occurrence equal to once per two calendar years.

Classification - The classification of emergencies is divided into FOUR (4) categories or conditions, covering the postulated spectrum of emergency situations. Each emergency classification is characterized by Emergency Action Levels (EALs) or event initiating conditions. The four classifications address emergencies of increasing severity.

Committed Dose Equivalent - The dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

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

County 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.

Dose Equivalent - The product of the absorbed dose in tissue, quality factor, and all other necessary modifying factors at the location of interest. The unit of dose equivalent is the Rem.

Dose Projection - The calculated estimate of a radiation dose to individuals at a given location (normally off-site), determined from the source term/quantity of radioactive material (Q) released, and the appropriate meteorological dispersion parameters (X/Q).

Drill - A supervised instruction period aimed at testing, developing and maintaining skill in a particular operation.

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

Emergency Alert System (EAS) - A network of broadcast stations and interconnecting facilities which have been authorized by the Federal Communications Commission to operate in a controlled manner during a war, state of public peril or disaster, or other national or local emergency. In the event of a nuclear reactor accident, state or local government authorities on the EAS would broadcast instructions/notifications to the public on conditions or protective actions.

Emergency Coordinator - A position title in NUREG 0654-Rev 1 corresponding to the Entergy position of Emergency Director.

Emergency Director - A previously designated and trained individual who assumes total responsibility 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 Notification System (ENS) - The NRC Emergency Notification System is a dedicated telephone system (part of the Federal Telephone System). It connects the plant with NRC headquarters in Bethesda, Maryland. It is used for reporting emergency conditions to NRC personnel.

Emergency Operations Facility - The facility for evaluating and coordinating all of Entergy activities related to an emergency.

Emergency Plan Administrative Procedures – Procedures that provide detailed information necessary to maintain the Emergency Planning Program. Primarily used by members of the Emergency Planning Staff.

Emergency Plan Implementing Procedures – Procedures that provide detailed information necessary to implement required tasks during an emergency. Primarily used by members of the Emergency Response Organization.

Appendix 4

Abbreviations, Acronyms and Definitions

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 Energy Center Site where planning is required for the plume exposure pathway, out to approximately 10-miles (10-mile EPZ). For the ingestion exposure pathway, the EPZ extends 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 Response Data System - ERDS is a direct near real-time electronic data link between the licensee's onsite computer system and the NRC Operations Center that provides for the automated transmission of a limited data set of selected parameters.

Essential Personnel - Those individuals needed to achieve the goals and tasks as deemed necessary by the Shift Manager, Emergency Director and/or Emergency Plant Manager during an emergency. Unless otherwise directed, initially all members of the Emergency Response Organization (ERO) are considered essential personnel.

Exclusion Area - The area surrounding the reactor in which the licensee has the authority to determine all activities including exclusion or removal of personnel and property from the area. (10CFR100)

Fission Product Barrier - The fuel cladding, reactor coolant system boundary, or the containment boundary.

Health Physics Network (HPN) - In the event of a site emergency, the NRC HPN line will be activated by the NRC Operations center in Bethesda, Maryland. This phone is part of a network that includes the NRC Regional Office and the NRC Operations Headquarters in Bethesda, Maryland. This system is dedicated for the transmittal of radiological information to the NRC Operations Headquarters in Bethesda, Maryland, and the NRC Regional Office. HPN phones are located in the TSC/OSC and EOF.

Indian Point Energy Center Site - The combined areas immediately surrounding Units 1, 2 and 3 that are owned and operated by Entergy.

Joint Information Center – Located outside the plume exposure emergency planning zone at the Hudson Valley Transportation Management Center, 200 Bradhurst Avenue, Hawthorne, NY. This facility provides for coordination of public information released to the news media and the public. It provides for a point-of-contact between Entergy and the news media.

New York Emergency Operations Center – New York State has principal Emergency Operations Centers in the Public Security Building, in Harriman State Office Campus in Albany, New York and at the Hudson Valley Transportation Center in Hawthorne, New York.

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

Offsite - Locations outside of the Indian Point Energy Center Site boundary.

Onsite - The area within the Indian Point Energy Center Site boundary.

Onsite Emergency Organization - The Indian Point Energy Center organization that has the capability to provide initial response to emergency situations

Operational – Status of an emergency facility declared by the appropriate facility manager upon determining that the facility is adequately staffed and equipment is setup and available to perform the emergency functions assigned to that facility.

