{CALVERT CLIFFS NUCLEAR POWER PLANT EMERGENCY RESPONSE PLAN

UNIT 3} ANNEX

{Constellation Generation Group

and

UniStar Nuclear Operating Services}

Revision ~~3~~3a4

Approved by ______________________________ Date __________

Senior Vice President, Regulatory Affairs

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Section 1: Introduction

This {Calvert Cliffs Nuclear Power Plant (CCNPP Unit 3)} Emergency Plan Annex provides unit specific details for {CCNPP Unit 3}.

This includes a unit description (type of reactor, relationship to other units, special emergency equipment), shift staffing, Emergency Action Levels (EALs), and any emergency facility locations which differ from those described in the emergency plan to provide a full understanding and representation of the station's emergency response capabilities. The Unit Annex is subject to the same review and audit requirements as the {Calvert Cliffs Nuclear Power Plant Unit 3} Emergency Plan.

1.1 Unit Description

ATTACHMENT 1
License Basis Document Change Request Form
Page 1 of 3

LBDCR #:______________________ Initiation Date:_________________________

Preparer:______________________

A. Originating Document and Brief Description of Change

B. Affected LBDs/ORDs

____ Part 0 – Cover Letter
____ Part 1 – General and Administrative Information
____ Part 2 – Final Safety Analysis Report
____ Part 3 – Environmental Report
____ Part 4 – Technical Specifications
____ Part 5 – Emergency Plan and Implementing Procedures
____ Part 6 – Limited Work Authorization
____ Part 7 – Departures Report
____ Part 8 – Safeguards and Security Plan
____ Part 9 – Proprietary and SUNSI
____ Part 10 – ITAAC
____ Part 11 – COLA References
____ This information is proprietary
____ Permits: ____
____ Other: ____

{CCNPP Unit 3} is an AREVA U.S. Evolutionary Power Reactor (EPR) is an evolutionary Pressurized Water Reactor (PWR) designed by Framatome ANP, Inc., a jointly-owned subsidiary of AREVA and Siemens. It is a four-loop plant with a rated thermal power of 4,590 MWt. The primary system design, loop configuration, and main components are similar to those of currently operating PWRs.

The U.S. EPR safety design features include four redundant trains of emergency core cooling, containment and Shield Building, and a core melt retention system for severe accident mitigation, which meet applicable regulatory and commercial requirements.

The safety design of the U.S. EPR is based primarily on deterministic analyses complemented by probabilistic analyses. The deterministic approach is based on the "defense-in-depth" concept which comprises four levels:

1. A combination of conservative design, quality assurance, and surveillance activities to prevent departures from normal operation

2. Detection of deviations from normal operation and protection devices and control systems to cope with them (This level of protection is provided to ensure the integrity of the fuel cladding and of the Reactor Coolant Pressure Boundary (RCPB) in order to prevent accidents.)

3. Engineered safety features and protective systems that are provided to mitigate accidents and consequently to prevent their evolution into severe accidents

4. Measures to preserve the integrity of the containment and enable control / mitigation of severe accidents

Low probability events with multiple failures and coincident occurrences up to the total loss of safety-grade systems are considered in addition to the deterministic design basis. Representative scenarios are defined for preventing both core melt and large releases in order to develop parameters for risk reduction features. A probabilistic approach is used to define these events and assess the specific measures available for their management. Consistent with international and U.S. probabilistic safety objectives, the frequency of core melt is less than 10-5/reactor-year including all events and all reactor states.

Design provisions for the reduction of the residual risk, core melt mitigation, and the prevention of large releases are:

- Prevention of high pressure core melt by high reliability of decay heat removal systems, complemented by primary system Overpressure Protection (OPP)

- Primary system discharge into the containment in the event of a total loss of secondary side cooling

- Features for corium spreading and cooling

- Prevention of hydrogen detonation by reducing the hydrogen concentration in the containment at an early stage with catalytic hydrogen recombiners

- Control of the containment pressure increase by a dedicated Severe Accident Heat Removal System (SAHRS) consisting of a spray system with recirculation through the cooling structure of the melt retention device

External events such as an aircraft hazard, Explosion Pressure Wave (EPW), seismic events, missiles, tornado, and fire have been considered in the design of Safeguard Buildings and the hardening of the Shield Building.

