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December 16, 2003

U.S. Nuclear Regulatory Commission Attention: Document Control Desk Washington, D.C. 20555

Subject: Grand Gulf Nuclear Station – Proposed Upgraded Emergency Action Levels (EALs) Using NEI 99-01 Revision 4 Methodology– LDC 2003-093

Grand Gulf Nuclear Station Docket No. 50-416 License No. NPF-29

Reference: NEI 99-01, Rev 4 "Methodology for Development of Emergency Action Levels".

GNRO-2003/00067

Ladies and Gentlemen:

Upgraded Emergency Action Levels (EALs) are enclosed for NRC staff review and approval as required by 10CFR50 Appendix E, IV.B. These new EALs were written using the methodology outlined in NEI 99-01, "Methodology for Development of Emergency Action Levels" (Revision 4, January 2003). NEI 99-01 has been endorsed by the NRC Staff in Regulatory Guide 1.101, Revision 4, July 2003, "Emergency Planning and Preparedness for Nuclear Power Reactors" and in NRC Regulatory Issue Summary 2003-18, October 8, 2003, "Use of NEI 99-01, Methodology for Development of Emergency Action Levels, Revision 4, Dated January 2003." These changes have been reviewed and approved by the Onsite Safety Review Committee and the State's of Mississippi and Louisiana and local governmental authorities.

The guidance contained in NEI 99-01 was found to be acceptable to the NRC staff as an alternative method to that described in Appendix 1 to NUREG-0654/FEMA-REP-1 and NUMARC/NESP-007 for developing EALs required in Section IV of Appendix E to 10CFR50 and 10CFR50.47(b)(4).

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Plant specific information is attached in the following order:

- Current Emergency Plan Mark-Up
- Proposed Emergency Plan Pages Changes Incorporated
- Proposed EALs To Be Incorporated in Procedure
- Proposed EAL Bases To Be Incorporated in Procedure
- NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications

The goal of this upgrade is to provide consistent emergency classifications internally and between the Entergy plants to the greatest extent possible limited only by plant specific design or location.

If you have any questions regarding this submittal, please contact Mr. Milton F. Guynn at 601-437-2166

Sincerely,

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CAB/MJL

attachments:

Attachment 1	GGNS Current Emergency Plan Mark-Up	
Attachment 2	GGNS Proposed Emergency Plan Pages – Changes Incorporated	
Attachment 3	GGNS Proposed EALs – To Be Incorporated in Procedure	
Attachment 4	GGNS Proposed EAL Bases - To Be Incorporated in Procedure	
Attachment 5	GGNS NEI 99-01, Rev. 4 to Plant Specific Correlations,	
	Differences, Deviations, and Justifications	

cc: see next page

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Attachment 1

to

GNRO-2003/00067

GGNS Current Emergency Plan Mark-Up

4.0 <u>EMERGENCY CONDITIONS</u>

4.1 Emergency Classification System

There are four classes of emergency conditions used in emergency planning. These four classes cover the entire spectrum of possible emergency situations, from minor local incidents to hypothetical major radiological emergencies, and allow for classification of an accident, notification of the appropriate offsite agencies and support groups, and the activation of emergency organizations. The system also provides for the notification and implementation of actions immediately applicable to a specific condition, and for upgrading the response to the appropriate level of classification in the event of a change in the severity of the condition. These actions are further described in Section 6.0.

PLANT Specific

Emergency Action Levels (EALs) are used to provide indication that an initiating condition exists. These levels are composed of a combination of plant parameters (such as instrument readings and system status) that can be used to give relatively quick indication to the Station operating staff of the severity of the accident situation. The purpose of the EALs is to provide the earliest possible indication of actual or potential accident situations. In most cases further assessment action is conducted both onsite and offsite before actual protective actions are initiated. EALs associated with radiological releases are related to the Environmental Protection Agency's Protective Action Guides (PAGs) summarized in EPA 400-R-92-001 "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents." A determination by the station emergency organization, along with state and local support agencies, of the potential of reaching or exceeding the PAGs is performed in accordance with dose assessment procedures in the event of a radiological release to the environment. The EALs discussed in this section are found in Table 4-1. The EALs were developed from guidance in Appendix-1 to NUREG-0654 and from accidents analyzed in the CONDITIONS GGNS Final Safety Analysis Report. When EALs are observed in conjunction with plant or equipment status due to planned maintenance or testing activities, an emergency condition may or may not exist and the situation must be evaluated on a case by case basis.

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The four emergency classes that comprise the emergency classification system are:

- a. Unusual Event
- b. Alert
- c. Site Area Emergency
- d. General Emergency.

4.1.1 Unusual Event

The Unusual Event class is generally minor in nature, involves no releases of radioactive material that would require offsite response or monitoring, and is such that no immediate hazard to the public exists.

Lumming Conditions

The EALs Table 4-1, while comprehensive, are not meant to be all inclusive. The Emergency Director may declare an Unusual Event based on other plant conditions and the potential for the degradation of these conditions.

Training of the Emergency Organization members should emphasize the need to evaluate the <u>potential</u> for more serious plant conditions to occur at a future time.

4.1.2 <u>Alert</u>

The Alert class involves relatively minor emergency situations that have a direct effect on the plant safety related systems. Because of the increased potential for more serious offsite consequences, the emergency organization is activated, as well as notification of key offsite authorities and the news media. The Alert class also addresses limited releases of radioactive material and therefore might require some radiological monitoring and assessment actions by the emergency organizations.

The Alert class assures that emergency personnel are readily available to respond to a

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change in plant conditions and to provide assessment support as required.

4.1.3 Site Area Emergency

Immediate protective actions are not required upon notification of a Site Area Emergency condition; however, preliminary steps are initiated in anticipation of possible protective actions. These preliminary steps include complete activation of the emergency organization, alerting and/or mobilizing of monitoring teams, and notification of all offsite authorities and the news media. The Site Area Emergency class includes accidents which have a significant potential for the release of radioactive material.

Unlike the two previously described classes of emergencies, the Site Area Emergency is very likely to involve some radiation exposure to the near-site public. Also, many of the accidents included in this class have the potential for escalation to the General Emergency class.

4.1.4 General Emergency

The most severe emergency class used in emergency planning is the General Emergency.

Protective actions shall be recommended upon declaration of the General Emergency, as the accidents considered could result in the exceeding of the lower limits of the PAGs. The General Emergency EALs that require dose projections offsite use <u>actual</u> <u>meteorology</u> rather than the adverse meteorology assumptions used in the Site Area Emergency action levels.

None of the accidents analyzed in the FSAR would normally be classified as a General Emergency. However, the Loss of Coolant Accident (LOCA) within the reactor coolant pressure boundary analyzed in the FSAR could lead to a General Emergency classification in a situation where there was a subsequent loss of plant safety systems

leading to a possible core melt and failure of containment. Criteria to be used for declaration of a General Emergency includes core and containment status as well as actual radiation release data.

4.2 Classification of Postulated Accidents

A thorough analysis of each of the postulated accidents is included in the Grand Gulf Nuclear Station Final Safety Analysis Report (FSAR). All of the postulated accidents could be classified into one of the four emergency classes (See Table 4-2). In classifying each of the postulated accidents, the conservative assumptions used in the FSAR analysis were considered. It is possible that occurrence of some of the postulated accidents results in a classification lower in severity.

TABLE 4-1

UNUSUAL EVENT	
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
1. Inability to reach required shutdown within Technical Specification time limits	Failure to reach the required plant operations mode within Technical Specification action statement time frames for any of the following LCO's:
Rete	1. Safety/relief Valves 3.4.4 2. ECCS - Operating 3.5.1 3. Primary Containment 3.6.1.1 4. Primary Containment Airlocks 3.6.1.2 5. Primary Containment Isolation Valves 3.6.1.3 6. Low Low Set Valves 3.6.1.6 7. Residual Heat Removal Containment Spray 3.6.1.7 8. Suppression Pool Average Temperature 3.6.2.1 9. Suppression Pool Level 3.6.2.2 10. Suppression Pool Makeup System 3.6.2.4 11. Secondary Containment 3.6.4.1 12. Secondary Containment Isolation Valves 3.6.4.2 13. Standby Gas Treatment System 3.6.4.3 14. Drywell 3.6.5.1 15. Drywell Airlocks 3.6.5.2 16. Drywell Isolation Valves 3.6.5.3
2. Radiological effluent Technical Requirements Manual (TRM) limits exceeded	 Entering the action statement of the following LCO's in the Radioactive Gaseous Effluent section of the TRM; 6.11.4, 6.11.5, or 6.11.6
	2. Entering the action statement of LCO 6.11.1, in the Radioactive Liquid Effluent section of TRM

TABLE 4-1

EMERGENCY ACTION LEVELS

	UNUSUA	L EVENT
	NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
3.	Fuel damage indication.	 Increase of 285mR/hr in 30 minutes on Offgas pretreatment monitor <u>Or</u>
4.	Exceeding primary system leak rate technical specification	 While in modes 1, 2 or 3: 1. >5 gpm unidentified leakage <u>or</u> 2. >30 gpm total leakage averaged over previous 24 hour period
5.	Failure of a safety or relief valve in a safety related system to close following reduction of applicable pressure	 P1. Shift Manager determines a SRV is stuck open in plan mode 1, 2, or 3
6.	Loss of offsite power or loss of onsite AC power capability	 Loss of offsite power to: a. 15AA and b. 16AB c. 17AC 2. Loss of <u>ALL</u> three divisional diesel generators while Plant Operational Condition 1, 2 or 3
7.	Fire within the plant lasting more than 10 minutes	 A fire within the power block, fire water pump house CO₂ skid lasting >10 minutes from the time of notification
8.	Indications or alarms on process or effluent parameters not functional in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability	 Total loss of vital accident assessment equipment suc as: All vessel level instruments All containment monitoring instruments, etc. 2. Degradation of the offsite communication system to offsite communication system to

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TABLE 4-1

UNUSUA	LEVENT
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
9. Security attempted entry	1. Site Security Code Yellow (Armed adversary attempting to or has entered Company Property)
 Natural phenomenon being experienced or projected beyond usual levels 	 A verified earthquake detected by in-plant seismic instrumentation <u>or</u> A tornado observed onsite <u>or</u> A hurricane warning issued that includes the site area
11. Other hazards being experienced or projected	 Notification of an aircraft crash onsite outside the protected area <u>or</u> Notification of unusual aircraft activity over the facility (Example: spraying or dropping something on Company Property) <u>or</u> Notification of an onsite explosion (does not affect plant operation) <u>or</u> <u>or</u> A Determination that a release of toxic, oxygen displacing, or flammable gas will significantly hamper the ability of personnel to perform activities affecting safety <u>or</u> S. A manual or automatic scram initiated because of a turbine blade failure that has not penetrated the casing <u>or</u> <u>or</u>
12. Other plant conditions exist that warrant increased awareness on the part of a plant operating staff or State and/or local offsite authorities or require plant shutdown under technical specification requirements or involve other than normal controlled shutdown	 Shift Manager determines that plant conditions exists that warrant a precautionary notification to state and local authorities.
13. A credible site-specific security threat notification.	1. The Shift Manager determines that GGNS has received a credible threat against the site. Credible means the threat notification has been received from, or validated by, a trustworthy source (FBI, NRC, Claiborne County Sheriff's Office, Plant Management, Site Security, etc.). Example: A report from Site Security of an unauthorized attempted Protected Area entry should be considered a credible threat.

TABLE 4-1

\square	ALI	ERT
	NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
1.	Severe loss of fuel cladding	 14,000 mR/hr on Offgas pretreatment monitor <u>or</u> <u>or</u> - Coolant-sample analysis indicates->300 μCi/ml dose equivalent I-131 <u>or</u> <u>or</u> Main steam line radiation <u>exceeds</u> radiation monitor trip setpoint
2.	Steam line break with MSIV malfunction causing leakage (>10 gpm)	 Isolation initiated and abnormal leakage downstream of MSIV's (>10 gpm or 5000 lbm/hr)
3.	Primary coolant leak rate greater than 50 gpm	1. Total leakage calculated to be >50 gpm while in Plant Operating Condition 1, 2 or 3
4.	Radiation levels or airborne contamination which indicate a severe degradation in the control of radioactive materials	Verification of area radiation monitor reading >1000 times setpoint 2. Verification of CAM reading >1000 times setpoint
5.	Loss of offsite power and loss of onsite AC power for less than 15 minutes.	 Loss of offsite power to: a. 15AA b. 16AB and c. 17AC and Loss of all three divisional diesel generators and < 15 minutes
6.	Loss of all onsite DC power for less than 15 minutes	1. Loss of Division 1, 2 and 3 (125 Vdc for \leq 15 minutes)
7.	Complete loss of any function needed for plant cold shutdown	 All control rods fully inserted <u>and</u> The determination that there are no longer enough systems functional to attain or maintain the reactor coolant < 200°F

TABLE 4-1

А	LERT
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
 Failure of the reactor protection system to initiate and complete a seram which brings the reactor subcritical 	 1. Scram conditions confirmed <u>and</u> 2. a. More than one rod is greater than position 02 <u>or</u> Rod position is unknown for more than one rod <u>and</u> b. SRM's are either upscale or countrate is increasing (Assuming SRMs are full in) <u>and</u> 3. a. Reactor power < 4% on APRM (APRM Down scale)
 Fuel damage accident with release of radioactivity to containment or fuel handling building 	 Notification of a spent fuel damaging accident <u>and</u> High high radiation alarms on either a. Fuel handling vent exhaust <u>or</u> Containment vent exhaust
10. Fire potentially affecting safety systems	1. A fire defeating <u>ONE</u> safety system electrical division
11. All alarms (annunciators) lost	1. Doss of <u>ALL annunciators</u> on the P680, P601 and P870 panels
12. Radiological effluents greater than 10 times Technica Requirements Manual (TRM) limits	 High high radiation alarms on <u>ONE OR MORE</u> <u>monitors</u>: a. Radwaste Bldg vent exhaust b. Fuel handling vent exhaust c. Containment vent exhaust d. Turbine Bldg vent exhaust d. Turbine Bldg vent exhaust and Summation of monitors (including SGTS A and B) <u>exceeds</u> 10 times TRM 6.11.4 limit Liquid release >10 times the limit of LCO 6.11.1 in the Radioactive Liquid Effluent section of TRM
13. Ongoing security compromise	1. Site Security Code Orange (Armed adversary attempting to or has crossed Protected Area fence)

TABLE 4-1

ALE	ERT
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
 Severe natural phenomena being experienced or projected 	 A verified earthquake detected by in-plant seismic instrumentation ≥ OBE levels <u>or</u> A tornado causing damage to Safety Related Structures <u>or</u> Sustained winds ≥ 73 mph onsite
15. Other hazards being experienced or projected	 Notification of an aircraft crash onsite inside the protected area, no damage to plant vital structures (SSW Complex, Diesel Generator, Auxiliary, Containment or Control Buildings) <u>or</u> Notification of missile impacts on plant non-vital structures <u>or</u> Notification of an onsite explosion affecting plant operation <u>or</u> Notification that the entry of toxic or flammable gases into facility structures has threatened to render Safety Related equipment Inoperable Notification of a turbine failure that has resulted in casing penetration
16. Other plant conditions exist that warrant precautionary activation of technical support center and placing near-site Emergency Operation Facility and other key emergency personnel on standby	1. Emergency Director determines that plant conditions exist that warrant precautionary activation of the TSC or EOF.
 Evacuation of control room anticipated or required with control of shutdown systems established from local stations 	 Control Room evacuated and Control of shutdown systems established at the remote shutdown panel

TABLE 4-1

SITE AREA EMERGENCY		
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL	
1. Known loss of coolant greater than makeup pump capacity	 RPV water level <-167 in. <u>and</u> Makeup capacity unable to maintain or increase reactor vessel level 	
 Degraded core with possible loss of coolable geometry 	 RPV water level <-167 in. or cannot be determined <u>and</u> a. High coolant activity indicated by analysis of sample > 300 μCi/ml dose equivalent I-131 <u>or</u> b. Containment or Drywell hydrogen concentration greater than 0.5% 	
3. Steam leak outside the containment without isolation	 RCIC or main steam line isolation required due to confirmed steam line break and The associated line fails to isolate 	
 Loss of offsite power <u>and</u> loss of onsite AC power for more than 15 minutes 	 Loss of offsite power to: a 15AA b. 16AB c. 17AC and c. 17AC and diesel generators and 3. > 15 minutes 	
5. Loss of all vital onsite DC power for more than 15 minutes	1. Loss of Division 1, 2 and 3 (125 Vdc for > 15 minutes)	
 Complete loss of any function needed for plant hot shutdown 	 HPCS and RCIC not functional and Not able to depressurize with SRVs and Main condenser is not available 	

TABLE 4-1

EMERGENCY ACTION LEVELS

	SITE AREA EMERGENCY		
	NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL	
7.	Transient requiring operation of shutdown systems with failure to scram	 Scram conditions confirmed <u>and</u> All control rods <u>NOT</u> inserted to between 00 and 02 <u>and</u> Reactor power ≥ 4% on APRM (APRM Down scale light off) 	
8.	Major damage to spent fuel in containment or fuel handling building	 a. Notification of a spent fuel damaging accident <u>or</u> b. Low water level in spent fuel pool below top of spent fuel and unable to restore level to above fuel. <u>and</u> a. Any post accident effluent radiation monitor confirm Noble Gas, Iodine release rates corresponding to: b. 0.5 Ci/sec Noble Gas (30 minutes) <u>or</u> c. 6.0 E-4 Ci/sec Iodine (30 minutes) <u>or</u> e. 6.0.E-3 Ci/sec Iodine (2 minutes) <u>or</u> adiation monitoring teams report Radiation and/or Iodine concentration readings at the site boundary corresponding to: a. 50 mR/Hr (for 30 minutes) <u>or</u> c. 6.0 E-6 µCi/cc Iodine <u>or</u> c. c. c.	
9.	Fire compromising the functions of safety systems	1. A fire defeating MORE THAN ONE safety system electrical division	