Operations Support Center - Located on the 53' elevation adjacent to the Technical Support Center, it houses all Operations, Instrument and Control, Maintenance, Chemistry and Radiation Protection personnel awaiting assignment by the Shift Manager/Plant Operations Manager. (NUREG 0654)

Plant Emergency Operating Procedures - Procedures located under separate cover from the Emergency Implementing Procedures that 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 Guide (PAG) - Projected radiological dose values to individuals in the general population who warrant protective action. Protective Action Guides contain criteria used to determine whether the general population needs protective action regarding projected radiological doses, or from actual committed (measured) dose values.

Protective Action Recommendations (PARs) - Recommended actions to the States and counties for the protection of the offsite public from whole body external gamma radiation, and inhalation and ingestion of radioactive materials. The State(s) assesses the PARs and may issue access control and other recommendations concerning the safeguards of affected food chain processes.

Protected Area - The area enclosed by the security fence immediately surrounding Units 1, 2 and 3 where access is restricted in accordance with the Security Plan.

Quarterly – Frequency of occurrence equal to once in each of the following periods: January 1st through March 31st, April 1st through June 30th, July 1st through September 30th, October 1st through December 31st.

Radiation Area - An area, accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 5mRem (0.05 mSv) in one hour at 30 cm (~ 12 inches) from the radiation source or from any surface that the radiation penetrates.

Radiologically Controlled Area – Any area within plant buildings or on plant property where access is restricted and monitored for the purpose of radiation protection.

Radiological Emergency Communication System - Dedicated private line telephone system connecting the licensee with NY State and the four County Warning Points and Emergency Operations Centers, and other agencies.

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.

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

Site Boundary - That line beyond which the land is neither owned, leased, nor otherwise controlled by the site licensee (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)

For Dose Assessment and Protective Actions Recommendation purposes the Site Boundary is the closest distance at which members of the public would be exposed to a radioactive release. When the plume is traveling toward the water, the distance to the nearest point on the opposite side of Hudson River will be considered as the Site Boundary.

Site Evacuation – Process of removing non-essential personnel from the Owner Controlled Area.

Site Recovery Director - The individual who reports to senior management of the Company and who directs the Corporate Response Organization during the recovery stage. The Site Recovery Director is responsible for the technical direction and control of the integrated recovery effort.

Staffed – The emergency response facility has been activated and sufficient personnel are available to perform the required functions as determined by the facility manager.

Station - The three Entergy Nuclear Generating Units (1, 2 and 3) located on the Indian Point Energy Center Site, near Peekskill, NY.

Technical Support Center – Located on the 53' elevation adjacent to the Operations Support Center, it is 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.

Vital Area - Areas within the station security fence that contain vital equipment. Examples include Control Rooms, Containment and Electrical Equipment Rooms.

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.

Appendix 5

EVACUATION PLANS

I. INTRODUCTION

Evacuation planning is based on the identification of both the population to be evacuated and the transportation resources required to accomplish the task. These are the essential data around which the Evacuation Time Estimate (ETE) is built. Because the population in the areas to be evacuated can vary with the time of day, the day of the week, the seasons and other factors, a set of fifteen temporal scenarios has been developed for use in the ETE. These scenarios, prepared for both fair and adverse weather conditions, address variations in the general population, employee population, transient population and special facility (e.g., schools, nursing homes, and hospitals) population, as well as variations in roadway conditions. The fifteen evacuation scenarios are:

Scenario	Season	Day of Week	Time of Day	Weather	Special
1	Summer	Midweek	Midday	Good	None
2	Summer	Midweek	Midday	Rain	None
3	Summer	Weekend	Midday	Good	None
4	Summer	Weekend	Midday	Rain	None
5	Summer	Midweek, Weekend	Evening	Good	None
6	Winter	Midweek	Midday	Good	None
7	Winter	Midweek	Midday	Rain	None
8	Winter	Midweek	Midday	Snow	None
9	Winter	Weekend	Midday	Good	None
10	Winter	Weekend	Midday	Rain	None
11	Winter	Weekend	Midday	Snow	None
12	Winter	Midweek, Weekend	Evening	Good	None
13	Winter	Weekend	Midday	Good	West Point Football
14	Summer	Weekend	Midday	Good	Event at Croton Point Park
15	Summer	Midweek	Midday	Good	Roadway impact Rt. 6; Rt. 9W; Palisades Pkwy; Taconic Pkwy

The traffic demand and trip-generation rate of evacuating vehicles were estimated from the gathered data. Sources of data include the 2010 Census, New York agencies, county agencies, a telephone survey and special concern facilities. (See Section 3/Appendix E and

Section 5/Appendix F of the ETE of the 2012 ETE Report (Indian Point Energy Center, Development of Evacuation Time Estimates, KLD Engineering PC, KLD TR-537, December 2012) for a complete discussion of traffic demand and trip generation time, respectively.)