A. Overview of the U.S. EPR Design

The U.S. EPR is furnished with a four-loop, pressurized water, Reactor Coolant System (RCS) composed of a reactor vessel that contains the fuel assemblies, a pressurizer including control systems to maintain system pressure, one Reactor Coolant Pump (RCP) per loop, one SG per loop, associated piping, and related control and protection systems.

The RCS is contained within a concrete containment building. The containment building is enclosed by a Shield Building with an annular space between the two buildings. The post-tensioned concrete shell of the Containment Building is furnished with a steel liner and the Shield Building wall is reinforced concrete. The Containment and Shield Buildings comprise the Reactor Building. The Reactor Building is surrounded by four Safeguard Buildings and a Fuel Building. The internal structures and components within the Reactor Building, Fuel Building, and two Safeguard Buildings (including the plant Control Room) are protected against aircraft hazard and external explosions. The other two Safeguard Buildings are not protected against aircraft hazard or external explosions. However, they are separated by the Reactor Building, which restricts damage from these external events to a single safeguards building.

Redundant capacity safety systems for certain major safety systems are separated into four divisions. With four divisions, one division can be out-of-service for maintenance and one division can fail to operate, while the remaining two divisions are available to perform the necessary safety functions, even if one is ineffective due to the initiating event.

In the event of a loss of off-site power, each safeguard division is powered by a separate Emergency Diesel Generator (EDG). In addition to the four safety-related diesels that power various safeguards, two independent diesel generators are available to power essential equipment during a postulated Station Blackout (SBO) event—loss of off-site AC power with coincident failure of all four EDGs.

Water storage for safety injection is provided by the In-containment Refueling Water Storage Tank (IRWST). Also inside containment, below the Reactor Pressure Vessel (RPV), is a dedicated spreading area for molten core material following a postulated worst-case severe accident.

The fuel pool is located outside the Reactor Building in a dedicated building to simplify access for fuel handling during plant operation and handling of fuel casks. The Fuel Building is protected against aircraft hazard and external explosions. Fuel pool cooling is assured by two redundant, safety-related cooling trains.

Section 2: Organizational Control of Emergencies

Section B of the {CCNPP Unit 3} Emergency Plan describes the station's Emergency Response Organization (ERO). When the ERO is fully activated it will be staffed as described in the plan. This section of the Unit Annex describes the ERO staffing and their responsibilities to implement the emergency plan.

2.1 Normal Station Management Overview

A. Corporate Organization and Functions

The {Constellation Generation Group and UniStar Nuclear Operating Services} is the owner and operator of the {CCNPP Unit 3}. {Constellation Generation Group and UniStar Nuclear Operating Services} is responsible for siting, design, construction and operation of Unit 3 in accordance with its Quality Assurance Program. The President, {Unistar Nuclear Operating Services}, reports to the Chief Executive Officer, {Constellation Energy Group}.

A detailed description of the Organizational Structure of {UniStar Nuclear Operating Services} can be found in Section 13.1 of the FSAR.

2.2 Normal Shift Staffing

The makeup of the normal shift is controlled by the unit's Technical Specifications and 10 CFR 50.54(m). Section B.1 of the {CCNPP Unit 3} Emergency Response Plan describes the normal responsibilities of shift personnel.

2.3 Shift Emergency Response Positional Responsibilities

Table B-1a outlines Shift ERO positions required to meet minimum staffing and the major tasks assigned to each position

Table B-1a
Shift Emergency Response Organization

Functional Area	Major Tasks	Emergency Positions		Minimum Shift Size
1. Plant Operations and Assessment of Operational Aspects	Control Room Staff	{Shift Supervisor}	(CR)	1
		Control Room Supervisor	(CR)	1
		Reactor Operator	(CR)	2
		Equipment Operator		2
2. Emergency Direction and Control	Command and Control /Emergency Operations	{Shift Supervisor (Interim Emergency Director)}	(CR)	1[a]
3. Notification & Communication	Emergency Communications	Shift Communicator [e]	(CR)	1
4. Radiological Accident Assessment and Support of Operational Accident Assessment	In-plant Surveys	RP Technicians		1
	Chemistry	Chemistry Personnel		1
5. Plant System Engineering, Repair and Corrective Actions	Technical Support	Shift Technical Assistant (STA) [e]	(CR)	1
	Repair and Corrective Actions	Mechanical Maintenance		1[b]
		Electrical / Instrument & Control		1[b]
6. In-Plant Protective Actions	Radiation Protection	RP Personnel		2[b]
7. Fire Fighting	--	Fire Brigade		(c)
8. First Aid and Rescue Operations	--	Plant Personnel		2[b]
9. Site Access Control and Personnel Accountability	Security & Accountability	Security Team Personnel		(d)
			TOTAL:	**10**

(a) The {Shift Supervisor} shall function as the {Interim Emergency Director} prior to TSC activation.