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TABLE 4-1

SITE AREA EMERGENCY		
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL	
 10. a. Effluent monitors detect levels corresponding to greater than 50 mr/hr for 1/2 hour or greater than 500 mr/hr W.B. for 2 minutes (or five times these levels to the thyroid) at the site boundary for adverse meteorology b. These dose rates are projected based on other plant parameters (e.g., radiation level in containment with leak rate appropriate for existing containment pressure) or are measured in the environs c. EPA Protective Action Guidelines are projected to be exceeded outside the site boundary 	 Any post accident effluent radiation monitor confirm release rates corresponding to: a. 0.5 Ci/sec Noble Gas for 30 minutes <u>or</u> b. 6.0 E-4 Ci/sec Iodine for 30 minutes <u>or</u> c. 5.0 Ci/sec Noble Gas for 2 minutes <u>or</u> d. 6.0 E-3 Ci/sec Iodine for 2 minutes <u>or</u> d. 6.0 E-3 Ci/sec Iodine for 2 minutes <u>or</u> Radiation monitoring teams report radiation and/or Iodine concentration readings at the site boundary corresponding to: a. 50 mR/Hr for 30 minutes <u>or</u> c. 6.0 E-6 µCi/cc Iodine <u>or</u> Containment post accident radiation monitor: a. >330 R/hr for 2 minutes <u>>3,300 R/hr for 2 minutes</u> <u>or</u> b. >3,300 R/hr for 2 minutes 	
11. Imminent loss of physical control of the plant	1. Site Security Code Red (Armed adversary has entered any Power Block building or Vital Area)	
 Severe natural phenomena being experienced or projected with plant not in cold shutdown 	 A verified earthquake detected by in-plant seismic instrumentation ≥ SSE levels Sustained winds ≥ 90 mph onsite 	

TABLE 4-1

SITE AREA E	EMERGENCY
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
13. Other hazards being experienced or projected with plant not in cold shutdown	 Notification of an aircraft crash into plant vital structures (SSW Complex, Diesel Generator, Auxiliary, Containment or Control Buildings) or Notification of severe damage to safe shutdown equipment from missiles or explosion Determination that the entry of toxic or flammable gases into vital areas (Control Room, ESF SWGR, Remote Shutdown Rooms, etc.) constitutes a plant safety problem
14. Other plant conditions exist that warrant activation of emergency centers and monitoring teams or a precautionary notification to the public near the site	 Emergency Director/Offsite Emergency Coordinator determines that a release is in progress or imminent that could affect the near site public.
 Evacuation of control room and control of shutdown systems not established from local stations in 15 minutes 	 Control Room evacuated <u>and</u> Unable to establish control of shutdown systems at the remote shutdown panel <u>within</u> 15 minutes of evacuating the Control Room

TABLE 4-1

GENERAL E	MERGENCY
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
 a. Effluent monitors detect levels corresponding to 1 rem/hr W.B. or 5 rem/hr thyroid at the site boundary under actual meteorological conditions b. These dose rates are projected based on other plant parameters (e.g., radiation levels in the containment with leak rate appropriate for existing containment pressure with some confirmation from effluent monitors) or are measured in the environs Note: Consider evacuation only within 2 miles of the site boundary unless these site boundary levels are exceeded by a factor of 10 or projected to continue for 10 hours or EPA Protective Action Guidelines are predicted to be exceeded at longer distances Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of primary coolant boundary, clad failure, and high potential for loss of containment) 	 Effluent monitor(s) (<u>UNDER ACTUAL</u> <u>METEOROLOGICAL CONDITIONS</u>) confirms release rates corresponding to site boundary exposure of: (2 hr dose commitment) a. 1000 mRem TEDE <u>Or</u> b. 5000 mRem CDE <u>Or</u> Radiation monitoring teams report radiation and/or iodine concentrations readings (at the site boundary) corresponding to: a. 1000 mRem TEDE <u>Or</u> b. 1.2 E-5 µCi/cc Iodine Loss of any two of the following fission product boundaries with a potential for loss of the third: <u>Fuel Cladding</u>
(Continued on next page)	 a. Coolant sample analysis indicates 300 μCi/ml dose equivalent I-131 <u>or</u> b. >1000 R/Hr in Drywell Potential Loss a. RPV water level cannot be restored and maintained > -167 in. <u>or</u> b. RPV pressure cannot be restored and maintained > 57 psig when in RPV flooding <u>or</u> c. >100 R/Hr in Drywell (Continued on next page)

TABLE 4-1

GENERAL	EMERGENCY
NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
2. (Continued) Loss of 2 of 3 fission product barriers with a potential loss of 3rd barrier, (e.g., loss of primary coolant boundary, clad failure, and high potential for loss of containment)	 (Continued) Loss of any two of the following fission product boundaries with a potential for loss of the third: <u>Reactor Pressure Boundary</u> <u>Loss</u> a. Drywell pressure >1.23 psig <u>and</u> indication of a steam leak in the drywell <u>OT</u> b. Main steam line not isolated <u>OT</u> c. RCIC steam line break outside containment with inability to isolate <u>Potential loss</u> a. Total reactor coolant leakage calculated to be >50 gpm <u>OT</u> b. >10 R/hr in Containment <u>Loss</u> a. Primary containment pressure >56 psig <u>OT</u> b. Loss of ability to isolate drywell or primary containment leakage into areas outside the primary containment a. Primary containment pressure >22 psig b. Operation in the unsafe region of HCTL <u>or</u> PSP curve c. Operation in the unsafe region of HDOL curve with the Hydrogen Igniters De-Energized
 Loss of physical control of the facility Note: Consider 2 mile precautionary evacuation 	 Physical attack on the plant has resulted in unauthorized personnel occupying the Control Room or the Remote Shutdown Panel or controlling Decay Heat Removal, Reactor Water Level or Reactivity

TABLE 4-1

TABLE 4-1

	GENERAL EN	MERGENCY
ľ	NUREG-0654 INITIATING CONDITIONS	EMERGENCY ACTION LEVEL
4. (co <u>Ex</u> a. b. c. d.	 Dontinued) xample BWR sequences Transient (e.g., loss of offsite power) plus failure of requisite core shut down systems (e.g., scram). Could lead to core melt in several hours with containment failure likely. More severe consequences if pumps trip does not function. Small or large LOCA's with failure of ECCS to perform leading to core melt degradation or melt in minutes to hours. Loss of containment integrity may be imminent. Small or large LOCA occurs and containment performance is unsuccessful affecting longer term success of the ECCS. Could lead to core degradation or melt in several hours without containment boundary. Shutdown occurs but requisite decay heat removal systems (e.g., RHR) or non-safety systems heat removal means are rendered unavailable. Core degradation or melt occur in 	Actor
. Ai su m	failure. ny major internal events (e.g., fires, earthquakes, ubstantially beyond design basis) which could cause hassive common damage to plant systems resulting	1. Fires, earthquakes, etc., substantially beyond designation basis which could or have caused massive common damage to plant systems

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITIC	DN	UNUSUAL		SITE AREA	GENERAL
CATEGORY	1	EVENT	ALERT	EMERGENCY	EMERGENCY
Abnormal Rad		AU1	AA1	AS1	AG1
Levels / Radiological Effluent	Radiological Effluents	Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥60 minutes <i>Plant Mode: 1,2,3,4,5,D</i>	Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 20 x ODCM limit for ≥15 minutes <i>Plant Mode: 1,2,3,4,5,D</i>	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology <i>Plant Mode: 1,2,3,4,5,D</i>	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology <i>Plant Mode: 1,2,3,4,5,D</i>
		AU2	AA2		
	al Rad Levels	Unexpected increase in plant radiation <i>Plant Mode: 1,2,3,4,5,D</i>	Release of radioactive material or increase in radiation levels within the facility that impedes operation of systems required to maintain or establish safe operations or cold shutdown <i>Plant Mode: 1,2,3,4,5,D</i>		
	orm		AA3		
	Abr		Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the RPV <i>Plant Mode: 1,2,3,4,5,D</i>		
Fission Product	SS	FU1	FA1	FS1	FG1
Barríer Degradation	FPB Loss / Potential Lo:	Loss or Potential Loss of Primary Containment <i>Plant Mode: 1,2,3</i>	Loss or Potential Loss of either Fuel Clad or Reactor Pressure Boundary <i>Plant Mode: 1, 2,3</i>	Loss or Potential Loss of any two Fission Product Barriers <i>Plant Mode: 1,2,3</i>	Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier. <i>Plant Mode: 1,2,3</i>

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITION CATEGORY		UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Hazards and Other Conditions Affecting Plant Safety	security Events	HU1 Confirmed security event which indicates a potential degradation in the level of safety of the plant. <i>Plant Mode: 1,2,3,4,5,D</i>	HA1 Confirmed security event in a plant Protected Area <i>Plant Mode: 1,2,3,4,5,D</i>	HS1 Confirmed security event in a plant Vital Area <i>Plant Mode: 1,2,3,4,5,D</i>	HG1 Security event resulting in loss of physical control of the facility <i>Plant Mode: 1,2,3,4,5,D</i>
	Discretionary	HU2 Conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event. <i>Plant Mode: 1,2,3,4,5,D</i>	HA2 Conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert. <i>Plant Mode: 1,2,3,4,5,D</i>	HS2 Conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency. <i>Plant Mode: 1,2,3,4,5,D</i>	HG2 Conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency. <i>Plant Mode: 1,2,3,4,5,D</i>
	Control Room Evacuation		HA3 Control Room evacuation has been initiated. <i>Plant Mode: 1,2,3,4,5,D</i>	HS3 Control Room evacuation has been initiated and plant control cannot be established. <i>Plant Mode: 1,2,3,4,5,D</i>	
	Natural and Destructive Phenomena	HU3 Natural or destructive phenomena affecting the Protected Area. <i>Plant Mode: 1,2,3,4,5,D</i>	HA4 Natural or destructive phenomena affecting a Vital Area Plant Mode: 1,2,3,4,5,D		

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITIO	N	UNUSUAL		SITE AREA	GENERAL
CATEGORY	CATEGORY EVENT		ALERT	EMERGENCY	EMERGENCY
Hazards and Other Conditions Affecting Plant Safety (cont)	Fire	HU4 Fire within the power block not extinguished within 15 minutes of detection. <i>Plant Mode: 1,2,3,4,5,D</i>	HA5 Fire within the power block affecting the operability of plant safety systems required to establish or maintain safe shutdown. <i>Plant Mode: 1,2,3,4,5,D</i>		
	Toxic or Flammable Gases	HU5 Release of toxic or flammable gases deemed detrimental to safe operation of the plant. <i>Plant Mode: 1,2,3,4,5,D</i>	HA6 Release of toxic or flammable gases within or contiguous to a Vital Area which jeopardizes operation of safety systems required to establish or maintain safe shutdown. <i>Plant Mode: 1,2,3,4,5,D</i>		
System Malfunction	Loss of AC Power	SU1 Loss of all offsite power to ESF Busses for >15 Minutes <i>Plant Mode: 1,2,3,4,5</i>	SA1 AC Power to Div I&II ESF busses reduced to a single power source for >15 minutes such that any additional single failure would result in loss of AC power to Div I & II ESF busses. <i>Plant Mode: 1,2,3</i> SA2 Loss of all offsite and onsite power to Div I & II ESF busses.	SS1 Loss of all offsite and onsite power to Div I&II ESF busses. <i>Plant Mode: 1,2,3</i>	SG1 Prolonged loss (>4 hours) of all offsite and onsite power to Div I&II ESF busses. <i>Plant Mode: 1,2,3</i>

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITION CATEGORY		UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
System Malfunction (cont)	Loss of DC Power	SU2 Unplanned loss of required DC power for >15 minutes <i>Plant Mode: 4,5</i>		SS2 Loss of all vital DC power <i>Plant Mode: 1,2,3</i>	
	Failure of Reactor Protection System		SA3 Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was successful. <i>Plant Mode: 1,2</i>	SS3 Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful. <i>Plant Mode: 1,2</i>	SG2 Failure of reactor protection system instrumentation to complete an automatic reactor scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core. <i>Plant Mode: 1,2</i>
	RCS Leakage	SU3 Loss of RPV inventory <i>Plant Mode: 1,2,3</i> SU4 Unplanned loss of RPV inventory <i>Plant Mode: 4</i> SU5 Unplanned loss of RPV inventory with irradiated fuel in the RPV <i>Plant Mode: 5</i>	SA4 Loss of RPV inventory with irradiated fuel in the RPV <i>Plant Mode: 4,5</i>	SS4 Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV <i>Plant Mode: 4,5</i>	SG3 Loss of RPV inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the RPV <i>Plant Mode: 4,5</i>

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Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITION		UNUSUAL		SITE AREA	GENERAL
CATEGORY	7	EVENT	ALERT	EMERGENCY	EMERGENCY
System Malfunction (cont)	Loss of Decay Heat Removal	SU6 Unplanned loss of decay heat removal capability with irradiated fuel in the RPV <i>Plant Mode: 4,5</i>	SA5 Inability to maintain plant in cold shutdown with irradiated fuel in the RPV <i>Plant Mode: 4,5</i>	SS5 Complete loss of heat removal capability. <i>Plant Mode: 1,2,3</i>	
	Inadvertent Criticality	SU7 Inadvertent criticality Plant Mode: 3,4,5			
	Loss of Annunciators / Indication	SU8 Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes <i>Plant Mode: 1,2,3</i>	SA6 Unplanned loss of most or all safety system annunciation or indication in the control room with either a significant transient in progress, or compensatory non-alarming indicators are unavailable. <i>Plant Mode: 1,2,3</i>	SS6 Inability to monitor a significant transient in progress. <i>Plant Mode: 1,2,3</i>	
	Los of Communication	SU9 Unplanned loss of all onsite or offsite communications capabilities. <i>Plant Mode: 1,2,3,4,5</i>			
	Cladding Degradation	SU10 Fuel clad degradation <i>Plant Mode: 1,2, 3,4,5</i>			

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITION		UNUSUAL	ALERT	SITE AREA	GENERAL
CATEGORY		EVENT		EMERGENCY	EMERGENCY
System Malfunction (cont)	Tech Spec Time Limit Exceeded	SU11 Inability to reach required shutdown within technical specification limits. <i>Plant Mode: 1,2,3</i>			

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TABLE 4-2

Classification of FSAR Design Bases Accidents

Design Bases Accident	Classification		
Seizure of one recirculation pump	Unusual Event		
Recirculation pump shaft break	Unusual Event		
Rod drop accident	Alert		
Instrument line break	Unusual Event		
Steam system pipe break outside containment	Site Area Emergency		
LOCA within reactor coolant pressure boundary	Site Area Emergency		
Feedwater line break outside containment	Site Area Emergency		
Main condenser Off Gas treatment system failure	Site Area Emergency		
Liquid radwaste tank failure	Alert		
Fuel handling accident outside primary containment	Site Area Emergency		
Fuel handling accident inside primary containment	Alert		

Note:

INPLEMENTING PROCEDURE 10-5-01.

This table is provided for example purposes only. Classification was determined by applying Table 4-1 EAL criteria to each FSAR Design Bases Accident. This table is not procedurally implemented.

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Attachment 2

to

GNRO-2003/00067

GGNS Proposed Emergency Plan Pages – Changes Incorporated

4.0 EMERGENCY CONDITIONS

4.1 Emergency Classification System

There are four classes of emergency conditions used in emergency planning. These four classes cover the entire spectrum of possible emergency situations, from minor local incidents to hypothetical major radiological emergencies, and allow for classification of an accident, notification of the appropriate offsite agencies and support groups, and the activation of emergency organizations. The system also provides for the notification and implementation of actions immediately applicable to a specific condition, and for upgrading the response to the appropriate level of classification in the event of a change in the severity of the condition. These actions are further described in Section 6.0.

Emergency Action Levels (EALs) are used to provide Plant Specific indication that an Initiating Condition exists. These levels are composed of a combination of plant parameters (such as instrument readings and system status) that can be used to give relatively quick indication to the Station operating staff of the severity of the accident situation. The purpose of the EALs is to provide the earliest possible indication of actual or potential accident situations. In most cases further assessment action is conducted both onsite and offsite before actual protective actions are initiated. EALs associated with radiological releases are related to the Environmental Protection Agency's Protective Action Guides (PAGs) summarized in EPA 400-R-92-001 "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents." A determination by the station emergency organization, along with state and local support agencies, of the potential of reaching or exceeding the PAGs is performed in accordance with dose assessment procedures in the event of a radiological release to the environment. The EALs are found in implementing Procedure 10-S-01-1 and correlate to the Initiating Conditions in Table 4-1. The EALs were developed from guidance contained in NEI 99-01 (Revision 4, January 2003) and from accidents analyzed in the GGNS Final Safety Analysis Report. When EALs are observed in conjunction with plant or equipment status due to planned maintenance or testing activities, an emergency condition may or may not exist and the situation must be evaluated on a case by case basis.

change in plant conditions and to provide assessment support as required.

4.1.3 <u>Site Area Emergency</u>

Immediate protective actions are not required upon notification of a Site Area Emergency condition; however, preliminary steps are initiated in anticipation of possible protective actions. These preliminary steps include complete activation of the emergency organization, alerting and/or mobilizing of monitoring teams, and notification of all offsite authorities and the news media. The Site Area Emergency class includes accidents which have a significant potential for the release of radioactive material.