Following federal guidelines, the Indian Point Energy Center (IPEC) Emergency Planning Zone (EPZ) is subdivided into 38 Protective Action Areas. The Protective Action Area definitions are provided in Section II. The Protective Action Areas have been designed so that each can be defined in terms of well-known community names or boundaries. These Protective Action Areas are then grouped to conform with circular areas or "keyhole" configurations (circles plus radial sectors) that define Evacuation Regions for the ETE study. The Evacuation Regions are defined in Appendix H of the 2012 ETE Report. Additional Regions were defined in the 2014 ETE Addendum (Indian Point Energy Center, Development of Evacuation Time Estimates, Addendum for Additional Regions (2-Mile Radius + Downwind to EPZ Boundary), KLD Engineering PC, KLD TR-557, October 17, 2014). For each Protective Action Area within the EPZ, primary evacuation routes have been identified. Descriptions of the Protective Action Areas and their associated evacuation routes are given in the county plan procedures and in Section 10 and Appendix L of the 2012 ETE Report. Listings and maps of reception centers for each Protective Action Area are also included in the county procedures and in Section 10 of the 2012 ETE Report.

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 Protective Action Area, thus identifying the recommended evacuation route and reception center as well.

II. PROTECTIVE ACTION AREAS

The plume exposure EPZ for the IPEC has been subdivided into 38 discrete Protective Action Areas as shown in Figure 1. The 2010 US Census permanent resident population estimates for each of the Protective Action Areas are presented in the 2014 ETE Addendum and are provided in Table 1. The boundaries of the various Protective Action Areas are described by county in Tables 2 through 5.

III. EVACUATION TIME ESTIMATES

Evacuation time estimates by Region for each of the scenarios are presented in Section 7 of the 2012 ETE Report. Updated evacuation time estimates for 90% and 100% of the population within the Protective Action Areas included in the regions defined by the two-mile and five-mile rings and for the full EPZ are presented in the 2014 ETE Addendum and provided in Tables 6-A, 6-B and 6-C.

IV. DESCRIPTION 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.

TABLE 1

EPZ Permanent Population 2010 Census

Protective Action Area	Orange	Putnam	Rockland	Westchester
Briarcliff Manor				8,370
Central Town of Clarkstown			23,052	
Northeastern Town of Ramapo			25,941	
Northeastern & Eastern Town of Clarkstown			15,127	
Northwestern Town of Clarkstown			7,453	
Ossining				30,478
Village of Haverstraw			11,910	
Town of New Castle (west of Hardscrabble Road)				4,686
Village of West Haverstraw			10,376	
Unincorporated Areas of the Town of West Haverstraw			11,483	
Town of Tuxedo east of NYS Thruway	204			
Village of Pomona			4,520	
Grassy Point			142	
Croton-on-Hudson				8,078
Stony Point			13,111	
Verplanck				2,183
Tompkins Cove			1,797	
Buchanan				2,232
Montrose				2,593
Jones Point			125	
Village of Harriman east of NYS Thruway	0			
Peekskill				23,565
Cortlandt				26,565
Bear Mountain State Park	16		5	
Harriman State Park	6		9	

TABLE 1 (cont.)

EPZ Permanent Population
2010 Census[1]

Protective Action Area	Orange	Putnam	Rockland	Westchester
Yorktown				36,275
Somers (west of Route 118)				4,436
Fort Montgomery	1,837			
Southwest Carmel		2,597		
Village of Highland Falls	4,175			
Lower Phillipstown		2,581		
Village of Woodbury (east of NYS Thruway)	2,386			
West Point	6,464			
Southern Putnam Valley		10,171		
Town of Highlands	0			
Hudson River	Hudson River			
Town of Cornwall (south of Angola Road)	1,035			
Southern Phillipstown		4,569		
Total Population by County:	**16,123**	**19,918**	**125,051**	**149,461**
Total EPZ Population	**310,553**			

1. Indian Point Energy Center, Development of Evacuation Time Estimates, Addendum for Additional Regions (2-Mile Radius + Downwind to EPZ Boundary), KLD Engineering P.C, KLD TR-557, Section 2, October 17, 2014