(b) May be provided by personnel assigned other functions. Personnel can fulfill multiple functions.

(c) Per Station Fire Protection Plan

(d) Per Station Security Plan

(e) An Individual shall be designated as {Shift Communicator} and an Individual shall be designated as {STA} for a classified event. Once assigned these individuals shall not be assigned other responsibilities.

Section 3: Classification of Emergencies

Section D of the {CCNPP Unit 3} Emergency Plan describes the classification of emergencies into four levels of Emergency Class. They are the UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, and GENERAL EMERGENCY. These classification levels are entered by meeting the criteria of Emergency Action Levels (EALs) provided in this section of the U.S. EPR Annex.

3.1 Emergency Action Levels (EALs)

An Emergency Action Level scheme based on Revision 5 of NEI 99-01, “Methodology for Development of Emergency Action Levels,” currently under review by the Nuclear Regulatory Commission is used for {CCNPP Unit 3}. Specific items not applicable to the U.S. EPR design are identified and alternate initiating conditions used as appropriate. Table 3-1, Emergency Action Level Initiating Conditions, provides a list of conditions considered for classification.

Emergency Action Level Threshold Values for each of the Initiating Conditions are provided in an EAL Technical Basis Document with appropriate basis and references.

An emergency is classified by assessing plant conditions and comparing abnormal conditions to Initiating Conditions and Threshold Values for each Emergency Action Level. Individuals responsible for the classification of events will refer to the Initiating Condition and Threshold Values in an Emergency Plan Implementing Procedure (EPIP). This EPIP contains Initiating Conditions, EAL Threshold Values, Mode Applicability Designators, appropriate EAL numbering system, and additional guidance necessary to classify events.

The EALs are set up in Recognition Categories. The first relates to Abnormal Radiological Conditions / Abnormal Radiological Effluent Releases. The second relates to Fission Product Barrier Degradation. The third relates to Hot Condition System Malfunctions. The fourth relates to Hazards and Other Conditions. The fifth related to Cold Shutdown System Malfunctions.

Emergency Action Levels are the measurable, observable detailed conditions that must be met in order to classify the event. Classification is not to be made without referencing, comparing and satisfying the Threshold Values specified in the Emergency Action Levels.

Mode Applicability provides the unit conditions when the Emergency Action Levels represent a threat. The Basis contains explanations and justification for including the Initiating Condition and Emergency Action Level.

A list of definitions is provided as part of this document for terms having specific meaning to the Emergency Action Levels. Site specific definitions are provided for terms with the intent to be used for a particular Initiating Condition/Threshold Value and may not be applicable to other uses of that term at other sites, the Emergency Plan or procedures.

An EAL Technical Basis Document provides references to documents which were used to develop the EAL Threshold Values.

References to the {Emergency Director} means the person in Command and Control as defined in the Emergency Plan. Classification of emergencies is a non-delegable responsibility of the {Emergency Director}.

Classifications are based on evaluation of the U.S. EPR Unit condition. 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 indications, or (3) by direct observation by plant personnel, such that doubt related to the indication's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

EALs are for unplanned events. A planned evolution involves 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. Planned evolutions to test, manipulate, repair, perform maintenance or modifications to systems and equipment that result in an EAL Threshold Value being met or exceeded are not subject to classification and activation requirements as long as the evolution proceeds as planned. However, these conditions may be subject to the reporting requirements of 10 CFR 50.72 and/or 10 CFR 50.73.

When two or more Emergency Action Levels are determined, declaration will be made on the highest classification level for the unit. {When all station units are affected, the highest classification for the Station will be used for notification purposes and specific units' classification levels will be noted}.

3.2. Emergency Action Levels Categories

The EAL Scheme is broken into the following five major categories and numerous sub-categories as appropriate. Each major initiating condition described in Table 3-1, Emergency Action Level Initiating Conditions may be broken into additional sub conditions based on actual threshold values.

A. Category F – Fission Product Barriers

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:

1. 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.