Unlike the two previously described classes of emergencies, the Site Area Emergency is very likely to involve some radiation exposure to the near-site public. Also, many of the accidents included in this class have the potential for escalation to the General Emergency class.

4.1.4 General Emergency

The most severe emergency class used in emergency planning is the General Emergency.

Protective actions shall be recommended upon declaration of the General Emergency, as the accidents considered could result in the exceeding of the lower limits of the PAGs. The General Emergency EALs that require dose projections offsite use <u>actual</u> <u>meteorology</u> rather than the adverse meteorology assumptions used in the Site Area Emergency action levels.

None of the accidents analyzed in the FSAR would normally be classified as a General Emergency. However, the Loss of Coolant Accident (LOCA) within the reactor coolant pressure boundary analyzed in the FSAR could lead to a General Emergency classification in a situation where there was a subsequent loss of plant safety systems

leading to a possible core melt and failure of containment. Criteria to be used for declaration of a General Emergency includes core and containment status as well as actual radiation release data.

4.2 Classification of Postulated Accidents

A thorough analysis of each of the postulated accidents is included in the Grand Gulf Nuclear Station Final Safety Analysis Report (FSAR). All of the postulated accidents could be classified into one of the four emergency classes (See Table 4-2). In classifying each of the postulated accidents, the conservative assumptions used in the FSAR analysis were considered. It is possible that occurrence of some of the postulated accidents results in a classification lower in severity.

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Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITIC)N	UNUSUAL		SITE AREA	GENERAL
CATEGORY		EVENT	ALERT	EMERGENCY	EMERGENCY
Abnormal Rad		AU1	AA1	AS1	AG1
Levels / Radiological Effluent	Radiological Effluents	Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥60 minutes <i>Plant Mode: 1,2,3,4,5,D</i>	Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 20 x ODCM limit for ≥15 minutes <i>Plant Mode: 1,2,3,4,5,D</i>	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology
				Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D
		AU2	AA2		
	ad Levels	Unexpected increase in plant radiation <i>Plant Mode: 1,2,3,4,5,D</i>	Release of radioactive material or increase in radiation levels within the facility that impedes operation of systems required to maintain or establish safe operations or cold shutdown		
	lal R		Plant Mode: 1,2,3,4,5,D		
	Jorm		AA3		
	Abr		Damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the RPV		
			Plant Mode: 1,2,3,4,5,D		
Fission Product	SS	FU1	FA1	FS1	FG1
Barrier Degradation	FPB Loss otential Lo	Loss or Potential Loss of Primary Containment <i>Plant Mode: 1.2.3</i>	Loss or Potential Loss of either Fuel Clad or Reactor Pressure Boundary	Loss or Potential Loss of any two Fission Product Barriers <i>Plant Mode: 1,2,3</i>	Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier.
	_ <u> </u>	· · · · · · · · · · · · · · · · · · ·	Plant Mode: 1, 2,3		Plant Mode: 1,2,3

Plant Mode 1 Power Operation

2 Startup 3 Hot Shutdown

4 Cold Shutdown 5 Refueling D Defueled

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Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

RECOGNITION		UNUSUAL		SITE AREA	GENERAL
CATEGORY		EVENT	ALERT	EMERGENCY	EMERGENCY
Hazards and Other Conditions Affecting Plant Safety		HU1	HA1	HS1	HG1
	y Event	Confirmed security event which indicates a potential	Confirmed security event in a plant Protected Area	Confirmed security event in a plant Vital Area	Security event resulting in loss of physical control of the facility
	ecurit	safety of the plant.	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D
		Plant Mode: 1,2,3,4,5,D			
		HU2	HA2	HS2	HG2
	Discretionary	Conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.	Conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.	Conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.	Conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.
	_	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D
	~		HA3	HS3	
	Control Room Evacuation		Control Room evacuation has been initiated.	Control Room evacuation has been initiated and plant	
			Plant Mode: 1,2,3,4,5,D	control cannot be established.	
				Plant Wode: 1,2,3,4,5,D	
	Vatural and Destructive Phenomena	HU3	HA4		
		Natural or destructive phenomena affecting the Protected Area.	Natural or destructive phenomena affecting a Vital Area		
	2011	Plant Mode: 1,2,3,4,5,D	Plant Mode: 1,2,3,4,5,D		

Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

Hazards and Other		HU4	HA5		
Conditions Affecting Plant Safety (cont)	Fire	Fire within the power block not extinguished within 15 minutes of detection. <i>Plant Mode: 1,2,3,4,5,D</i>	Fire within the power block affecting the operability of plant safety systems required to establish or maintain safe shutdown.		
			Plant Mode: 1,2,3,4,5,D		
	ses	HU5	HA6		
	c or Flammable Ga	Release of toxic or flammable gases deemed detrimental to safe operation of the plant. <i>Plant Mode: 1,2,3,4,5,D</i>	Release of toxic or flammable gases within or contiguous to a Vital Area which jeopardizes operation of safety systems required to establish or maintain safe shutdown.		
	Tox		Plant Mode: 1,2,3,4,5,D		
System		SU1	SA1	SS1	SG1
Malfunction	s of AC Power	Loss of all offsite power to ESF Busses for >15 Minutes <i>Plant Mode: 1,2,3,4,5</i>	AC Power to Div I&II ESF busses reduced to a single power source for >15 minutes such that any additional single failure would result in loss of AC power to Div I & II ESF busses.	Loss of all offsite and onsite power to Div I&II ESF busses. <i>Plant Mode: 1,2,3</i>	Prolonged loss (>4 hours) of all offsite and onsite power to Div I&II ESF busses. <i>Plant Mode: 1,2,3</i>
	Los		6 A 2		
			JAZ		
			power to Div I & II ESF busses.		
			Plant Mode: 4,5,D		
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Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

System	Q	SU2		SS2		
Malfunction (cont)	oss of D Power	Unplanned loss of required		Loss of all vital DC power		
		DC power for >15 minutes		Plant Mode: 1,2,3		
		Plant Mode: 4,5				
	u		SA3	SS3	SG2	
	ailure of Reactor Protectio System		Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was successful. <i>Plant Mode: 1.2</i>	Failure of reactor protection system to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful. <i>Plant Mode: 1,2</i>	Failure of reactor protection system instrumentation to complete an automatic reactor scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core.	
	Ľ				Plant Mode: 1,2	
		SU3	SA4	SS4	SG3	
		Loss of RPV inventory	Loss of RPV inventory with	Loss of RPV inventory	Loss of RPV inventory affecting	
	ss of Decay at Removal RCS Leakage	Plant Mode: 1,2,3	irradiated fuel in the RPV	affecting core decay heat	containment challenged with	
		SU4	Plant Mode: 4,5	irradiated fuel in the RPV	irradiated fuel in the RPV	
		Unplanned loss of RPV inventory		Plant Mode: 4,5	Plant Mode: 4,5	
		Plant Mode: 4				
		SU5				
		Unplanned loss of RPV inventory with irradiated fuel in the RPV				
		Plant Mode: 5				
		SU6	SA5	SS5	· · · · · · · · · · · · · · · · · · ·	
		Unplanned loss of decay heat removal capability with irradiated fuel in the RPV	Inability to maintain plant in cold shutdown with irradiated fuel in the RPV	Complete loss of heat removal capability. <i>Plant Mode: 1.2.3</i>		
	με Γ	Plant Mode: 4,5	Plant Mode: 4,5			
Plant Mode 1 Power Operation 2 Startup 3 Hot Shutdown 4 Cold Shutdown 5 Refueling D Defueled						

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Table 4-1

INITIATING CONDITIONS for Grand Gulf Nuclear Station

System	ity	SU7			
Malfunction (cont)	lver	Inadvertent criticality			
	Cri	Plant Mode: 3,4,5			
	_	SU8	SA6	SS6	
	-oss of Annunciators / Indication	Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes <i>Plant Mode: 1,2,3</i>	Unplanned loss of most or all safety system annunciation or indication in the control room with either a significant transient in progress, or compensatory non-alarming indicators are unavailable.	Inability to monitor a significant transient in progress. <i>Plant Mode: 1,2,3</i>	
	-		Plant Mode: 1,2,3		
	Los of Communication	SU9 Unplanned loss of all onsite or offsite communications capabilities. <i>Plant Mode: 1,2,3,4,5</i>			
	fion	SU10			
	addir radat	Fuel clad degradation			-
	Deg	Plant Mode: 1,2, 3,4,5			
	ed	SU11			
	ch Spec Ti nit Exceed	Inability to reach required shutdown within technical specification limits.			
	ĽĒ	Plant Mode: 1,2,3			

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TABLE 4-2

Classification of FSAR Design Bases Accidents

Design Bases Accident	Classification		
Seizure of one recirculation pump	Unusual Event		
Recirculation pump shaft break	Unusual Event		
Rod drop accident	Alert		
Instrument line break	Unusual Event		
Steam system pipe break outside containment	Site Area Emergency		
LOCA within reactor coolant pressure boundary	Site Area Emergency		
Feedwater line break outside containment	Site Area Emergency		
Main condenser Off Gas treatment system failure	Site Area Emergency		
Liquid radwaste tank failure	Alert		
Fuel handling accident outside primary containment	Site Area Emergency		
Fuel handling accident inside primary containment	Alert		

Note:

This table is provided for example purposes only. Classification was determined by applying implementing Procedure 10-S-01-1 criteria to each FSAR Design Bases Accident. This table is not procedurally implemented.

Attachment 3

to

GNRO-2003/00067

GGNS Proposed EALs – To Be Incorporated in Procedure

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<u>NOTE</u>

Any changes made to information in Attachment I may require changes to EPP 01-02 (EAL Matrix).

ABNC	RMAL RAD LEVELS / RADIOLOGICAL EFFLUE	NT Plant Modes: 1 Power Operat	tions 2 St	tartup 3 Hot Shutdown 4 Cold Shutdown 5	Refueling D Defueled
	GENERAL EMERGENCY	SITE AREA EMERGENCY		ALERT	
	AG1 1 2 3 4 5 D	AS1	12345D		D AU1 12345D
Radiological Effluents	AG1 1 2 3 4 5 D Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology Emergency Action Level: 1. Dose projection of > 1000mR TEDE at or beyond site boundary based on in plant or field team data OR 2. Dose projection of > 5000mR CDE Thyriod at or beyond site boundary based on in plant or field team data	 AS1 Offsite dose resulting from an actual <u>or</u> in release of gaseous radioactivity exceeds TEDE <u>or</u> 500 mR CDE Thyroid for the aprojected duration of the release using admeteorology <u>Emergency Action Level:</u> Dose projection of > 100mR TEDE beyond site boundary based on in field team data OR Dose projection of > 500mR CDE To or beyond site boundary based on in field team data 	12345D nminent 100 mR ctual <u>or</u> ctual at <u>or</u> plant <u>or</u>	AA1 [1 2 3 4 5]C Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 20 x ODCM limit ≥ 15 minutes Emergency Action Level: 1. Liquid release > 40 x High High Alarm set point on G17-RR-R521 with failure of G17-F355 to close for ≥ 15 minutes OR 2. High High Alarm on one or more of the following: OG Radwst Vent	AU1 [1]2]3]4]5 D Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥ 60 minutes Emergency Action Level: 1. Liquid release > 4 x High High Alarm set point on G17-RR-R521 with failure of G17-F355 to close for ≥ 60 minutes OR 2. High High Alarm on one or more of the following: OG/Radwaste Vent (P601-19A-A8) FHA Vent (P601-19A-C11) Ctmt Vent (P601-19A-G9) Turb Bldg Vent (P601-19A-F11) AND Summation of all monitors (including SBGT A & B) exceeds 2 x TRM Spec limit (6.11.4) for ≥ 60 minutes OR 2. Confirmed comple comple conducis for gaseous or
				 3. Confirmed sample analysis for gaseous or liquid release exceeds 20 x TRM Spec limit (6.11.1, 6.11.2, 6.11.4, 6.11.5 or 6.11.6) for ≥ 15 minutes 	 Commed sample analysis for gaseous <u>or</u> liquid release exceeds 2 x TRM Spec limit (6.11.1, 6.11.2, 6.11.4, 6.11.5, <u>or</u> 6.11.6) for ≥ 60 minutes

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ABNC	RMAL RAD LEVELS / RADIOLOGICAL EFFLUENT	Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown
	GENERAL EMERGENCY	SITE AREA	EMERGENCY		ALE	RT
				AA2 Rele leve syste oper	e ase of radioactive mater s within the facility that ems required to maintain ations <u>or</u> cold shutdowr	1234 rial <u>or</u> increase in radiati i mpedes operation of n <u>or</u> establish safe
				Eme	rgency Action Level:	
				1.	Valid radiation level ≥ Room	15 mR/hr in the Control
				OR		
els				2.	Valid radiation level ≥ C, HPCS, LPCS, <u>or</u> R required	80 R/hr in the RHR A, E CIC Room <u>and</u> access i
Lev				AA:	<u>B</u>	1234
al Rad				Dam has outs	age to irradiated fuel <u>or</u> <u>or</u> will result in uncoveri ide the RPV	loss of water level that ng of irradiated fuel
E S				Emo	ergency Action Level:	
Abn				1.	Potential spent fuel dan one <u>or</u> more of the follow	naging event with Alarm ving:
					Ctmt Vent	(P601-19A-G9
					FH Area Vent	(P601-19A-C1
					Ctmt 209 Airlock	(P844-1A-A1)
					Ctmt Fuel Hdlg Area	(P844-1A-A3)
					Aux Bidg Fuel Haig Area	a (P844-1A-A4)
				2.	Valid indication of unco decrease in Aux Bldg Fu Pools that has <u>or</u> will rea assemblies becoming u	ntrolled water level uel Pools <u>or</u> Upper Ctmt sult in irradiated fuel ncovered

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5 R	efuel	ing	D Defueled
- Description			UNUSUAL EVENT
5 D	<u>AU2</u>		1 2 3 4 5 D
ion	Unex	pec	ted increase in plant radiation
	Eme	rgeı	ncy Action Level:
	1.	Val indi rad sca	id Area Radiation Monitor <u>or</u> survey icates an unplanned increase in plant iation levels by a factor of 1000 <u>or</u> full ale
	<u>OR</u>		
3, s	2.	Val dec Ctr ren	l id indication of uncontrolled water level crease in Aux Bldg Fuel Pools <u>or</u> Upper nt Pools with all irradiated fuel assemblies maining covered by water
4 5 D		<u>AN</u>	<u>D</u>
		a.	Valid Alarm on any of the following:
			Ctmt 209 Airlock (P844-1A-A1)
			Ctmt Fuel Hdlg Area (P844-1A-A3)
n on			Aux Bldg Fuel Hdlg Area - (P844-1A-A4) OR
9) 1)		b.	survey indicates increased radiation level in the associated area
)			
)			
L			
[

FISSI	ON PRODUCT BARRIER DEGRADATION	Plant Modes: 1 Power Operations 2 Startup	3 Hot Shutdown	
	GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
:PB Loss / Potential Loss	FG1 1 2 3 Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier Emergency Action Level: 1. Loss of any two Fission Product Barriers AND 2. Loss or Potential Loss of third Loss of third barrier.	FS1 123 Loss or Potential Loss of any two Fission Product Barriers Emergency Action Level: 1. Loss or Potential Loss of any two Fission Product Barriers Product Barriers	FA1 123 FU1 Loss or Potential Loss of either Fuel Clad or Reactor Loss or Pressure Boundary Emergency Action Level: 1. 1. Loss or Potential Loss of either Fuel Clad or 1. 1. Loss or Potential Loss of either Fuel Clad or 0. 1. Loss or Potential Loss of either Fuel Clad or 0. 1. Loss or Potential Loss of either Fuel Clad or 0.	<u>or</u> Potential Loss of Primary Containment gency Action Level: Loss <u>or</u> Potential Loss of Primary Containment

Fission Product Barrier Matrix

Fuel Clad						
Parameter Loss Potential Loss						
Primary Coolant Activity	Coolant activity >300 μCi/mI dose eq. I ¹³¹	None				
RPV Water Level	RPV water level cannot be restored above -192 in.	RPV water level cannot be restored above -167 in.				
Drywell Rad Monitoring	>5000 R/hr	None				
MSL Rad Monitoring	MSL Rad level > the Hi Hi Alarm Setpoint (P608- 18A-C4, P608-19A-C4)	None				
ED Judgment	Other	Other				

n	easter Dressure Devisite			Primary Containment	
R	eactor Pressure Bounda	ry		Primary Containment	
Parameter	Loss	Potential Loss	Parameter	Loss	Potential Loss
Drywell Pressure	>1.39 psig in drywell with indications of a leak in the drywell	None	Primary Ctmt Press	Unexplained loss of pressure following initial pressure increase	>22 psig in Pri Ctmt
RPV Water Level	RPV water level cannot be restored above -167 in. with indications of a leak in the drywell	None	Hydrogen Concentration	None	H2 igniters de-energized <u>and</u> either DW H2 >9% <u>or</u> Ctmt H2 in HDOL Unsafe Zone
	Unisolable RCIC <u>or</u> MSL break	Unisolable Reactor Pressure Boundary leakage >50 gpm	RPV Water Level	None	Entry into SAP 1, 5 or 6
Reactor Pressure Boundary Leak Rate	None	Area Temp <u>or</u> Area Rad > Alert Value in Table F1 with confirmed Reactor Pressure Boundary leak in the area		Inability to isolate Primary Ctmt when isolation is required	None
SRVs	SRV stuck open	None	Primary Ctmt Isolation Failure <u>or</u> Bypass	Primary Ctmt venting required by SAPs	None
ED Judgment	Other	Other		Area Temp <u>or</u> Area Rad > SAE / GE Value in Table F1 with confirmed Reactor Pressure Boundary leak in the area	None
			Pri Ctmt Rad Monitoring	None	>11,500 R/hr
			ED Judgment	Other	Other