Table 2. Orange County Protective Action Area Descriptions

Protective Action Area	Description
Town of Tuxedo east of NYS Thruway	The Town of Tuxedo east of the NYS Thruway from the Rockland County line to the Town of Woodbury town line (not in Harriman State Park).
Village of Harriman east of NYS Thruway	Village of Harriman east of NYS Thruway.
Fort Montgomery	The Hamlet of Fort Montgomery.
Village of Highland Falls	Village of Highland Falls.
Village of Woodbury east of NYS Thruway	The Village of Woodbury east of the NYS Thruway from the Town of Tuxedo to the Town of Cornwall.
West Point	The United States Military Academy (West Point)
Town of Highlands	The Town of Highlands excluding the Village of Highland Falls and the Hamlet of Fort Montgomery.
Town of Cornwall (south of Angola Road)	The Town of Cornwall from the Woodbury Town Line east of Route 32 and south of Angola Rd to Route 9W west of Route 9W to the Town of Highlands town line.
Bear Mountain State Park	The portion of Bear Mountain State Park in Orange County.
Harriman State Park	The portion of Harriman State Park in Orange County.

Table 3. Putnam County Protective Action Area Descriptions

Protective Action Area	Description
Southwest Carmel	The southwestern corner of the Town of Carmel; that is, the portion south of Lake Secor Road (County Route 30), and west of State Route 6N, including the area known as Secor.
Lower Phillipstown	The most southern part of the Town of Phillipstown; that is, south of Canopus Hollow Road; Old West Point Road east, east of US Route Canopus Hollow Road; Old West Point Road east, east of US Route 9, south of State 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 Garrison. This part includes the area known as Continental Village.
Southern Putnam Valley	The southern portion of the Town of Putnam Valley; that is, the portion south of Clarence Fahnestock Memorial State Park and west of Sunken Mine Road, south of Northshore Road, west of Lake Road (County Route 20), south of Tinker Hill Road, Peekskill Hollow Road, Bryant Pond Road and Lake Secor Road. This portion includes the areas known as Gilbert Corners, Sunnybrook, Oscawana Corners, Crofts Corners, Adams Corners, and Lake Peekskill.
Southern Phillipstown	The southern half of Phillipstown, not including the area defined as Lower Phillipstown; that is, the Village of Garrison and the Village of Nelsonville except for the portion of Hudson Highlands State Park, and the portion of Phillipstown south of Moffett Road, Lane Gate Road, Old Albany Post Road, Indian Brook Road and south of Clarence Fahnestock Memorial State Park, and including the areas known as Nelson Corners, Garrison, Travis Corners, South Highland, Four Corners, and Forsonville.

Table 4. Rockland County Protective Action Area Descriptions

Protective Action Area	Description
Central Town of Clarkstown	Central part of the Town of Clarkstown, bounded on the south by (west to east) West Clarkstown Road, a short segment of the Palisades Interstate Parkway (PIP), Church Road, Germonds Road, Parrott Road 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, State 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 PIP and south of Conklin Road and a short section of State Route 45 connecting Conklin Road to the PIP.
Northeastern Town of Ramapo	The Town of Ramapo west of the Palisades Interstate Parkway and north of Viola and Eckerson Roads, including the Villages of Wesley Hills, New Hempstead and New Square and the Hamlet of Hillcrest.
Northeastern & Eastern Town of Clarkstown	Northeastern and Eastern-central parts of the Town of Clarkstown, excepting High Tor State Park, bounded on the south by Crusher and Christian Herald Roads and Nyack Beach State Park and on the west by Lake Deforest, including the Hamlets of Congers and Valley Cottage and Rockland Lake and Hook Mountain State Parks.
Northwestern Town of Clarkstown	Northwestern part of the Town of Clarkstown, excepting High Tor State Park, bounded on the east by the western boundary of Lake De Forest, and on the south by (east to west) Congers Road, Goebel Road northward, State 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 State Route 45.
Village of Haverstraw	In the Town of Haverstraw, the Village of Haverstraw.
Village of West Haverstraw	In the Town of Haverstraw, the Village of West Haverstraw.
Unincorporated Areas of the Town of Haverstraw	The unincorporated areas of the Town of Haverstraw including the Hamlets of Thiells and Mount Ivy.