2. Reactor Coolant System (RC): 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 comprise the RCS.

3. Containment (CT): 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 3-1. "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 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 ability to escalate the emergency classification 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 monitoring must be capable of addressing dynamic conditions. If reaching a loss or potential loss threshold is imminent (i.e., within 1 to 2 hours) while an event or multiple events occur, judgment dictates that the imminent situation deserves classification as if the thresholds were actually exceeded.

B. Category R – Radiological Effluent / Abnormal Rad Levels

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. Radiological Effluents

   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. Abnormal Radiation Levels

   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.

C. Category H – Hazards

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. Security

   Unauthorized entry attempts into the Protected Area, bomb threats, sabotage attempts, and actual security compromises threatening loss of physical control of the plant.

2. 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.

3. 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 vehicle crashes, missile impacts from turbine failure, etc. are included.

4. 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.

5. Toxic / Flammable Gas

   Non-naturally occurring events that can cause damage to plant facilities and include toxic or flammable gas leaks.

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 {Interim Emergency Director}, {Emergency Plant Manager} and/or {Emergency Director} the latitude to classify emergency conditions consistent with the established classification criteria based upon their judgment.

D. Category S – System Malfunction

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 vital plant 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 total losses of vital plant power sources.

2. Loss of DC Power

   Loss of vital plant 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.

3. Failure of Protection System

   Events related to failure of the Protection System (PS) to initiate and complete reactor trips. In the plant licensing basis, postulated failures of the PS 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.

4. Plant Monitoring

   Certain events that degrade plant operator ability to effectively assess plant conditions within the plant warrant emergency classification. Losses of annunciators are in this subcategory.

5. Technical Specification Limits

   System malfunctions may lead to loss of capability to remove heat removal the reactor core and RCS.

   Only 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.

6. Communications

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

7. 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.

9. Fuel Clad Degradation (Note: Fuel Clad Degradation is number 9, 8 is a RCS leakage in Category C)

   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 Barriers 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.

E. Category C – Cold Shutdown / Refueling System Malfunction

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 (5 - Cold Shutdown, 6 - Refueling, D – Defueled).

The events of this category pertain to the following subcategories:

1. Loss of AC Power

   Loss of vital plant 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 total losses of vital plant power sources.

2. Loss of DC Power

   Loss of vital plant 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.

3. Failure of Protection System

If PS actuation fails to assure positive control of reactivity it could cause a threat to Fuel Clad, RCS and Containment integrity.

6. Communications

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

7 and 8. RCS Leakage (Note: Categories 7 and 8 are both RCS Leakage in NEI guidance document.)

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. This EAL, for Cold Shutdown and Refueling, will be based on RCS leakage limits that are applicable during the operational modes unless other mode specific limits have been established.

10. Heat Sink

Loss of the ability to remove decay heat could lead to fuel clad degradation.

3.3 Maintenance of Emergency Action Levels

The details of EAL development are documented in an Emergency Action Level Technical Basis Document. Revision of the Technical Basis Document is controlled the same way as the {CCNPP Unit 3} Emergency Plan, requiring the same reviews including a review in accordance with 50.54(q).

Table 3-1, Emergency Action Levels

FISSION PRODUCT BARRIER DEGRADATION

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FG1 1 2 3 4 1. Loss of any two barriers and loss or potential loss of the third barrier.	**FS1** 1 2 3 4 1. Loss or potential loss of any two barriers.	**FA1** 1 2 3 4 1. Any loss or any potential loss of either Fuel Clad or RCS.	**FU1** 1 2 3 4 1. Any loss or any potential loss of Containment.

RADIOLOGICAL EFFLUENT / ABNORMAL RADIATION LEVELS

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Radiological Effluents			
RG1 1 2 3 4 5 6 D Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mRem (10 mSv) TEDE or 5000 mRem (50 mSv) Thyroid CDE for the actual or projected duration of the release using actual meteorology.	**RS1** 1 2 3 4 5 6 D Offsite dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mRem (1 mSv) TEDE or 500 mRem (5 mSv) Thyroid CDE for the actual or projected duration of the release.	**RA1** 1 2 3 4 5 6 D Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM limit for 15 minutes or longer.	**RU1** 1 2 3 4 5 6 D Any release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM limit for 60 minutes or longer.
Abnormal Radiation Levels			
		RA2 1 2 3 4 5 6 D Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel.	**RU2** 1 2 3 4 5 6 D UNPLANNED rise in plant radiation levels.
		RA3 1 2 3 4 5 6 D Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions.	