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FISSION PRODUCT BARRIER DEGRADATION	Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	

Table F1

	Area Temperature			Area Radiation Level	
Parameter	Alert Limit	SAE / GE Limit	Parameter	Alert Limit	SAE / GE Limit
MSL Pipe Tunnel Temp.	185°F (P601-19A/18A-A3/A4)	235°F (E31-N064A,B,C,D,E,F)	RHR Room A Rad	10 ² MR/HR (P844-1A-D4)	8 x 10⁴ MR/HR
RHR-A Equip Area Temp.	165°F (P601-20A-B1)	225°F (E31-N068A,N610A)	RHR Room B Rad	10 ² MR/HR (P844-1A-D4)	8 x 10⁴ MR/HR
RHR-B Equip Area Temp.	165°F (P601-20A-B1)	225°F (E31-N068B,N610B)	RHR HX A Hatch Rad	10 ² MR/HR (P844-1A-C4)	8 x 10⁴ MR/HR
RCIC Equip Area Temp.	185°F (P601-21A-G3)	212°F (E31-N602A/B)	RHR HX B Hatch Rad	10 ² MR/HR (P844-1A-C4)	8 x 10⁴ MR/HR
RWCU Pmp Rm 1 Temp	170°F (P680-11A-A1)	NA	RCIC Room Rad	10 ² MR/HR (P844-1A-D4)	8 x 10⁴ MR/HR
RWCU Pmp Rm 2 Temp	170°F (P680-11A-A2)	NA	MSL Rad Monitor	1.5xFPB (P601-19A-D4)	8 x 10⁴ MR/HR
	ankan ang ang ang ang ang ang ang ang ang a	******	SGTS Fltr Trn Rad	2.5 MR/HR (P844-1A-C5)	8 x 10² MR/HR

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HAZA	RDS AND OTHER MALFUNCTIONS	Plant Modes: 1	Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown	5 Refueli	ng Defueled
	GENERAL EMERGENCY	SITE	AREA EMERGENCY			ALERT	1	UNUSUAL EVENT
Security Events	 HG1 12345D Security event resulting in loss of physical control of the facility Emergency Action Level: Loss of physical control of the Control Room due to a security event OR Loss of physical control of the Remote Shutdown Panel due to a security event OR Loss of physical control of adequate core cooling or reactivity control capability 	HS1 Confirmed security Emergency Action 1. Site Security has entered a Area)	event in a plant Vital A <u>n Level:</u> Code Red (Armed adv any power block buildir	12345D Area versary ng or Vital	HA1 Confirmed security even Emergency Action Le 1. Site Security Cod attempting to or h	ent in plant protected ar evel: de Orange (Armed ad has crossed protected a	12345D ea versary area fence)	 <u>HU1</u> <u>1</u>2345D Confirmed security event which indicates a potential degradation in the level of safety of the plant <u>Emergency Action Level:</u> 1. A credible threat notification received from, or validated by, a trustworthy source (FBI, NRC, Claiborne County Sheriff's Office, Plant Management, Site Security, etc.) Eaxmple: A report from Site Security of an unauthorized attempted PA entry should be considered a credible threat. <u>OR</u> 2. Site Security Code Yellow (Armed adversary attempting to or has entered company property)
Discretionary	 HG2 Conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency Emergency Action Level: 1. Conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate area. 	HS2 Conditions exist will Emergency Director Site Area Emerger Emergency Action 1. Conditions exe Emergency D progress or h or likely major needed for pr are not expect which exceed exposure level	hich in the judgment of or warrant declaration of ncy on Level: kist which in the judgmen Director indicate that eve ave occurred which invo or failures of plant func rotection of the public. A cted to result in exposure d EPA Protective Action els beyond the site bour	1 2 3 4 5 D f the of a nt of the ents are in olve actual tions Any releases e levels Guideline ndary.	HA2 Conditions exist which Emergency Director w Emergency Action Le 1. Conditions exist w Emergency Direct progress or have potential substa safety of the plant limited to small fra Action Guideline of	in the judgment of the earrant declaration of a evel: which in the judgment of tor indicate that events occurred which involve intial degradation of the t. Any releases are exp actions of the EPA Prot exposure limits.	12345D e in Alert f the are in actual <u>or</u> he level of bected to be ective	HU2 1 2 3 4 5 D Conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event Emergency Action Level: 1. Conditions exist which 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. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur
Control Room Evacuation		HS3 Control Room eva plant control canno Emergency Actio 1. Control Room 05-1-02-II-1, Shutdown Pa be establishe	cuation has been Initia ot be established on Level: n evacuation has been of Shutdown from the Ren anel, <u>and</u> control of the p ed in <15 minutes	12345D ted and directed per note blant cannot	HA3 Control Room evacuat Emergency Action La 1. Control Room eva 05-1-02-II-1, Shut Panel	tion has been initiated <u>evel:</u> acuation has been direction tdown from the Remote	12345D cted per Shutdown	

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HAZA	RDS AND OTHER MALFUNCTIONS	Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown	5 Refueli	ng [D Defueled	
	GENERAL EMERGENCY	S	ITE AREA EMERGENCY			ALERT			UNUSUAL EVENT	
					HA4		1 2 3 4 5 D	<u>HU3</u>		1 2 3 4 5 D
ena					Natural <u>or</u> destructive Vital Area	phenomena affecting	а	Natura protect	al <u>or</u> destructive phenomena aff ed area	ecting the
Ĕ					Emergency Action L	evel:		Emerg	gency Action Level:	
Phen					1. Verified earthquation	ake detected by in pla greater than OBE	nt seismic	1. \ s	Verified earthquake detected by seismic instrumentation	in plant
ive				,	<u>OR</u>			<u>OR</u>		
uct					2. Tornado resultin	g in visual damage to	a vital area	2. 1	Fornado observed in protected	area
str					OR			<u>OR</u>		
ă					3. Vehicle crash int	to a vital area structur	e resulting	3. \	Vehicle crash into a power bloch	< structure
ano					in visual damage	e to vital area		<u>OR</u>		
ral								4. E	Explosion within the protected a	rea causing
atu					4. Explosion causir	ng visual damage to v	ital area		equipment	e <u>or</u>
Z							to the second	OR		
					5. Main turbine fail visible damage f	ure-generated missile to safety related equip	ment	5.	Main turbine failure resulting in casing <u>or</u> generator seal damag	visual turbine je
					<u>HA5</u>		1 2 3 4 5 D	<u>HU4</u>		12345D
					Fire within the power plant safety systems r	block affecting the op required to establish <u>c</u>	erability of or maintain	Fire w 15 mir	ithin the power block not exting nutes of detection	uished within
					safe shutdown	<u>.</u>		Emer	gency Action Level:	
Fire					Emergency Action L1.Fire in the powe	<u>evel:</u> r block causing visual	damage to	1. 1	Fire in power block not extinguis 15 minutes of either:	shed within
					plant safety equ	ipment required to es nutdown.	tablish <u>or</u>		a. Main control room notificat	on
								OR		
									b. Verification of annunciators	5
es					<u>HA6</u>		1 2 3 4 5 D	<u>HU5</u>		1 2 3 4 5 D
able Gas					Release of toxic <u>or</u> fla contiguous to a Vital <i>i</i> of safety systems req safe shutdown.	ammable gases within Area which jeopardize juired to establish <u>or</u> r	i or es operation naintain	Relea detrim <u>Emer</u>	se of toxic <u>or</u> flammable gases nental to safe operation of the p gency Action Level:	deemed lant
Ē					Emergency Action L	_evel:		1.	Determination of toxic, oxygen	displacing or
oxic or Flai					1. Determination of flammable gase manned for safe immediately dar	of toxic, oxygen displayers to a Vital Area, that the operation of the plar ngerous to life and he	cing or must be nt, alth <u>or</u>		disrupt normal plant operation	ncient to
I ⊨					> lower flammal	bility limit				

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SYST	EM MALFUNCTIONS	Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown	1 5 F
	GENERAL EMERGENCY	SI	TE AREA EMERGENCY			ALERT	
Loss of AC Power	SG1 123 Prolonged loss (>4 hrs) of all offsite and onsite AC power to Div I & II ESF busses Emergency Action Level: 1. Loss of AC power to 15AA and 16AB AND Either: a. Restoration of power to either 15AA or 16AB within 4 hours is not likely OR b. Conditions are imminent that a loss of two fission product barriers and loss or potential loss of the third (FG1) is expected to occur prior to restoration of power to either 15AA or 16AB.	SS1 Loss of all offsite ESF busses Emergency Ac 1. Loss of AC AND Failure to 16AB with of both of	e and onsite AC power to <u>etion Level:</u> C power to 15AA <u>and</u> 16A restore power to either 1 in 15 minutes from the ti ifsite <u>and</u> onsite AC powe	123 • Div I & II AB 5AA <u>or</u> me of loss fr	SA1 AC power to Div I & I power source for >15 single failure would re Div I & II ESF busses Emergency Action L 1. AC power to 15. one of the follow a. ESF11 or E3 OR b. DG11 or DG SA2 Loss of all offsite and ESF busses Emergency Action L 1. Loss of AC pow AND Failure to restor within 15 minut offsite and onsi	I ESF busses reduced minutes such that an esult in loss of AC pow <u>evel:</u> AA <u>and</u> 16AB reduced ving sources for >15 m SF21 <u>or</u> ESF12 transf G12 diesel generators onsite AC power to D <u>evel:</u> for to 15AA <u>and</u> 16AB re power to either 15A re power to either 15A re power to either 15A re power to either 15A	d to a si iy additi ier to bo d to only ninutes formers iv I & II
Loss of DC Power		<u>SS2</u> Loss of all vital <u>Emergency Ac</u> 1. 11DA <u>and</u>	DC power <u>ction Level:</u> I 11DB <105 VDC for >15 i	∐2]3 minutes.			

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Refueli	na	Defueled	
123	SU1	1234	5
ngle onal	Loss >15 r	of all offsite power to ESF busses for minutes	
oth	Eme	rgency Action Level:	
y :	1.	Loss of power from ESF11 and ESF21 and ESF12 transformers for >15 minutes	
4 5 D			
			-
AB th			
	SU2	[4	5
	Unpl >15 i	lanned loss of required DC power for minutes	
	Eme	rgency Action Level:	
	1.	Unplanned reduction in 11DA <u>and</u> 11DB to <pre><pre><pre><pre></pre></pre></pre></pre>	
	AN	<u>D</u>	
	2.	Unable to restore either 11DA <u>or</u> 11DB battery charger within 15 minutes after reaching 105 VDC	

SYST	EM MALFUNCTIONS	Plant Mo	des:	1 Power Operati	ions	2 Startup	3	Hot Shutdown	4 Cold Shutdown	5 R
	GENERAL EMERGENCY		SIT	E AREA EMERGEN	ICY	4444 			ALERT	
ε	<u>SG2</u> 12	<u>SS3</u>				1 2	<u>SA3</u>			
tion Syste	Failure of the reactor protection system to complete an automatic scram <u>and</u> manual scram was not successful <u>and</u> there is indication of an extreme challenge to the ability to cool the core		Failure of reactor protection system to complete <u>or</u> initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded <u>and</u> manual scram was not successful			Failure of reactor protection system to complete <u>or</u> initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded <u>and</u> manual scram was successful			lete <u>or</u> eactor ed <u>and</u>	
tect	Emergency Action Level:	Emergency Action Level:			Emergency Action Level:					
tor Prot	 Automatic <u>and</u> manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical 		omatic s ert suffic ctor sub	cram <u>and</u> manual ient control rods to critical	failed to bring th	rapidly ie	1.	Automatic scran control rods to b manual scram w	n failed to rapidly inser pring the reactor subcri vas successful	t sufficie tical, <u>an</u>
eac	AND									
of Re	a. RPV parameters requiring entry into SAPs									
Inr	OR									
Fai	b. RPV pressure <u>and</u> suppression pool temperature cannot be maintained in the HCTL Safe Zone									
	<u>SG3</u> 4 5	<u>SS4</u>				4 5	<u>SA4</u>			
	Loss of RPV inventory affecting fuel clad integrity	Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV			Loss of RPV inventory with irradiated fuel in the R			n the RP		
	with containment challenged with irradiated fuel in the RPV				Eme	rgency Action L	<u>_evel:</u>			
	Emergency Action Level:	Emergency Action Level:			1. Loss of RPV inventory as indicated by RF			RPV le		
age	1. RPV level:	I. a.		in RPV inventory						
eat	a. <-167 in. for >30 minutes		RP\/ la	evel cannot he mo	nitored f	or >30	$\frac{OK}{2}$	a Loss of RP	V inventory	
۲ ۲	OR	minutes			AND	· moonory				
br	b. cannot be monitored with indication of	OR						b. RPV level (cannot be monitored f	or >15
Bour	core uncovery for >30 minutes <u>AND</u>	2. a.	RPV le	evel <-156.3in. wit e not established	th contai	nment		minutes		
nre	2. a. Containment closure not established	OF	<u>R</u>							
ess	OR	b.	RPV le	evel <-167 in. with	n contain	ment				
Å	 b. Containment pressure >22 psig 		closur	e established						
teactor	OR									
	c. Containment hydrogen concentration >19%									
–	OR									
	 Any EP-4 radiation monitor reading above its Max Safe Value 									

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efueli	ng	DDefueled
		UNUSUAL EVENT
12		
ent		
<u>ia</u> a		
45	<u>SU3</u>	123
י∨י	Loss	of RPV inventory
	Eme	rgency Action Level:
evel	1.	Unidentified or pressure boundary leakage > 10 gpm
	<u>0</u> 2.	Identified leakage > 35 gpm
	<u>SU4</u>	4
	Unpla	anned loss of RPV inventory
	Eme	rgency Action Level:
	1.	RPV water level cannot be restored and maintained above 11.4 in.
	SU5	5
	Unpl fuel i	anned loss of RPV inventory with irradiated n the RPV
	Eme	rgency Action Level:
	1.	Unplanned RPV level decrease below the RPV flange for >15 minutes
	<u>OR</u> 2.	a. Loss of RPV inventory
		b. RPV level cannot be monitored

SYST	EM MALFUNCTIONS	Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown	5 R
Loss of Decay Heat Removal	GENERAL EMERGENCY	Si <u>SS5</u> <u>Complete loss of</u> <u>Emergency Act</u> 1. Inability to temperatur Emergenc	TE AREA EMERGENCY of heat removal capability tion Level: o maintain Suppression Por re in the HCTL Safe Zone y Depressurization per EF	123	SA5 Inability to maintain plirradiated fuel in the RI irradiated fuel in the RI Emergency Action Lee 1. An unplanned extemperature >200 Pressure Boundar OR 2. An unplanned extemperature >200 CTMT integrity a Boundary integrit OR 3. An unplanned extemperature >200 results in RPV pr	ALERT lant in Cold Shutdown PV evel: vent results in reactor 0 °F without CTMT <u>a</u> ary integrity vent results in reactor 0 °F for >20 minutes nd without Reactor P ty vent results in reactor 0 °F for >60 minutes ressure increase >10 p	coolan <u>see Note</u> Pressure scoolan <u>see Note</u>
ors / Indication Criticality		<u>SS6</u> Inability to mor progress <u>Emergency Ac</u> 1. a. Loss 1H13 for >	hitor a significant transient tion Level: of most <u>or</u> all annunciator -P680, 1H13-P601 <u>and</u> 1H 15 minutes	123 in rs on H13-P870	SA6 Unplanned loss of mo annunciation or indicat a significant transient i non-alarming indicator Emergency Action Le	ost or all safety system tion in control room wi in progress, <u>or</u> compe rs are unavailable evel:	n ith eithe ensatory
Loss of Annunciato		AND b. Indica core l barrie AND c. A sigu AND d. Comp are u	ations needed to monitor of heat removal <u>or</u> fission pro er are unavailable nificant transient is in prog pensatory non-alarming in navailable	priticality <u>or</u> oduct gress dications	 I. Unplanned loss indicators on 1H 1H13-P870 for > <u>AND</u> a. A significant <u>OR</u> b. Compensate unavailable 	of most <u>or</u> all annunc 13-P680, 1H13-P601 15 minutes t transient is in progres ory non-alarming indic	ators <u>and</u> ss

Note: If a decay heat removal system is in operation within this time frame and reactor coolant temperature is being reduced then this EAL is not applicable.