Table 4 Rockland County Protective Action Area Descriptions (continued)

Protective Action Area	Description
Village of Pomona	In the Towns of Haverstraw and Ramapo, the Village of Pomona and the unincorporated portions of the Hamlet of Pomona.
Grassy Point	Grassy Point east of the Penny Bridge, Minisceongo Yacht Club, Haverstraw Marina, Haverstraw Bay County Park, Bowline Park.
Stony Point	The Town of Stony Point east of Bear Mountain and Harriman State Parks, south of Tompkins Cove and west of Grassy Point.
Tompkins Cove	Tompkins Cove zip code area.
Jones Point	Eastern part of Bear Mountain State Park and the Jones Point and Dunderberg areas, south of Salisbury Meadow and Ring Meadow and east of U.S. Route 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.
Bear Mountain State Park	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 U.S. Route 9W/202 and the Park boundary, where the boundary is west of Route 9W/202.
Harriman State Park	The central and western parts of Harriman State Park bounded on the east by the Palisades Interstate Parkway (PIP) northbound and a line connecting PIP/US. Route 6 to the West Point Military Reservation boundary where they are very close, about 1 1/2 miles W 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 (Interstate Route 87/287, not included in the EPZ) and the NW/SE running utility right-of-way crossing Smith Rock and Pound Mountain.

Table 5. Westchester County Protective Action Area Descriptions

Protective Action Area	Description
Briarcliff Manor	The Village of Briarcliff Manor.
Ossining	The Town and Village of Ossining.
Town of New Castle (west of Hardscrabble Rd)	The Town of New Castle west of Hardscrabble Road.
Croton-on-Hudson	The Village of Croton-on-Hudson.
Verplanck	The Hamlet of Verplanck.
Buchanan	The Village of Buchanan.
Montrose	The Hamlet of Montrose.
Peekskill	The City of Peekskill.
Cortlandt	The Town of Cortlandt excluding the Hamlets of Verplanck and Montrose, and the Villages of Buchanan and Croton-on-Hudson; including Camp Smith and the FDR VA Hospital.
Yorktown	The Town of Yorktown.
Somers (west of Route 118)	The Town of Somers west of State Route 118/Tomahawk Street.

Table 6-A. Evacuation Time Estimates for the 2-Mile Region, 5-Mile Region and Full EPZ – Summer Scenarios

	Summer									
	Midweek				Weekend				Midweek, Weekend	
Scenario:	1		2		3		4		5	
Region	Midday				Midday				Evening	
	Good Weather		Rain		Good Weather		Rain		Good Weather	
	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%
R1 (2 Mile)	2:25	5:20	2:25	5:20	2:10	5:15	2:15	5:15	2:10	5:15
R2 (5 Mile)	3:05	5:20	3:20	5:20	3:10	5:20	3:20	5:20	2:40	5:20
R3 (Full EPZ)	3:55	6:55	4:10	7:10	3:35	6:10	3:45	6:10	3:15	5:55

Table 6-B. Evacuation Time Estimates for the 2-Mile Region, 5-Mile Region and Full EPZ – Winter Scenarios

	Winter													
	Midweek						Weekend						Midweek, Weekend	
Scenario:	6		7		8		9		10		11		12	
Region	Midday						Midday						Evening	
	Good Weather		Rain		Snow		Good Weather		Rain		Snow		Good Weather	
	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%
R1 (2 Mile)	2:25	5:20	2:25	5:20	3:15	6:20	2:10	5:15	2:10	5:15	3:00	6:15	2:10	5:15
R2 (5 Mile)	3:05	5:20	3:25	5:20	3:50	6:25	2:40	5:20	2:50	5:20	3:25	6:20	2:40	5:20
R3 (Full EPZ)	3:55	6:45	4:20	6:55	4:55	7:50	3:20	5:55	3:35	6:05	4:10	6:25	3:15	5:55

Table 6-C. Evacuation Time Estimates for the 2-Mile Region, 5-Mile Region and Full EPZ – Special Events

	Winter		Summer			
	Weekend		Weekend		Midweek	
Scenario:	13		14		15	
Region	Midday		Midday		Midday	
	Good Weather		Good Weather		Good Weather	
	West Point Football		Croton Point Park Event		Roadway Impact	
	90%	100%	90%	100%	90%	100%
R1 (2 Mile)	2:10	5:15	2:10	5:15	2:25	5:20
R2 (5 Mile)	2:45	5:20	3:05	5:20	3:05	5:20
R3 (Full EPZ)	3:30	5:55	3:35	6:10	4:40	7:00

FIGURE 1

EMERGENCY PLANNING PROTECTIVE ACTION AREAS