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Security			
HG1 1 2 3 4 5 6 D HOSTILE ACTION resulting in loss of physical control of the facility.	**HS1** 1 2 3 4 5 6 D HOSTILE ACTION within the PROTECTED AREA.	**HA1** 1 2 3 4 5 6 D HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.	**HU1** 1 2 3 4 5 6 D Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant.
Control Room Evacuation			
	HS2 1 2 3 4 5 6 D Control Room evacuation has been initiated and plant control cannot be established.	**HA2** 1 2 3 4 5 6 D Control Room evacuation has been initiated.	
Natural or Destructive Phenomena			
		HA3 1 2 3 4 5 6 D Natural or destructive phenomena affecting VITAL AREAS.	**HU3** 1 2 3 4 5 6 D Natural or destructive phenomena affecting the PROTECTED AREA.
Fire / Explosion			
		HA4 1 2 3 4 5 6 D FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown.	**HU4** 1 2 3 4 5 6 D FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA.
Toxic / Flammable Gas			
		HA5 1 2 3 4 5 6 D Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize the ability to safely operate or shutdown the reactor.	**HU5** 1 2 3 4 5 6 D Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS.
Judgment			
HG6 1 2 3 4 5 6 D Other conditions exist which in the judgment of the {Emergency Director} warrant declaration of General Emergency.	**HS6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the {Emergency Director} warrant declaration of Site Area Emergency.	**HA6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the {Emergency Director} warrant declaration of an Alert.	**HU6** 1 2 3 4 5 6 D Other conditions exist which in the judgment of the {Emergency Director} warrant declaration of an Unusual Event.

SYSTEM MALFUNCTIONS - HOT

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power			
SG1 1 2 3 4 Prolonged loss of all offsite and all onsite AC power to emergency busses.	**SS1** 1 2 3 4 Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.	**SA1** 1 2 3 4 AC power capability to emergency busses reduced to a single source for 15 minutes or longer such that any additional single failure would result in a loss of all AC power to the emergency busses.	**SU1** 1 2 3 4 Loss of all offsite AC power to emergency busses for 15 minutes or longer.
Loss of DC Power			
	SS2 1 2 3 4 Loss of vital DC power for 15 minutes or longer.		
Failure of Protection System			
SG3 1 2 Automatic trip and all manual actions failed to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists.	**SS3** 1 2 Automatic trip failed to shutdown the reactor and manual actions taken from the reactor control console failed to shutdown the reactor.	**SA3** 1 2 Automatic trip failed to shutdown the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.	**SU3** 3 4 Inadvertent criticality.
Plant Monitoring			
	SS4 1 2 3 4 Loss of all monitoring functions for 15 minutes or longer with a SIGNIFICANT TRANSIENT in progress.	**SA4** 1 2 3 4 Loss of all monitoring functions for 15 minutes or longer.	**SU4** 1 2 3 4 Degradation of monitoring functions for 15 minutes or longer.
Technical Specification Limits			
			SU5 1 2 3 4 Inability to reach required operating mode within Technical Specification limits.
Communications			
			SU6 1 2 3 4 Loss of all onsite or offsite communications capabilities.
Reactor Coolant System Leakage			
			SU7 1 2 3 4 RCS leakage.
Fuel Clad Degradation			
			SU9 1 2 3 4 Fuel clad degradation.

SYSTEM MALFUNCTIONS - COLD

Modes: 1 – Power Operation, 2 – Startup, 3 – Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 – Refueling, D – Defueled

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
Loss of AC Power			
		CA1 5 6 D Loss of all offsite and all onsite AC power to emergency busses for 15 minutes or longer.	**CU1** 5 6 AC power capability to emergency busses reduced to a single source for 15 minutes or longer such that any additional single failure would result in a loss of all AC power to the emergency busses.
Loss of DC Power			
			CU2 5 6 Loss of required DC power for 15 minutes or longer.
Failure of Protection System			
			CU3 5 6 Inadvertent criticality.
Communications			
			CU6 5 6 D Loss of all onsite or offsite communications capabilities.
Reactor Coolant System Leakage			
CG7 5 6 Loss of RPV inventory affecting fuel clad integrity with containment challenged.	**CS7** 5 6 Loss of RPV inventory affecting core decay heat removal capability.	**CA7** 5 6 Loss of RPV inventory.	**CU7** 5 RCS leakage.
			CU8 6 UNPLANNED Loss of RCS inventory.
Heat Sink			
		CA10 5 6 Inability to maintain plant in cold shutdown.	**CU10** 5 6 UNPLANNED Loss of decay heat removal capability.