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Refueli	ng DDefueled
5	UNUSUAL EVENT
4 5	<u>SU6</u> 4 5
	Unplanned loss of decay heat removal capability with irradiated fuel in the RPV
	Emergency Action Level:
nt actor	 An unplanned event results in reactor coolant temperature >200 °F
	<u>OR</u>
nt with	 Loss of reactor coolant temperature <u>and</u> RPV level indication for >15 minutes
Ŭ	
nt or	
<u>91</u>	
	SU7 [3]4[5]
	Inadvertent criticality
	Emergency Action Level:
	1. An unplanned sustained positive period observed on nuclear instrumentation
123	SU8 1 2 3
er y	Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes
	Emergency Action Level:
or	 Unplanned loss of most <u>or</u> all safety system annunciators <u>or</u> indication on 1H13-P680, 1H13-P601 <u>and</u> 1H13-P870 for >15 minutes
are	

SYSTEM MALFUNCTIONS		Plant Modes:	1 Power Operations	2 Startup	3 Hot Shutdown	4 Cold Shutdown	5 Refue	
					s and a second		S I	
ication		Onsite (Table S1 Communications Equipme	ent	Table S2 Offsite Communications Equipment			
unu		Plant Paging System			All telephone lines (co			
L L L		Sound Powered I	Phones					
° C		In-plant Telephor						
s of					Cellular Phones		~)	
-OS					LIHE Radios			
Cladding Degradation						μ		
Tech Spec Time Limit Exceeded								

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				······		
ing	DDefu	eled				
s 20 Alex Alexandra Alexandra Alexandra		UNUS	JAL EVEN	Т		
SU9					4	
					12	345
Unpl comn	anned lo nunicatio	ess of all c ons capab	onsite <u>or</u> o ilities	offsite		
Emei	rgency A	Action Le	vel:			
1.	Unplan	ned loss o	of all onsit	е		
	commur	nications	equipment	t (See Ta	ble	S1)
OR	2					
2.	Unplanı	ned loss (of all offsit	е		
	commur	nications	capability	(See Tab	le S	2)
SU1	0				12	345
	-				<u> </u>	
Fuel	clad deg	radation				
Eme	rgency A	Action Le	vel:			
1.	Offgas i	solation d	lue to valio	d Offgas I	Post	
	Treatme	ent monito	or signal.			
	(1H13-F	'601-19A	-08)			
OR						
2.	Coolant	sample	activity :	>4.0 µCi	/ml	dose
	equivale	ent l ¹³¹				
<u>SU1</u>	1					123
Inabi techr	i lity to re nical spe	ach requi	ired shutd time limits	own withi	n	
Eme	rgency /	Action Le	evel:			
1.	Plant is mode w Action S	not broug ithin Tech Statement	ght to requ nnical Spe Time	ired oper cifications	atin s LC	g O
	ng SU9 Unplicomn Emei 1. CR 2. SU1 Fuel Emei 1. SU1 SU1 SU1 Inabitechr Emei 1.	ing Defut SU9 Unplanned loc communication Emergency A 1. Unplant commun OR 2. Unplant commun SU10 Fuel clad deg Emergency A 1. Offgas in Treatment (1H13-P OR 2. Coolant equivale SU11 Inability to re- technical spect Emergency A 1. Plant is mode w Action S	ID-S-01- Attachme Ing DDefueled UNUSC SU9 Unplanned loss of all of communications capable Emergency Action Lee 1. Unplanned loss of communications of OR 2. Unplanned loss of communications of SU10 Fuel clad degradation Emergency Action Lee 1. Offgas isolation of Treatment monitor (1H13-P601-19A) OR 2. Coolant sample equivalent I ¹³¹ SU11 Inability to reach requi technical specification Emergency Action Lee 1. Plant is not broug mode within Tech Action Statement	10-S-01-1 Attachment I ing D Defueled UNUSUAL EVEN SU9 Unplanned loss of all onsite or of communications capabilities Emergency Action Level: 1. Unplanned loss of all onsite communications equipment OR 2. Unplanned loss of all offsite communications capability of SU10 Fuel clad degradation Emergency Action Level: 1. Offgas isolation due to valide Treatment monitor signal. (1H13-P601-19A-C8) OR 2. Coolant sample activity : equivalent l ¹³¹ SU11 Inability to reach required shutdatechnical specification time limits Emergency Action Level: 1. Plant is not brought to required shutdatechnical Spe Action Statement Time	IO-S-01-1 Revision > Attachment I Page 11 ing D Defueled Unplanned loss of all onsite or offsite communications capabilities Emergency Action Level: 1. Unplanned loss of all onsite communications equipment (See Tal OR 2. Unplanned loss of all offsite communications capability (See Tab SU10 Fuel clad degradation Emergency Action Level: 1. Offgas isolation due to valid Offgas Farment monitor signal. (1H13-P601-19A-C8) OR 2. Coolant sample activity >4.0 µCi equivalent l ¹³¹ SU11 Inability to reach required shutdown withit technical specification time limits Emergency Action Level: 1. Plant is not brought to required oper mode within Technical Specifications Action Statement Time	IO-S-01-1 Revision xx Attachment I Page 11 of ing Defueled UNUSUAL EVENT SU9 12 Unplanned loss of all onsite or offsite communications capabilities Emergency Action Level: 1. Unplanned loss of all onsite communications equipment (See Table S OR 2. 2. Unplanned loss of all offsite communications capability (See Table S OR 2. 2. Unplanned loss of all offsite communications capability (See Table S SU10 1 1 1 Fuel clad degradation 1 Emergency Action Level: 1 1. Offgas isolation due to valid Offgas Post Treatment monitor signal. (1H13-P601-19A-C8) OR 2. Coolant sample activity >4.0 µCi/mI equivalent I ¹³¹ SU11 Inability to reach required shutdown within technical specification time limits Emergency Action Level: 1. 1. Plant is not brought to required operating mode within Technical Specifications LC Action Statement Time

Attachment 4

to

GNRO-2003/00067

GGNS Proposed EALs Bases – To Be Incorporated in Procedure

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SYSTEM MALFUNCTION

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	AA2	10
	AA3	11
	AS1	12
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SYSTEM MALFUNCTION

AU1

Initiating Condition -- UNUSUAL EVENT

Unplanned release of gaseous or liquid radioactivity to the environment that exceeds 2 x ODCM limit for ≥60 minutes

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown
	Mode 4Cold Shutdown
	Mode 5Refueling
	Mode DDefueled

Emergency Action Levels:

(1 or 2 or 3)

- Liquid release > 4 x High High Alarm set point G17-RR-R521 (Discharge Radiation High High, 1. SH22-P089-1B-D8) with failure of G17-F355 (Drain Basin Isolation Valve) to close for \geq 60 minutes
- 2. High High Alarm on one or more of the following:
 - OG Radwst Vent ----- (P601-19A-A8) a.
 - FH Area Vent ------ (P601-19A-C11) b.
 - Ctmt Vent ----- (P601-19A-G9) C. Turb Bldg Vent----- (P601-19A-F11)
 - d.

AND

Summation of all monitors (including SBGT A & B) exceeds 2 x TRM Spec. limit (6.11.4) for ≥ 60 minutes

Confirmed sample analysis for gaseous or liquid release exceeds 2 x TRM Spec limit (6.11.1, 3. 6.11.2, 6.11.4, 6.11.5, or 6.11.6) for ≥ 60 minutes

Basis:

This IC addresses a potential or actual 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. These controls are located in the Offsite Dose Calculation Manual (ODCM). The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

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AU1(cont)

The ODCM multiples are specified in ICs AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an offsite 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 TRM Spec limit for 30 minutes does not meet the threshold for this IC.

UNPLANNED, as used in this context, 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. The Emergency Director should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the Emergency Director should, in the absence of data to the contrary, assume that the release has exceeded 60 minutes.

EAL #1 addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed two times the TRM Spec. limit and releases are not terminated within 60 minutes. This alarm setpoint is associated with a planned batch release. The setpoint is established by the ODCM to alarm at 50% of the TRM Spec. limit. Thus four times the setpoint corresponds with two times the TRM Spec. limit.

EAL #2 addresses normal effluent monitoring on release pathways for which a discharge permit would not normally be prepared. The set points for these release paths are established by the ODCM to alarm at 25% of the TRM Spec. limit. Use of the High High Alarm for any one of the release pathways provided early warning of a potential radiological release. Requiring a summation of all monitors including the non-routine SBGT release pathway ensures that all release pathways are considered when calculating the total release.

EAL #3 addresses uncontrolled releases that are detected by sample analysis, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage into river water systems, etc.

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AU2

Initiating Condition -- UNUSUAL EVENT

Unexpected increase in plant radiation

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown
Mode 4	Cold Shutdown
Mode 5	Refueling
Mode D	Defueled

Emergency Action Levels:

(1 <u>or</u> 2)

- 1. Valid Area Radiation Monitor <u>or</u> survey indicates an unplanned increase in plant radiation levels by a factor of 1000 <u>or</u> full scale
- 2. Valid indication of uncontrolled water level decrease in Aux Bldg Fuel Pools <u>or</u> Upper Ctmt Pools with irradiated fuel assemblies remaining covered by water

AND

a. Valid Alarm on any of the following:

Ctmt 209 Airlock----- (P844-1A-A1)

Ctmt Fuel Hdlg Area ----- (P844-1A-A3)

Aux Bldg Fuel Hdlg Area ----- (P844-1A-A4)

<u>Or</u>

b. survey indicates increased radiation level in the associated area

Basis:

EAL #1 addresses **UNPLANNED** increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. 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, the reading on an area radiation monitor located on the containment floor may increase due to planned evolutions such as head lift. Generally, increased radiation monitor indications will need to combined with another indicator (or personnel report) of water loss. The term "Full scale" was included in the EAL to address those areas where the ARM range will not allow the determination of an increase by a factor of 1000 (i.e., the ARM range is too small). This event escalates to an Alert per IC AA2 if the increase in dose rates impedes personnel access necessary for safe operation.

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AU2(cont)

EAL #2 addresses a verified **uncontrolled** water level decrease in the Aux Bldg Fuel Pools (Spent fuel pool, fuel transfer canal, and cask storage pool) <u>or</u> the Upper Ctmt Pools (Reactor cavity, drier storage pool, and fuel transfer canal). The key word is **uncontrolled**. Planned level changes during refueling evolutions would not require entry into this IC.

When in Mode 5 **EAL #2** addresses increased radiation levels as a result of water level decreases **above** the RPV flange or events that have resulted, or may result, in unexpected increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and may represent a potential degradation in the level of safety of the plant.

For Mode 5 events where the water level drops below the RPV flange classification would be via SU4. This event escalates to an Alert per IC AA2 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 Matrix in Modes 1-3.

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SYSTEM MALFUNCTION

AA1

Initiating Condition -- ALERT

Unplanned release of gaseous <u>or</u> liquid radioactivity to the environment that exceeds 20 x ODCM limit for ≥15 minutes

Emergency Action Levels:	(1 <u>or</u> 2 <u>or</u> 3)
	Mode DDefueled
	Mode 5Refueling
	Mode 4Cold Shutdown
	Mode 3Hot Shutdown
	Mode 2Startup
Operating Mode Applicability:	Mode 1Power Operation

Emergency Action Levels: (1

- 1. Liquid release >40 x High High Alarm set point on G17-RR-R521 with failure of G15-F355 to close for ≥ 15 minutes
- 2. **High High Alarm** on one or more of the following:
 - a. OG Radwst Vent ------ (P601-19A-A8)
 - b. FH Area Vent ----- (P601-19A-C11)
 - c. Ctmt Vent ----- (P601-19A-G9)
 - d. Turb Bldg Vent----- (P601-19A-F11)

AND

Summation of all monitors (including SBGT A & B) exceeds 20 x TRM Spec limit (6.11.4) for ≥ 15 minutes

3. Confirmed sample analysis for gaseous <u>or</u> liquid release exceeds 20 x TRM Spec limit (6.11.1, 6.11.2, 6.11.4, 6.11.5, <u>or</u> 6.11.6 for ≥ 15 minutes

Basis:

This IC addresses a potential or actual 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. These controls are located in the Offsite Dose Calculation Manual (ODCM), The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

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SYSTEM MALFUNCTION

AA1(cont)

The multiples are specified in ICs AU1 and AA1 only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an offsite 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.

UNPLANNED, as used in this context, 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 setpoint, etc.) on the applicable permit. The Emergency Director should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 15 minutes. Also, if an ongoing release is detected and the starting time for that release is unknown, the Emergency Director should, in the absence of data to the contrary, assume that the release has exceeded 15 minutes.

EAL #1 addresses radioactivity releases that for whatever reason cause effluent radiation monitor readings that exceed twenty times the alarm setpoint established by the radioactivity discharge permit. This alarm setpoint may be associated with a planned batch release, or a continuous release path. In either case, the setpoint is established by the ODCM to warn of a release that is not in compliance. Indexing the EAL threshold to the ODCM setpoint in this manner insures that the EAL threshold will never be less than the setpoint established by a specific discharge permit.

EAL #2 is similar to EAL #1, but is intended to address effluent or accident radiation monitors on nonroutine release pathways (i.e., for which a discharge permit would not normally be prepared). The ODCM establishes a methodology for determining effluent radiation monitor setpoint. The ODCM specifies default source terms and, for gaseous releases, prescribes the use of pre-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. Each of the identified vent monitors is set to alarm at 25% of the ODCM limit which provides an early warning for this EAL. A summation of all release points is required to determine the total release.

EAL #3 addresses uncontrolled releases that are detected by sample analysis, particularly on unmonitored pathways, e.g., spills of radioactive liquids into storm drains, heat exchanger leakage into river water systems, etc.

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SYSTEM MALFUNCTION

AA2

Initiating Condition -- ALERT

Release of radioactive material <u>or</u> increases in radiation levels within the facility that **impedes** operation of systems required to maintain safe operations <u>or</u> to establish <u>or</u> maintain cold shutdown

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown
	Mode 4Cold Shutdown
	Mode 5Refueling
	Mode DDefueled
Emergency Action Levels:	(1 <u>or</u> 2)

- 1. Valid radiation level ≥ 15 mR/hr in the Control Room
- 2. Valid radiation level ≥ 80 R/hr in the RHR A, B, C, HPCS, LPCS, <u>or</u> RCIC room <u>and</u> access is required

Basis:

This IC addresses increased radiation levels that impede necessary access to operating stations, or other areas containing equipment that must be operated manually or that requires local monitoring, in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. The cause and/or magnitude of the increase in radiation levels is not a concern of this IC. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other IC may be involved. For example, a dose rate of 15 mR/hr in the control room may be a problem in itself. However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, an SAE or GE may be indicated by the fission product barrier matrix ICs.

This IC is not meant to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

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.

For areas requiring infrequent access, the value corresponds to the Max Safe Values in Table 3, 05-S-01-EP-4, Auxiliary Building Area Parameters. As used here, *impede*, includes hindering or interfering provided that the interference or delay is sufficient to significantly threaten the safe operation of the plant.

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SYSTEM MALFUNCTION

Initiating Condition -- ALERT

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

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown
	Mode 4Cold Shutdown
	Mode 5Refueling
	Mode DDefueled
Emergency Action Levels:	(1 <u>or</u> 2)

Emergency Action Levels:

1. Potential spent fuel damaging event with High High Alarm on one or more of the following:

Ctmt Vent ----- (P601-19A-G9) a.

-

- FH Area Vent ----- (P601-19A-C11) b.
- Ctmt 209 Airlock------ (P844-1A-A1) C.
- Ctmt Fuel Hdlg Area ----- (P844-1A-A3) d.
- Aux Bldg Fuel Hdlg Area ----- (P844-1A-A4) e.
- 2. Valid indication of uncontrolled water level decrease in Aux Bldg Fuel Pools or Upper Ctmt Pools that has or will result in irradiated fuel assemblies becoming uncovered

Basis:

This IC addresses specific events that have resulted, or may result, in unexpected 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 a degradation in the level of safety of the plant. These events escalate from IC AU2 in that fuel activity has been released, or is anticipated due to fuel heat up.

EAL #1 addresses increased radiation monitor indications coincident with a potential fuel damaging event. Increased readings on ventilation monitors may be indication of a radioactivity release from the fuel, confirming that damage has occurred. Application of this Initiating Condition requires understanding of the actual radiological conditions present in the vicinity of the monitor. For example, the 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

EAL #2 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.

Escalation would occur via IC AS1 or AG1 or Emergency Director judgment.

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SYSTEM MALFUNCTION

AS1

Initiating Condition -- SITE AREA EMERGENCY

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE or 500 mR CDE Thyroid for the actual or projected duration of the release using actual meteorology.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3 Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D..... Defueled

Emergency Action Levels:

(1 or 2)

- 1. Dose projection of > 100 mR TEDE at or beyond site boundary based on plant or field team data
- Dose projection of > 500 mR CDE Thyroid at or beyond site boundary based on plant or field 2. team data

Basis:

This IC addresses radioactivity releases that result in doses at or beyond the site boundary that exceed a small fraction 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 ICs, this IC provides appropriate diversity and addresses events which may not be able to be classified on the basis of plant status alone, e.g., fuel handling accident in spent fuel building.

The TEDE and CDE thyroid doses are set at 10% of the EPA PAG.

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SYSTEM MALFUNCTION

AG1

Initiating Condition -- GENERAL EMERGENCY

Offsite dose resulting from an actual <u>or</u> imminent release of gaseous radioactivity exceeds **1000 mR TEDE** <u>or</u> **5000 mR CDE Thyroid** for the actual <u>or</u> projected duration of the release using actual meteorology.

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown
	Mode 4Cold Shutdown
	Mode 5Refueling
	Mode DDefueled
Emorgonov Action Lovale	(1 or 2)

Emergency Action Levels:

(1 <u>or</u> 2)

- 1. Dose projection of > 1000 mR TEDE at <u>or</u> beyond site boundary based on plant <u>or</u> field team data
- 2. Dose projection of > 5000 mR CDE Thyroid at <u>or</u> beyond site boundary based on plant <u>or</u> field team data

Basis:

This IC 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 ICs, this IC 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.

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SYSTEM MALFUNCTION

FU1

Initiating Condition -- UNUSUAL EVENT

Loss <u>or</u> Potential Loss of Primary Containment

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown

Emergency Action Level:

1. Loss or Potential Loss of Primary Containment

Basis:

The Primary Containment barrier includes connections up to and including the outermost containment isolation valves.

See Primary Containment Parameters section for additional information.

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SYSTEM MALFUNCTION

FA1

Initiating Condition -- ALERT

Loss or Potential Loss of either Fuel Clad or Reactor Pressure Boundary

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. Loss or Potential Loss of either Fuel Clad or Reactor Pressure Boundary

Basis:

See Fuel Clad or Reactor Pressure Boundary Parameters sections for additional information.

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SYSTEM MALFUNCTION

FS1

Initiating Condition – SITE AREA EMERGENCY

Loss or Potential Loss of any two Fission Product Barriers

Operating Mode Applicability:	Mode 1Power Operation	
	Mode 2Startup	
	Mode 3Hot Shutdown	

Emergency Action Level:

1. Loss or Potential Loss of any two Fission Product Barriers

Basis:

Loss two Fission Product Barriers represents a major failure of plant systems needed to protect public health and safety.

See **Primary Containment, Fuel Clad** or **Reactor Pressure Boundary Parameters** sections for additional information.

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SYSTEM MALFUNCTION

FG1

Initiating Condition – GENERAL EMERGENCY

Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier

Operating	Mode	Applica	bility:
-----------	------	---------	---------

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. Loss of any two Fission Product Barriers

<u>AND</u>

2. Loss <u>or</u> Potential Loss of third barrier

Basis:

Conditions required to cause loss of two Fission Product Barriers with Loss or Potential Loss of the third barrier could reasonably be expected to cause or create a potential to cause a radiological release exceeding the EPA Protective Action Guidelines.

See **Primary Containment, Fuel Clad** or **Reactor Pressure Boundary Parameters** sections for additional information.

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SYSTEM MALFUNCTION

Fuel Clad Parameters

Parameter:

Primary Coolant Activity Level

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Coolant activity >300 µCi/ml dose equivalent I¹³¹

Potential Loss: None

Basis:

LOSS:

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.

POTENTIAL LOSS:

There is no equivalent "Potential Loss" EAL for this item.

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Fuel Clad Parameters

Parameter:

RPV Water Level

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: RPV water level cannot be restored above -192 in

Potential Loss: RPV water level cannot be restored above -167 in

Basis:

LOSS:

The -192 in. value corresponds to the level which is used in EOPs to indicate challenge of core cooling. This corresponds to the Minimum Steam Cooling RPV Water Level. This is the minimum RPV water that assures maximum peak cladding temperature will not exceed 1500°F. This temperature is considered to be the cladding perforation threshold below which loss of cladding integrity due to oxidation pitting is not expected to occur.

POTENTIAL LOSS:

The -167in. value corresponds to the Top of Active Fuel RPV Water Level and is the same level value used in the Reactor Pressure Boundary barrier "Loss" EAL. If there is indication of a leak in the drywell, this level indicates a "Loss" of Reactor Pressure Boundary and a "Potential Loss" of the Fuel Clad barriers.

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SYSTEM MALFUNCTION

Fuel Clad Parameters

Parameter:

Drywell Radiation Monitoring

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: >5000 R/hr

Potential Loss: None

Basis:

LOSS:

A reading in excess of 5000 R/hr in the drywell is indicative of approximately 5% clad failure and therefore is indicative of a loss of the fuel cladding barrier.

POTENTIAL LOSS:

There is no "Potential Loss" EAL associated with this item.
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SYSTEM MALFUNCTION

Fuel Clad Parameters

Parameter:

Main Steam Line Radiation Monitoring

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Main Steam Line Radiation level > Hi Hi Alarm Setpoint (P608-18A-C4, P608-19A-C4)

Potential Loss: None

Basis:

LOSS:

The purpose of the Main Steam Line Radiation Monitoring system is to monitor for the gross release of fission products from the fuel indicating a loss of fuel cladding. The Main Steam Line Radiation Monitor setpoint [3xFPB] is selected high enough above background radiation levels to avoid spurious annunciations, yet low enough to promptly detect a gross release of fission products from the fuel.

POTENTIAL LOSS:

There is no "Potential Loss" EAL associated with this item.

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SYSTEM MALFUNCTION

Fuel Clad Parameters

Parameter:

Emergency Director Judgment

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Other

Potential Loss: Other

Basis:

LOSS or POTENTIAL LOSS:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the Fuel Clad barrier is lost or potentially lost. The inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that the barrier may be considered lost or potentially lost. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Parameter:

Drywell Pressure

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown

Emergency Action Level:

Loss: >1.39 psig in the drywell with indications of a leak in the drywell

Potential Loss: None

Basis:

LOSS:

The drywell pressure is based on the drywell high pressure set point [1.39 psig] which indicates a LOCA and automatically initiates the ECCS. The requirement to determine that a leak exists concurrently with the high pressure in the drywell assures that this EAL is limited to actual loss of Reactor Pressure Boundary barrier and not implemented during testing, loss of drywell cooling, etc.

POTENTIAL LOSS:

There is no "Potential Loss" EAL corresponding to this item.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Parameter:

RPV Water Level

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: RPV water level cannot be restored above **-167 in.** with indications of a leak in the drywell

Potential Loss: None

Basis:

LOSS:

The -167 in. value is the same as the Fuel Clad barrier "Potential Loss" EAL and corresponds to the Top of Active Fuel RPV Water Level. The requirement to determine that a leak exists concurrently with the RPV low level assures that this EAL is limited to actual loss of Reactor Pressure Barrier events making it consistent with other EALs in this category. (See Reactor Pressure Boundary, Drywell Pressure EAL).

POTENTIAL LOSS:

There is no "Potential Loss" EAL corresponding to this item.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Parameter:

Reactor Pressure Boundary Leak Rate

Operating Mode Applicability: Mode

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Unisolable RCIC or Main Steam Line break

Potential Loss: Unisolable Reactor Pressure Boundary leakage >50 gpm

<u>OR</u>

Area Temp <u>or</u> Area Rad > Alert Value in Table F1 with confirmed Reactor Pressure Boundary leakage in the area.

Basis:

LOSS:

An unisolable RCIC or Main Steam Line break is a breach of the Reactor Pressure Boundary barrier. Thus, this EAL is included for consistency with the Alert emergency classification.

POTENTIAL LOSS:

Potential loss of Reactor Pressure Boundary based on leakage is set at a level indicative of a small breach of the Reactor Pressure Boundary but is well within the makeup capability of normal and emergency high pressure systems. Core uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible. If primary system leak rate information is unavailable, other indicators of Reactor Pressure Boundary leakage should be used.

Potential loss of Reactor Pressure Boundary based on primary system leakage outside the primary containment is determined from Table F1. The Alert Limit column contains area temperatures and area radiation values in the areas of the main steam line tunnel, RCIC, etc., which indicate a direct path from the Reactor Pressure Boundary to areas outside primary containment. These values are the same as the Operating Limit in Table 3 of EP-4. The indicators should be confirmed to be caused by Reactor Pressure Boundary leakage in the area.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Reactor Pressure Boundary Leak Rate (cont)

The area temperature or radiation values in the Alert Limit column are to be used to declare an Alert classification if no other barrier degradation is observed.

The GE / SAE Limit column contains the same values as the Max Safe Value in Table 3 of EP-4. The values in this column should be used when escalating to Site Area Emergency or General Emergency as multiple barriers degrade.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Parameter:

Safety Relief Valves

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: SRV stuck open

Potential Loss: None

Basis:

LOSS:

The SRV stuck open EAL identifies a SRV failure mode that results in a loss of the Reactor Pressure Boundary barrier. All methods of closing the SRV (switch in closed position, pulling fuses, etc.) should be exhausted before the Shift Manager declares the SRV stuck open.

POTENTIAL LOSS:

There is no "Potential Loss" EAL corresponding to this item.

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SYSTEM MALFUNCTION

Reactor Pressure Boundary Parameters

Parameter:

Emergency Director Judgment

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Other

Potential Loss: Other

Basis:

LOSS or POTENTIAL LOSS:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the Reactor Pressure Boundary barrier is lost or potentially lost. The inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that the barrier may be considered lost or potentially lost. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

Primary Containment Pressure

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Unexplained loss of pressure following initial pressure increase

Potential Loss: >22 psig in Primary Containment

Basis:

LOSS:

Unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity. Containment pressure should increase as a result of mass and energy release into containment from a LOCA. Thus, containment pressure not increasing under these conditions 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 and could occur at less than the 22 psig used for the potential loss. The unexpected response is important because it is the indicator for a containment bypass condition. Due to the size of the Mark III containment small breaks may not be able to be detected by this EAL. Smaller breaks are addressed in the Primary Ctmt Isolation Failure <u>or</u> Bypass EAL

POTENTIAL LOSS:

The 22 psig value used for potential loss of containment is used in the EOPs and is based on the containment vent isolation valve operational limits. If containment vent valves are required to be operated above this pressure, damage to the valve may occur preventing the re-establishment of containment integrity.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

Hydrogen Concentration

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: None

Potential Loss: H₂ igniters de-energized and either Drywell H₂ >9% or Containment H₂ in HDOL Unsafe Zone

Basis:

LOSS:

There is no "Loss" EAL corresponding to this item.

POTENTIAL LOSS:

Without hydrogen igniters in operation, the existence of a hydrogen concentration in the drywell or primary containment that exceeds the respective Hydrogen Deflagration Overpressurization Limit identifies a condition that could result in over pressurization of the drywell or containment if a hydrogen burn were to occur.

Conversely, with the hydrogen igniters in operation, hydrogen concentrations in excess of these limits indicates that sufficient hydrogen combustion has occurred to lower the oxygen concentration below the concentration needed to support further combustion. Under these conditions, as long as the hydrogen igniters remain in operation, any action that results in the addition of oxygen to the space will result in controlled hydrogen removal by combustion. Therefore, with hydrogen igniters in operation, there is no "Potential Loss" EAL for this item regardless of hydrogen concentration.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

RPV Water Level

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: None

Potential Loss: Entry into SAP 1, 5 or 6

Basis:

LOSS:

There is no "Loss" EAL corresponding to this item.

POTENTIAL LOSS:

Entry into the Severe Accident Procedures (SAPs) indicates reactor vessel water level can not be restored and that core melt could occur. EOPs direct the operators to enter SAPs when Reactor Vessel Level cannot be restored and maintained greater than -192 in. Entry into the SAPs is a logical escalation in response to the inability to maintain reactor vessel level.

Even though entry into the SAPs is an indication that adequate core cooling may no longer exist and that core melt may eventually occur, under certain plant conditions there is confidence that the core will remain in the RPV. These plant conditions are identified by which SAP is entered. Entry into SAPs 5 or 6 are indicative of plant conditions that no longer provide confidence that the core will remain in the vessel thus creating a potential for containment failure if plant conditions do not improve. Entry into SAP 1 is indicative that vessel failure, due to molten core debris, has occurred which creates a potential for containment failure.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

Primary Containment Isolation Failure or Bypass

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Inability to isolate Primary Ctmt when isolation is required

<u>OR</u>

Primary Containment venting required by SAPs

<u>OR</u>

Area Temp <u>or</u> Area Rad **>SAE/GE Value** in **Table F-1** with confirmed Reactor Pressure Boundary leak in the area.

Potential Loss: None

Basis:

LOSS:

This EAL is intended to cover the inability to isolate the containment when containment isolation is required. In addition, the presence of area radiation or temperature alarms indicating **unisolable** primary system leakage outside the drywell are covered after a containment isolation. The indicators should be confirmed to be caused by Reactor Pressure Boundary leakage.

An intentional venting of primary containment for pressure control per SAPs to the secondary containment and/or the environment is considered a loss of containment due to the potential for a large radioactivity inventory to be present in the containment. Containment venting for pressure control when in the EOPs should not be considered a loss of containment because no significant radioactivity inventory is expected to be present in the containment when operating within the EOP limits.

POTENTIAL LOSS:

There is no "Potential Loss" EAL corresponding to this item.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

Primary Containment Radiation Monitoring

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: None

Potential Loss: >11,500 R/Hr

Basis:

LOSS:

There is no "Loss" EAL corresponding to this item.

POTENTIAL LOSS:

In order to reach this dose rate in the containment, significant fuel damage well in excess of that required for loss of Reactor Pressure Boundary and Fuel Clad must have occurred. A major release of radioactivity, requiring offsite 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 physically challenged or not, this amount of activity in the primary 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.

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SYSTEM MALFUNCTION

Primary Containment Parameters

Parameter:

Emergency Director Judgment

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

Loss: Other

Potential Loss: Other

Basis:

LOSS or POTENTIAL LOSS:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the Primary Containment barrier is lost or potentially lost. The inability to monitor the barrier should also be considered in this EAL as a factor in the Emergency Director's judgment that the barrier may be considered lost or potentially lost. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

HU1

Initiating Condition – UNUSUAL EVENT

Confirmed security event which indicates a potential degradation in the level of safety of the plant

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Levels: (1 <u>or</u> 2)

- 1. A credible threat notification received from, or validated by, a trustworthy source (FBI, NRC, Claiborne County Sheriff's Office, Plant Management, Site Security, Etc.) Example: A report from Site Security of an unauthorized attempted protected area entry should be considered a credible threat.
- 2. Site Security Code Yellow (Armed adversary attempting to or has entered company property)

Basis:

The intent of EAL 1 is to ensure that appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made by the Shift Manager (Emergency Director) with assistance from the Security Superintendent. Additional resources may be necessary to assist in this determination. These additional resources could include other sites, corporate, law enforcement or federal resources. The threat must be specific to Grand Gulf. Consideration should be given to the following types of events during the determination of "credible": sabotage, hostage, extortion, civil disturbance, strike action, etc. EAL 1 is limited to security events that do not involve an armed attack (attempted entry by force) against the plant.

EAL 2, Site Security Code Yellow (Armed adversary attempting to or has entered company property) is limited to security events involving an armed attack against the plant. An armed attack against the plant is a unique security emergency that is expected to be an extremely fast moving event which presents an immediate and serious threat to human life. A site security code system is used to enhance communication for this event and allows immediate recognition and rapid notification for this event. It is imperative for personnel to take cover immediately to minimize loss of life. A Site Security Code Orange would result in escalation to an Alert.

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SYSTEM MALFUNCTION

HU2

Initiating Condition – UNUSUAL EVENT

Conditions exist which in the judgment of the emergency director warrant declaration of an Unusual Event.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

1. Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which indicate a **potential degradation** of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

Basis:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the plant conditions warrant declaration of an Unusual Event. The inability to monitor identified parameters should also be considered in this EAL as a factor in the Emergency Director's judgment that the hazard actually exists. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

HU3

Initiating Condition -- UNUSUAL EVENT

Natural or destructive phenomena affecting the protected area

Operating Mode Applicability:

Power Operation
.Startup
Hot Shutdown
.Cold Shutdown
.Refueling
.Defueled

Emergency Action Level: (1 or 2 or 3 or 4 or 5)

- 1. Verified earthquake detected by in plant seismic instrumentation.
- 2. Tornado observed in the protected area.
- 3. Vehicle crash into a power block structure.
- 4. Explosion within the protected area causing damage to power block structure <u>or</u> equipment
- 5. Main turbine failure resulting in visual turbine casing <u>or</u> generator seal damage.

Basis:

The EALs in this IC are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators. Areas identified in the EALs define the location of the event based on the potential for damage to equipment contained therein. 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.

EAL #1 damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Method of detection can be based on in plant instrumentation, validated by a reliable source, or operator assessment. 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, <u>and</u> (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

EAL #2 is based on the assumption that a tornado striking (touching down) within the protected area may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

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SYSTEM MALFUNCTION

HU3(cont)

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to have caused damage in a plant Vital Area, the event may be escalated to Alert.

EAL #4 only those explosions of sufficient force to damage permanent structures or equipment within the power block should be considered. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the explosion with reports of evidence of damage is sufficient for declaration. The Emergency director also needs to consider any security aspects of the explosion, if applicable.

EAL #5 is intended to address main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. 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 HU4 and HU5.

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. This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or by the radiological releases. These latter events would be classified by the Radiological ICs or Fission Product Barrier ICs.

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SYSTEM MALFUNCTION

HU4

Initiating Condition -- UNUSUAL EVENT

Fire within power block not extinguished within 15 Minutes of detection.

Operating Mode Applicability:

Mode 1	Power Operation
Mode 2	Startup
Mode 3	Hot Shutdown
Mode 4	Cold Shutdown
Mode 5	Refueling
Mode D	Defueled

Emergency Action Level:

- 1. FIRE in protected area not extinguished within 15 minutes of either:
 - a. Main control room notification

OR

b. Verification of annunciators

Basis:

The purpose of this IC is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. 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 valid fire detection system alarm. Verification of a fire detection system alarm includes actions that can be taken within the control room to ensure that the alarm is not spurious. A verified 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). The intent of this IC is not to include buildings (i.e., warehouses) or areas that are not contiguous (in actual contact with or immediately adjacent) to plant Vital Areas. This excludes fires within administration buildings, waste-basket fires, and other small fires of no safety consequence.

Escalation to a higher emergency class is by IC HA5, "Fire affecting the operability of plant safety systems required to establish <u>or</u> maintain safe shutdown".

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SYSTEM MALFUNCTION

HU5

Initiating Condition – UNUSUAL EVENT

Release of toxic or flammable gases deemed detrimental to normal operation of the plant.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Levels:

1. Determination of toxic, oxygen displacing or flammable gases in amount sufficient to disrupt normal plant operation.

Basis:

This IC is based on the existence of **uncontrolled** releases of toxic, oxygen displacing or flammable gas that may enter the site boundary and affect normal plant operations. It is intended that releases of toxic, oxygen displacing or flammable gases are of sufficient quantity, and the release point of such gases is such that normal plant operations would be affected. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation. The EAL is intended to not require significant assessment or quantification. The IC assumes an uncontrolled process that has the potential to affect plant operations, or personnel safety.

Escalation of this EAL is via HA6, which involves a quantified release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of safety systems required to establish or maintain safe shutdown.