Section 4: Emergency Response Facilities and Equipment

4.1 Unit Specific Emergency Response Facilities

A. Control Room

Plant operations are directed from the Control Room. Nuclear plant Instrumentation, Area and Process Radiation Monitoring System Instrumentation, Controls and Instrumentation for Reactor and Turbine Generator operation are provide here. The Control Room is located in Safeguards Building 2 - 53' Elevation. A description of the Control Room is contained in the Final Safety Analysis Report. Emergency equipment available to the Control Room is listed and maintained in accordance with Emergency Response Plan Implementation Procedures and/or Administrative procedures.

B. Technical Support Center

The Technical Support Center (TSC) is located on the Control Rooms floor level outside the Main Control Room and has a separate access. It is located in the fully hardened Safeguards Building. Thus the TSC is protected against radiological hazards, internal and external missiles, and seismic activity. Also, this arrangement ensures suitable ambient environmental conditions.

The TSC is sized to provide:

- Working space, without crowding, for the personnel assigned to the TSC at the maximum level of occupancy;
- Space for the TSC data system equipment needed to acquire, process, and display data used in the TSC;
- Sufficient space to perform repair, maintenance, and service of equipment, displays, and instrument;
- Space for data transmission equipment needed to transmit data originating in the TSC to other locations;
- Space for personnel access to functional displays of TSC data;
- Space for unhindered access to communications equipment by all TSC personnel who need communications capabilities to perform their functions;
- Space for storage of and/ or access to plant records and historical data; and
- A separate room adequate for at least three persons to be used for private NRC consultations.

In summary, the minimum size of working space of the TSC shall be 1875 square feet (174 square meters). This includes space for 25 personnel (5 which are NRC personnel) at 75 square feet (7 square meters)/person.

The TSC has the same protection from radiological hazards, including direct radiation and airborne radioactivity under accident conditions as the Control Room.

The TSC is provided with several means of communications within and outside the plant. Communications shall be established between the Control Room and the TSC, The EOF, the principle state and local EOCs, the monitoring teams and a general line throughout the site in accordance with the requirements of 10 CFR Part 50, Appendix E: Section (E)(9)(d).

Communications will also be established with NRC Headquarters and the appropriate Regional Office Operations Center, from the Control Room, TSC and EOF in accordance with 10 CFR, Appendix E: Section (E)(9)(d).

C. Operations Support Center

The Operations Support Center (OSC) is located in the Access Building within the protected area separate from Control Room and TSC. Both the Control Room and TSC shall have diverse means of communication with various plant locations including the OSC.

D. Onsite Laboratories

Chemistry laboratories located in the Nuclear Auxiliary Building are available for emergency response during an accident. The on-site laboratory sampling system is designed to provide gas and liquid samples of the containment atmosphere following an accident.

All modules, the sampling box and the local control cabinet are located in the Fuel Building. To ensure protection of the operating staff while taking a sample, in the sampling box, all modules and pipes which convey highly contaminated fluids are located behind a biological shield.

E. Decontamination Facilities

The personnel decontamination facility is located the Access Building and contains provisions for radiological decontamination of personnel, their wounds, supplies, instruments and equipment. This facility has extra clothing and decontaminants suitable for the type of contamination expected, including radioiodine skin contamination.

F. First Aid

The First Aid station located in the Access Building facilitates medical treatment and initial assessment of radiation exposure and uptake.

4.2 Assessment Resources

A. Onsite Meteorological Monitoring Instrumentation

{CCNPP Unit 3 shares meteorological instrumentation with CCNPP Units 1 & 2. Section H.5 of the Emergency Plan describes the CCNPP Meteorological instrumentation.}

B. Onsite Radiation Monitoring Equipment

The onsite radiation monitoring capability includes an installed process, effluent, and area radiation monitoring system; portable survey instrumentation; counting equipment for radiochemical analysis; and a personnel dosimetry program to record integrated exposure. Some onsite equipment is particularly valuable for accident situations and is described in the following subsections.