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SYSTEM MALFUNCTION

HA1

Initiating Condition – ALERT

Confirmed security event in plant protected area

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Levels:

Site Security Code Orange (Armed adversary attempting to or has crossed the protected area 1. fence)

Basis:

Site Security Code Orange (Armed adversary attempting to or has crossed the protected area fence) is limited to security events involving an armed attack against the plant. An armed attack against the plant is a unique security emergency that is expected to be an extremely fast moving event which presents an immediate and serious threat to human life. A site security code system is used to enhance communication for this event and allows immediate recognition and rapid notification for this event. It is imperative for personnel to take cover immediately to minimize loss of life. A Site Security Code Red would result in escalation to a Site Area Emergency.

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SYSTEM MALFUNCTION

HA2

Initiating Condition -- ALERT

Conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D....Defueled

Emergency Action Level:

1. Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

Basis:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the plant conditions warrant declaration of an Alert. The inability to monitor identified parameters should also be considered in this EAL as a factor in the Emergency Director's judgment that the hazard actually exists. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

HA3

Initiating Condition -- ALERT

Control room evacuation has been initiated.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3 Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

Control Room evacuation has been directed per 05-1-02-II-1, Shutdown from the Remote 1. Shutdown Panel.

Basis:

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center or other emergency response facilities is desirable. Inability to establish plant control from outside the control room will escalate this event to a Site Area Emergency per IC HS3.

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SYSTEM MALFUNCTION

HA4

Initiating Condition -- ALERT

Natural or destructive phenomena affecting the plant Vital Area

Operating Mode Applicability:	Mode 1Power Operation	
	Mode 2Startup	
	Mode 3Hot Shutdown	
	Mode 4Cold Shutdown	
	Mode 5Refueling	
	Mode DDefueled	
Emergency Action Levels:	(1 <u>or</u> 2 <u>or</u> 3 <u>or</u> 4 <u>or</u> 5)	

- 1. Verified earthquake detected by in plant seismic instrumentation greater than OBE
- 2. Tornado resulting in visual damage to a vital area
- 3. Vehicle crash into a vital area structure resulting in visual damage to vital area
- 4. Explosion causing visual damage to vital area
- 5. Main turbine failure-generated missiles resulting in visual damage to safety related equipment

Basis:

The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The EALs in this IC escalate from the EALs in HU3 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 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 to higher classifications may occur on the basis of other ICs (e.g., System Malfunction).

EAL #1 is based on UFSAR design basis. Seismic events of this magnitude can result in a plant Vital Area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

EAL #2 is based on observation of visible damage within a vital area believed to be caused by tornadic winds and is an escalation of EAL HU3.

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SYSTEM MALFUNCTION

HA4(cont)

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant.

EAL#4 addresses an explosion and not the degradation in performance of affected systems. System degradation is addressed in the System Malfunction EALs. The reference to visual damage is used to identify the magnitude of the explosion and to discriminate against minor explosions. The reference to vital area is included to discriminate against 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 explosion was large enough to cause damage to these systems. Thus, the designation of a single train was intentional and is appropriate when the explosion is large enough to affect more than one component.

This situation is not the same as removing equipment for maintenance that is covered by a plant's Technical Specifications. Removal of equipment for maintenance is a planned activity controlled in accordance with procedures and, as such, does not constitute a substantial degradation in the level of safety of the plant. An explosion is an unplanned activity and, as such, does constitute a substantial degradation in the level of safety of the plant. In this situation, an Alert classification is warranted.

EAL#5 is intended to address the threat to safety related equipment imposed by missiles generated by main turbine rotating component failures. This EAL is, therefore, consistent with the definition of an Alert in that if missiles have damaged or penetrated areas containing safety-related equipment the potential exists for substantial degradation of the level of safety of the plant.

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SYSTEM MALFUNCTION

HA5

Initiating Condition -- ALERT

Fire in the power block affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D....Defueled

Emergency Action Level:

Fire in the power block causing visual damage to plant safety equipment required to establish <u>or</u> maintain safe shutdown

Basis:

Site-Specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown. This will make it easier to determine if the fire is potentially affecting one or more redundant trains of safety systems. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels / Radiological Effluent, or Emergency Director Judgment ICs.

This EAL addresses a fire and not the degradation in performance of affected systems. System degradation is addressed in the System Malfunction EALs. The reference to damage of systems is used to identify the magnitude of the fire and to discriminate against minor fires. The reference to safety systems is included to discriminate against fires 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 was large enough to cause damage to these systems. Thus, the designation of a single train was intentional and is appropriate when the fire is large enough to affect more than one component.

This situation is not the same as removing equipment for maintenance that is covered by a plant's Technical Specifications. Removal of equipment for maintenance is a planned activity controlled in accordance with procedures and, as such, does not constitute a substantial degradation in the level of safety of the plant. A fire is an unplanned activity and, as such, does constitute a substantial degradation in the level of in the level of safety of the plant. In this situation, an Alert classification is warranted.

The inclusion of a "report of visible damage" 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.

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SYSTEM MALFUNCTION

HA6

Initiating Condition -- ALERT

Release of toxic or flammable gases within or contiguous to a vital area which jeopardizes operation of safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3 Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Levels:

Determination of toxic, oxygen displacing or flammable gasses in a vital area, that must be manned for safe operation of the plant, immediately dangerous to life and health or > lower flammability limit.

Basis:

This IC is based on gases that affect the safe operation of the plant. This IC applies to buildings and areas contiguous to plant vital areas or other significant buildings or areas (i.e., Standby Service Water basin or pump house). The intent of this IC is not to include buildings (e.g., warehouses) or other areas that are not contiguous or immediately adjacent to plant vital areas. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels / Radioactive Effluent, or Emergency Director Judgment ICs.

EAL is met if measurement of toxic or oxygen displacing gas concentration results in an atmosphere that is IDLH within a vital area or any area or building contiguous to vital area. Exposure to an IDLH atmosphere will result in immediate harm to unprotected personnel, and would preclude access to any such affected areas.

Flammable casses, such as hydrogen and acetylene, are routinely used to maintain plant systems or to repair equipment/components. This EAL addresses concentrations at which gases can ignite/support combustion. 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. Once it has been determined that an uncontrolled release is occurring, then sampling must be done to determine if the concentration of the released gas is within this range.

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SYSTEM MALFUNCTION

HS1

Initiating Condition – SITE AREA EMERGENCY

Confirmed security event in a plant vital area

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Levels:

1. Site Security Code Red (Armed adversary has entered any power block building or vital area)

Basis:

Site Security Code Red (Armed adversary has entered any power block building or vital area) is limited to security events involving an armed attack against the plant. An armed attack against the plant is a unique security emergency that is expected to be an extremely fast moving event which presents an immediate and serious threat to human life. A site security code system is used to enhance communication for this event and allows immediate recognition and rapid notification for this event. It is imperative for personnel to take cover immediately to minimize loss of life. A security event resulting in loss of physical control of the facility would result in escalation to a General Emergency.

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SYSTEM MALFUNCTION

HS2

Initiating Condition – SITE AREA EMERGENCY

Conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

1. Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Basis:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the plant conditions warrant declaration of a Site Area Emergency. The inability to monitor identified parameters should also be considered in this EAL as a factor in the Emergency Director's judgment that the hazard actually exists. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

HS3

Initiating Condition – SITE AREA EMERGENCY

Control Room evacuation has been initiated and plant control cannot be established.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

1. Control Room evacuation has been directed per 05-1-02-II-1, Shutdown from the Remote Shutdown Panel, <u>and</u> control of the plant cannot be established in < 15 minutes

Basis:

The intent of this IC is to capture those events where control of the plant cannot be re-established in a timely manner. This time should not exceed 15 minutes without additional justification. The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The ED is expected to make a reasonable, informed judgment within the site-specific time for transfer that the licensee has control of the plant from the remote shutdown panel.

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 (ability to shutdown the reactor and maintain it shutdown), reactor water level (ability to cool the core), and decay heat removal (ability to maintain a heat sink).

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Emergency Director Judgment ICs.

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SYSTEM MALFUNCTION

HG1

Initiating Condition – GENERAL EMERGENCY

Security event resulting in loss of physical control of the facility

Operating Mode Applicability:

.Power Operation
.Startup
.Hot Shutdown
.Cold Shutdown
.Refueling
.Defueled

Emergency Action Level: (1 or 2 or 3)

- 1. Loss of physical control of the Control Room due to a security event
- 2. Loss of physical control of the Remote Shutdown Panel due to a security event
- 3. Loss of physical control of adequate core cooling or reactivity control capability

Basis:

This IC encompasses conditions under which a hostile force has taken 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. Typically, these safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) reactor water level and decay heat removal (ability to cool the core). Loss of both SSW systems does not by itself constitute loss of decay heat removal capability. Example: In an extended Station Blackout condition using RCIC to maintain RPV water level above Minimum Steam Cooling Water Level, decay heat is removed by steam through an SRV to the suppression pool. If containment pressure increases due to suppression pool heat up, the containment can be vented to the environs if necessary to maintain containment pressure within EOP limits with no significant radiological consequences.

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SYSTEM MALFUNCTION

HG2

Initiating Condition – GENERAL EMERGENCY

Other conditions existing which in the judgment of the Emergency Director warrant declaration of General Emergency.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Basis:

This EAL is not intended to be used to anticipate conditions already identified in other EALs. This EAL is intended to address unanticipated conditions, not addressed explicitly elsewhere, that can be used by the Emergency Director in determining whether the plant conditions warrant declaration of a General Emergency. The inability to monitor identified parameters should also be considered in this EAL as a factor in the Emergency Director's judgment that the hazard actually exists. The emphasis is on the need for an accurate assessment recognizing that over-classification, as well as under-classification, is to be avoided.

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SYSTEM MALFUNCTION

SU1

Initiating Condition -- UNUSUAL EVENT

Loss of all offsite power to ESF busses for >15 Minutes

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Level:

1. Loss of power from ESF-11 and ESF-21 and ESF-12 transformers for >15 minutes

Basis:

Prolonged loss of offsite 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. This IC is met even if all emergency diesel generators start and provide AC power to the ESF busses. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the event to an Alert, due to subsequent loss of diesel generators such that only one source remains, will occur in accordance with IC SA1, (AC power capability to **Div I & II ESF busses** reduced to a single power source for >15 minutes such that any additional single failure would result in loss of AC power to **both Div & Div II ESF busses**).

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SYSTEM MALFUNCTION

SU2

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of required DC power for >15 Minutes

Operating	Mode	Applic	ability:
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Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Level:

1. Unplanned reduction in 11DA and 11DB voltage to <105 VDC

AND

Unable to restore either 11DA or 11DB battery charger within 15 minutes after reaching 105 VDC

Basis:

The purpose of this IC and its associated 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.

Unplanned is included in this IC and EAL to preclude the declaration of an emergency as a result of planned maintenance activities. Routinely plants will perform maintenance on a Train related basis during shutdown periods. It is intended that the loss of the operating (operable) train is to be considered.

The 105 VDC is based on the minimum bus voltage necessary for the operation of safety related equipment.

Escalation of the event to an Alert, if the loss results in the inability to maintain cold shutdown, will occur in accordance with SA5 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

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SYSTEM MALFUNCTION

SU3

Initiating Condition -- UNUSUAL EVENT

Reactor Pressure Boundary leakage

Operating Mode Applicability:	Mode 1Power Operation
	Mode 2Startup
	Mode 3Hot Shutdown

Emergency Action Levels:

1. Unidentified or pressure boundary leakage >10 gpm

<u>OR</u>

2. Identified leakage >35 gpm

Basis:

This IC is included because it may be a precursor of more serious conditions and 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 because it is greater than the minimum detectable amount used as the Technical Specification limit and is expected to be observable with normal control room indications without lengthy calculations.

The EAL 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. The 35 gpm value for the unidentified and pressure boundary leakage was selected because it is greater than the minimum detectable amount used as the Technical Specification limit and is expected to be observable with normal control room indications without lengthy calculations.

The difference between IC SU3 and IC SU5 addresses the different Reactor Pressure Boundary conditions that exist between refueling and other operating modes. In other operating modes the Reactor Pressure Boundary will be intact and RPV level monitoring means are normally available. In the refueling mode the Reactor Pressure Boundary is not intact and RPV level is monitored by different means.

Escalation of the event to an Alert, in Modes 1, 2, & 3, will occur in accordance with IC FA1 (Loss or potential loss of any two barriers).

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SYSTEM MALFUNCTION

SU4

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of RPV inventory

Operating Mode Applicability: Mode 4...

Mode 4Cold Shutdown

Emergency Action Levels:

1. RPV water level cannot be restored and maintained above 11.4 in.

Basis:

This IC is included because it may be a precursor of more serious conditions and is considered to be a potential degradation of the level of safety of the plant. The words "cannot be restored and maintained" are use to be consistent with directions in the EOPs. The word unplanned is used to ensure planned evolutions which reduce RPV water level below 11.4 in. do not meet the criteria of this EAL.

Escalation of the event to an Alert, due to prolonged loss of RPV inventory in Mode 4, may occur in accordance with IC SA4 (Loss of RPV inventory with irradiated fuel in the RPV).
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SYSTEM MALFUNCTION

SU5

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of RPV inventory with irradiated fuel in the RPV

Operating Mode Applicability: Mode 5Refueling

Emergency Action Levels:

1. **Unplanned** RPV level decrease below the RPV flange for > 15 minutes

<u>OR</u>

2. a. Loss of RPV inventory

and

b. RPV level **cannot** be monitored

Basis:

This IC is included because it may be a precursor of more serious conditions and is 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 warrants declaration of an Unusual Event due to the reduced RPV 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.

The difference between IC SU3 and IC SU5 addresses the different Reactor Pressure Boundary conditions that exist between refueling and other operating modes. In other operating modes the Reactor Pressure Boundary will be intact and RPV normal level monitoring means are available. In the refueling mode the Reactor Pressure Boundary is not intact and RPV level is monitored by different means. In the refueling mode, 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 RPV 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 RPV leakage.

EAL#1 involves a decrease in RPV 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 (covered by IC AU2 EAL1) until such time as the level decreases to the level of the vessel flange

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SYSTEM MALFUNCTION

SU5(cont)

Escalation of the event to an Alert, due to continued loss of RPV Inventory, will occur in accordance with either IC SA4 (Loss of RPV Inventory with Irradiated Fuel in the RPV) or IC SA5 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

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SYSTEM MALFUNCTION

SU6

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

Operating	Mode	Applica	bility:
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Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Levels:

1. An unplanned event results in reactor coolant temperature exceeding 200°F

OR

2. Loss of all reactor coolant temperature and RPV level indication for > 15 minutes

Basis:

This IC is included as a NOUE because it may be a precursor of more serious conditions and 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 RPV inventory. Since the Reactor Pressure Boundary usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

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 reactor coolant temperatures depending on the time since shutdown. Unlike the cold shutdown mode, normal means of core temperature indication and RPV 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, EAL 2 would result in declaration of a NOUE if either temperature or level indication cannot be restored within 15 minutes from the loss of both means of indication.

Escalation of the event to an Alert, due to continued loss of RPV Inventory or reactor coolant temperature increase, will occur in accordance with IC SA5 (Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV).

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SYSTEM MALFUNCTION

SU7

Initiating Condition -- UNUSUAL EVENT

Inadvertent criticality

OPERATING MODE APPLICABILITY Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Level:

1. An **unplanned** sustained positive period observed on nuclear instrumentation.

Basis:

This IC addresses inadvertent criticality events. While the primary concern of this IC is 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), the IC is applicable in other modes in which inadvertent criticalities are possible. This IC indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification. This IC 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 period monitors. The term "sustained" is used in order to allow exclusion of expected short term positive periods from planned control rod movements. (Example: Short term positive periods as the result of the increase in neutron population due to subcritical multiplication)

Escalation of the event to an Alert will occur in accordance with either IC FA1 (Loss of potential loss of any two barriers) or IC HA6 (Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert).

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SYSTEM MALFUNCTION

SU8

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

Operating Mode Applicability:	Mode
	Mode
	Mode

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

 Unplanned loss of most or all safety system annunciators or indication on 1H13-P680, 1H13-P601 and 1H13-P870 for >15 minutes

Basis:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Quantification of "Most" 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.

Escalation of the event to an Alert, if a transient is in progress during the loss of annunciation or indication, will occur in accordance with IC SA6 (Unplanned loss of most or all safety system annunciation or indication in control room wither either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are unavailable).

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SYSTEM MALFUNCTION

SU9

Initiating Condition -- UNUSUAL EVENT

Unplanned loss of all onsite <u>or</u> offsite communications capabilities

Operating Mode Applicabili

Mode 1Power OperationMode 2StartupMode 3Hot ShutdownMode 4Cold ShutdownMode 5Refueling

Emergency Action Levels:

1. Loss of all onsite communications equipment (See Table S1)

<u>OR</u>

2. Loss of all offsite communications equipment (See Table S2)

<u>Table S1</u> Onsite Communications Equipment

Plant Radio System Plant Paging System Sound Powered Phones In-plant telephones

> Table S2 Offsite Communications Equipment

All telephone lines (commercial and fiber optic) Satellite telephone OHL NRC telephones (ENS, HPN, MCL, RSCL, PMCL) Cellular phones UHF radios

Basis:

The purpose of this IC and its associated EALs 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.

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SYSTEM MALFUNCTION

SU9(cont)

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 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 (Gaitronics) and radios / walkie talkies).

The list for offsite communications loss encompasses the loss of all means of communications with offsite authorities. This should include the ENS, commercial telephone lines, telecopy transmissions, and dedicated phone systems.

There is no escalation above the Unusual Event for this event.