1. Radiation Monitoring Systems

a. Area Radiation Monitoring

The area monitoring system provides information of existing radiation levels in various areas of the plant to ensure safe occupancy. It is equipped with Main Control Room and local readout and audible alarms to warn personnel of a raised radiation level.

b. Radiological Noble Gas Effluent Monitoring

The wide range gas monitors are installed on normal station effluent release points. These monitors have the capability to monitor noble gas activity in the range {of postulated accidents and in support of emergency response}. Each monitor system has a microprocessor which utilizes digital processing techniques to analyze data and control monitor functions. These monitors provide readout and alarm functions to the Main Control Room.

c. Radioiodine and Particulate Effluent Monitoring

The wide range gas monitor includes a sampling rack for collection of the Auxiliary Building Vent Stack particulate and radioiodine samples. Filter holders and valves are provided to allow grab sample collection for isotopic analyses in the station's counting rooms. The sampling rack is shielded to minimize personnel exposure. The sampling media will be analyzed by a gamma ray spectrometer which utilizes a gamma spectrometer system.

d. High Range Containment Radiation Monitors

High range containment radiation monitors are installed for the U.S. EPR. The monitors will detect and measure the radiation level within the reactor containment during and following an accident. The monitors are in the range {of postulated accidents and in support of emergency response}.

e. In-plant Iodine Instrumentation

Effective monitoring of increasing iodine levels in buildings under accident conditions will include the use of portable instruments using silver zeolite as a sample media. It is expected that a sample can be obtained, purged, and analyzed for iodine content within a two-hour time frame.

f. Onsite Process Monitors

An adequate monitoring capability exists to properly assess the plant status for all modes of operation and is described in the unit’s FSAR. The operability of the post-accident instrumentation ensures information is available on selected plant parameters to monitor and assess important variables following an accident. Instrumentation is available to monitor the parameters given in Technical Specifications.

The unit’s Emergency Operating Procedures assist personnel in recognizing inadequate core cooling using applicable instrumentation.

C. Onsite Fire Detection Instrumentation

The Plant Fire Alarm System (PFAS) is designed to meet the requirements of the applicable National Fire Protection Association (NFPA) Standards (e.g., NFPA 72, 13, 20, etc.) and detection is generally provided in areas containing safety related components/systems as recommended in Regulatory Guide 1.189, "Fire Protection for Operating Nuclear Power Plants." The PFAS is furnished with electrically supervised circuits that monitor field input devices including smoke and heat detection, water supply and suppression supervisory devices and output devices such as suppression releasing and alarm notification devices. Instrumentation is provided in the Main Control Room and at the local fire control panels to alert operators of the location of a detected fire, the release of a suppression system, or the annunciation of a trouble condition within a portion of the system.

In the event that a portion of the PFAS is inoperable, compensatory measures may be required for the affected areas.

Further details on the unit's Plant Fire Alarm system can be found in the unit's FSAR.

D. Unit Specific Station Parameter Monitoring System

A process and information system provides access to all process information needed to monitor the state of the plant in all plant states, including accident conditions. The system displays information on workstations providing selected data to anyone with authorization to access the data. The system displays are used for:

- Reviewing the accident sequence,
- Determining appropriate mitigating actions,
- Evaluating the extent of any damage, and
- Determining plant status during recovery operations.

The ERO shall use the information obtained from the system to monitor plant parameters and provide recommendations to the operators.

Section 5: Emergency Measures

5.1 Unit Assembly Areas

Unit assembly areas have been identified at the Access Building, Radiation Protection Lab area, the clean hallways on the ground level of the Radioactive Waste Processing Building, and the shop areas of the Switchgear Building. Evacuation of non-essential personnel is usually conducted immediately after accountability if a Site Area Emergency or General Emergency has been declared and conditions permit.

If it is determined that the prearranged Assembly Area is unfit for personnel, the {Shift Supervisor} or the {Emergency Plant Manager} may designate an alternative Assembly Area and direct personnel using appropriate communication systems that are available.

5.2 Unit Evacuation Routes

Unit and Station Evacuation Routes will normally be via normal site egress routes. Alternate egress routes may be considered and are determined based on the event in progress and provided to evacuees over the unit's public address system. {The CCNPP Unit 3 alternate egress route is through a gate located in the southwest corner of the CCNPP Unit 3 Protected Area where evacuees would proceed onto Camp Conoy Road.}