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SYSTEM MALFUNCTION

SU10

Initiating Condition -- UNUSUAL EVENT

Fuel Clad Degradation.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Levels:

1. Offgas isolation due to valid Offgas Post Treatment monitor signal. (1H13-P601-19A-C8)

OR

2. Coolant sample activity >4.0 μ Ci/ml l¹³¹ dose equivalent.

Basis:

This IC is included as a NOUE because it is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. EAL #1 addresses Modes 1, 2, & 3 radiation monitor readings that provide indication of fuel clad integrity. EAL #2 addresses coolant samples exceeding coolant technical specifications for iodine spike.

Escalation of the event to an Alert in Modes 1, 2, & 3 will occur in accordance with IC FA1 (Loss of potential loss of any two barriers)

There is no escalation above the Unusual Event for this event in Modes 4 & 5.

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SYSTEM MALFUNCTION

SU11

Initiating Condition -- UNUSUAL EVENT

Inability to reach required shutdown within technical specification time limits

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. Plant is **not** brought to required operating mode within Technical Specifications LCO Action Statement Time

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 declaration 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 a 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.

There is no escalation above the Unusual Event for this event.

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SYSTEM MALFUNCTION

SA1

Initiating Condition -- ALERT

AC power capability to **Div I & II ESF busses** reduced to a single power source for **>15 minutes** such that any additional single failure would result in loss of AC power to both Div I & II ESF busses.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

- 1. AC power to 15AA and 16AB busses reduced to only one of the following sources for >15 minutes
 - a. ESF11 or ESF21 or ESF12 transformers

<u>OR</u>

b. DG11 or DG12 diesel generators

Basis:

This IC and the associated EALs are intended to provide an escalation from IC SU1, (Loss of All Offsite Power To ESF Busses for > 15 Minutes). The condition indicated by this IC is the degradation of the offsite and onsite power systems such that any additional single failure would result in a station blackout.

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS1, (Loss of all offsite and onsite AC power to Div I&II ESF busses).

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SYSTEM MALFUNCTION

SA2

Initiating Condition -- ALERT

Loss of all offsite and onsite AC Power to Div I & II ESF Busses

Operating Mode Applicability:

Mode 4Cold Shutdown Mode 5Refueling Mode D.....Defueled

Emergency Action Level:

1. Loss of power to 15AA <u>and</u> 16AB busses

AND

Failure to restore power to either 15AA <u>or</u> 16AB bus within **15 minutes** from the time of loss of both offsite <u>and</u> onsite AC power

Basis:

Loss of AC power to Div I&II compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink. When in cold shutdown, refueling, 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 busses, relative to that specified for the Site Area Emergency EAL. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses. Even though an essential bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable.

There is no escalation above the Alert for this event.

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SYSTEM MALFUNCTION

SA3

Initiating Condition -- ALERT

Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded <u>and</u> manual scram was successful

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup

Emergency Action Level:

1. Automatic scram failed to rapidly insert sufficient control rods to bring the reactor subcritical, <u>and</u> a manual scram was successful

Basis:

This condition indicates failure of the automatic protection system to scram 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 and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded.

An Alert is indicated because conditions exist that could lead to potential loss of fuel clad or Reactor Pressure Boundary. Reactor protection system setpoint being exceeded, rather than limiting safety system setpoint being exceeded, is specified here because failure of the automatic protection system is the issue.

A scram performs two functions:

(1) The first function is to initiate a rapid control rod insertion which immediately inserts a step change of negative reactivity into the core to immediately turn reactor power and bring the reactor subcritical. Subcritical conditions are indicated by reactor power level below the APRM downscale **and** continuing to decrease. The first function provides the necessary core protection in response to a plant transient and is the criteria used to determine if the automatic and/or manual scram was successful.

(2) The second function is, following the initiation of control rod insertion, to continue to insert control rods until sufficient negative reactivity is inserted to assure adequate shutdown margin. The second function is monitored by IC SU6 (Inadvertent Criticality).

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes sufficient control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., Scram Push Buttons, Reactor Mode Switch, Alternate Rod Insertion).

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SYSTEM MALFUNCTION

SA3(cont)

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS3, (Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful).

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SYSTEM MALFUNCTION

SA4

Initiating Condition -- ALERT

Loss of RPV inventory with irradiated fuel in the RPV

Operating Mode Applicability:

Mode 4Cold Shutdown Mode 5Refuel

Emergency Action Levels:

1. Loss of RPV inventory as indicated by RPV level <-150.3 in. (Level 1)

<u>OR</u>

2. a. Loss of RPV inventory

<u>and</u>

b. RPV level cannot be monitored for >15 minutes

Basis:

These EALs serve 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 classification of Alert. The Low-Low ECCS Actuation Setpoint was chosen because it is a standard setpoint at which all available injection systems automatically start. The inability to restore and maintain level after reaching this setpoint would therefore be indicative of a failure of the Reactor Pressure Boundary barrier.

In the cold shutdown mode, normal RPV level and RPV level instrumentation systems will normally be available. In the refueling mode, normal means of RPV level indication may not be available. Redundant means of RPV level indication will be normally 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 RPV 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 Reactor Pressure Boundary leakage. The 15-minute duration for the loss of level indication was chosen because it is half of the IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV) duration. The 15-minute duration allows this EAL to be an effective precursor to CS1. 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 SS4 basis. Therefore this EAL meets the definition for an Alert emergency.

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SYSTEM MALFUNCTION

SA4(cont)

Escalation of the event to a Site Area Emergency, if RPV level continues to decrease, will occur in accordance with IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV).

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SYSTEM MALFUNCTION

SA5

Initiating Condition -- ALERT

Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV

Operating	Mode	Applica	bility:
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Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Levels:

1. An **unplanned** event results in reactor coolant temperature >200 °F without CTMT <u>and</u> without Reactor Pressure Boundary integrity

<u>OR</u>

 An unplanned event results in reactor coolant temperature >200 °F for >20 minutes See Note with CTMT integrity and without Reactor Pressure Boundary integrity

<u>OR</u>

- An unplanned event results in reactor coolant temperature >200 °F for >60 minutes See Note or results in RPV pressure increase > 10 psig
- **Note:** If a decay heat removal system is in operation within this time frame and reactor coolant temperature is being reduced then this EAL is not applicable

Basis:

EAL 1 addresses complete loss of functions required for core cooling during refueling and cold shutdown modes when neither containment closure nor Reactor Pressure Boundary integrity are established. Reactor Pressure Boundary integrity is in place when the Reactor Pressure Boundary pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). No delay time is allowed for EAL1 because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.

EAL 2 addresses the complete loss of functions required for core cooling for > 20 minutes during refueling and cold shutdown modes when containment closure is established but R Reactor Pressure Boundary CS integrity is not established. As in EAL 1, Reactor Pressure Boundary integrity should be assumed to be in place when the Reactor Pressure Boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). 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" (discussed later in this basis) and is believed to be conservative given that a low pressure containment barrier to fission product release is established. The Note indicates that EAL 2 is not applicable if

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SYSTEM MALFUNCTION

SA5(cont)

actions are successful in restoring a decay heat removal system to operation and reactor coolant temperature is being reduced within the 20 minute time frame.

EAL 3 addresses complete loss of functions required for core cooling for > 60 minutes during refueling and cold shutdown modes when Reactor Pressure Boundary integrity is established. As in EAL 1 and 2, Reactor Pressure Boundary integrity should be considered to be in place when the Reactor Pressure Boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The status of containment closure in this EAL is immaterial given that the Reactor Pressure Boundary 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, could be less than 60 minutes. RPV pressure would have to be monitored on the Plant Data System computer to determine the 10 psig pressure increase. The Note indicates that EAL 3 is not applicable if actions are successful in restoring a decay heat removal system to operation and reactor coolant temperature is being reduced within the 60 minute time frame assuming that the RPV pressure increase has remained less than 10 psig

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°F when the heat removal function is available.

Escalation of the event to a Site Area Emergency, should boiling result in significant RPV level loss leading to core uncovery, will occur in accordance with IC SS4 (Loss of RPV inventory affecting core decay heat removal capability with irradiated fuel in the RPV).

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SYSTEM MALFUNCTION

SA6

Initiating Condition -- ALERT

Unplanned loss of most or all safety system annunciation or indication in control room with either a significant transient in progress, <u>or</u> compensatory non-alarming indicators are unavailable

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

 Unplanned loss of most <u>or</u> all safety system annunciators <u>or</u> indication on 1H13-P680, 1H13-P601 and 1H13-P870 for >15 minutes

AND

<u>or</u>

b. Compensatory non-alarming indications are unavailable.

Basis:

This IC and its associated EAL are 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 transient. Recognition of the availability of computer based indication equipment is considered (e.g., SPDS, plant computer, etc.).

"Planned" loss of annunciators or indicators includes scheduled maintenance and testing activities.

Quantification of "Most" 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 Supervisor 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 plant design provides redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators may be more

a. A significant transient is in progress.

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SYSTEM MALFUNCTION

SA6(cont)

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, a NOUE should be declared based on IC SU10 (Inability to reach required shutdown within technical specification time limits).

"Compensatory non-alarming indications" in this context includes computer based information such as SPDS. This should include any computer systems available for this use. If both a major portion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

Escalation of the event to a Site Area Emergency will occur in accordance with IC SS6 (Inability to monitor a significant transient in progress).

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SYSTEM MALFUNCTION

SS1

Initiating Condition -- SITE AREA EMERGENCY

Loss of all offsite and onsite AC power to Div I & II ESF busses

Operating	Mode	Applica	ability:
-----------	------	---------	----------

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. Loss of power to 15AA <u>and</u> 16AB busses

<u>AND</u>

Failure to restore power to **either** 15AA <u>or</u> 16AB bus within **15 minutes** from the time of loss of **both** offsite <u>and</u> onsite AC power

Basis:

Loss of AC power to Div I&II 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 can cause core uncovering and loss of containment integrity, thus this event can escalate to a General Emergency. The 15 minute time duration was selected to exclude transient or momentary power losses.

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of AC power to essential busses. Even though an essential bus may be energized, if necessary loads (i.e., loads that if lost would inhibit decay heat removal capability or Reactor Vessel makeup capability) are not operable on the energized bus then the bus should not be considered operable. If this bus is the only energized bus then a Site Area Emergency per SS1 should be declared.

Escalation of the event to a General Emergency will occur in accordance with IC SG1, (Prolonged loss (>4 hrs) of all offsite and onsite AC power to Div I&II ESF busses).

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SYSTEM MALFUNCTION

SS2

Initiating Condition -- SITE AREA EMERGENCY

Loss of all vital DC power

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. 11DA and 11DB ≤105 VDC for >15 minutes

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power may cause core uncovering or loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. 15 minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation of the event to a General Emergency will occur in accordance with either IC AG1 (Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDY or 5000 mR Thyroid CDE for the actual or projected duration of the release using actual meteorology), IC FG1 (Loss of any two barriers and loss or potential loss of third barrier), or IC HG2 (Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency).

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SYSTEM MALFUNCTION

SS3

Initiating Condition -- SITE AREA EMERGENCY

Failure of reactor protection system instrumentation to complete <u>or</u> initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup

Emergency Action Level:

1. Automatic scram <u>and</u> a manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical

Basis:

Under the conditions of EAL 1, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that could lead to imminent or potential loss of both fuel clad and Reactor Pressure Boundary. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.

A scram performs two functions:

(1) The first function is to initiate a rapid control rod insertion which immediately inserts a step change of negative reactivity into the core to immediately turn reactor power and bring the reactor subcritical. Subcritical conditions are indicated by reactor power level below the APRM downscale **and** continuing to decrease. The first function provides the necessary core protection in response to a plant transient and is the criteria used to determine if the automatic and/or manual scram was successful.

(2) The second function is, following the initiation of control rod insertion, to continue to insert control rods until sufficient negative reactivity is inserted to assure adequate shutdown margin. The second function is not applicable in EAL 1 because both automatic and manual actions have failed to successfully perform the first function.

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes sufficient control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., Scram Push Buttons, Reactor Mode Switch, Alternate Rod Insertion).

Escalation of the event to a General Emergency will occur in accordance with IC SG2 (Failure of the reactor protection system to complete an automatic scram and manual scram was not successful and there is indication of an extreme challenge to the ability to cool the core

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SYSTEM MALFUNCTION

SS4

Initiating Condition -- SITE AREA EMERGENCY

Loss of RPV inventory **affecting** core decay heat removal capability **with** irradiated fuel in the RPV

Operating Mode Applicability:

Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Level:

1. a. Loss of RPV inventory

<u>and</u>

b. RPV level cannot be monitored for >30 minutes

<u>OR</u>

- 2. a. RPV level <-156.3 in. with containment closure not established
 - or
 - b. RPV level <-167 in. with containment closure established

Basis:

Under the conditions specified by this IC, continued decrease in RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RPV breach, pressure boundary leakage, or continued boiling in the RPV.

In the cold shutdown mode, normal reactor vessel level indication systems will normally be available. However, if all level indication were to be lost during a loss of RPV 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 Reactor Pressure Boundary leakage.

A number of variables such as initial vessel level, or shutdown heat removal system design can have a significant impact on heat removal capability challenging the fuel clad barrier. The 30-minute duration allows sufficient time for actions to be performed to recover needed cooling equipment and is considered to be conservative.

Escalation to a General Emergency is via SG3 (Loss of RPV inventory affecting fuel clad integrity with containment challenged with irradiated fuel in the RPV) or radiological effluent IC AG1 (Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the actual or projected duration of the release using actual meteorology).

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SYSTEM MALFUNCTION

SS5

Initiating Condition -- SITE AREA EMERGENCY

Complete loss of heat removal capability.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. **Inability** to maintain Suppression Pool temperature in the **HCTL Safe Zone** requiring Emergency Depressurization per EP-3

Basis:

This EAL addresses complete loss of functions, including ultimate heat sink, required for hot shutdown with the reactor at pressure and temperature. Loss of heat removal function is indicated by the inability to maintain Suppression Pool temperature within the Heat Capability Temperature Limit as prescribed in EP-3. Under these conditions, there is an actual major failure of a system intended for protection of the public.

Escalation to General Emergency is via IC AG1 (Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the actual or projected duration of the release using actual meteorology), IC FG1(Loss of any two barriers and loss or potential loss of third barrier), or IC HG2 (Other conditions existing which in the judgment of the Emergency Director warrant declaration of General Emergency).

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SYSTEM MALFUNCTION

SS6

Initiating Condition -- SITE AREA EMERGENCY

Inability to monitor a significant transient in progress

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. a. Loss of most <u>or</u> all annunciators or indication on 1H13-P680, 1H13-P601 <u>and</u> 1H13-P870 for >15 minutes

<u>AND</u>

b. Indications needed to monitor criticality <u>or</u> core heat removal <u>or</u> fission product barrier status are unavailable

AND

c. A significant transient is in progress

AND

d. Compensatory non-alarming indications are unavailable

Basis:

This IC and its associated EAL is intended to recognize the inability of the control room staff to monitor the plant response to a transient. A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public.

"Compensatory non-alarming indications" in this context includes computer based information such as SPDS. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.

Indications needed to monitor safety functions necessary for protection of the public include control room indications, computer generated indications and dedicated annunciation capability. The specific 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 Pressure Boundary intact, and to maintain containment intact.

Quantification of "Most" 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

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SYSTEM MALFUNCTION

SS6(cont)

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 Supervisor be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

There is no escalation above the Site Area Emergency for this event.

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SYSTEM MALFUNCTION

SG1

Initiating Condition -- GENERAL EMERGENCY

Prolonged Loss (>4 hrs) of all offsite and onsite AC power to Div I & II ESF busses.

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup Mode 3Hot Shutdown

Emergency Action Level:

1. Loss of AC power to 15AA and 16AB busses,

<u>AND</u>

Either:

a. Restoration of AC power to either 15AA or 16AB within 4 hours is not likely

or

b. Conditions are imminent that a Loss of two fission product barriers <u>and</u> loss <u>or</u> potential loss of third (FG1) is expected to occur prior to restoration of AC power to <u>either</u> 15AA or 16AB.

Basis:

Loss of AC power to Div I&II 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 could lead to loss of fuel clad, Reactor Pressure Boundary, and containment. The four (4) 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". Appropriate allowance for offsite emergency response including evacuation of surrounding areas should be considered. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response.

This IC is specified to assure that in the unlikely event of a prolonged station blackout, 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 emergency 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.

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SYSTEM MALFUNCTION

SG1(cont)

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.

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SYSTEM MALFUNCTION

SG2

Initiating Condition -- GENERAL EMERGENCY

Failure of the reactor protection system to complete an automatic scram <u>and</u> manual scram was **not** successful <u>and</u> there is indication of an extreme challenge to the ability to cool the core

Operating Mode Applicability:

Mode 1Power Operation Mode 2Startup

Emergency Action Level:

1. Automatic scram <u>and</u> manual failed to rapidly insert sufficient control rods to bring the reactor subcritical

<u>AND</u>

Either:

a. RPV parameters cannot be maintained within EP-2A limits

or

b. RPV pressure <u>and</u> suppression pool temperature cannot be maintained in the HCTL Safe Zone

Basis:

A scram performs two functions:

(1) The first function is to initiate a rapid control rod insertion which immediately inserts a step change of negative reactivity into the core to immediately turn reactor power and bring the reactor subcritical. Subcritical conditions are indicated by reactor power level below the APRM downscale **and** continuing to decrease. The first function provides the necessary core protection in response to a plant transient and is the criteria used to determine if the automatic and/or manual scram was successful.

(2) The second function is, following the initiation of control rod insertion, to continue to insert control rods until sufficient negative reactivity is inserted to assure adequate shutdown margin. The second function is not applicable in EAL 1 because both automatic and manual actions have failed to successfully perform the first function.

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes sufficient control rods to be rapidly inserted into the core and brings the reactor subcritical (e.g., Scram Push Buttons, Reactor Mode Switch, Alternate Rod Insertion).

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SYSTEM MALFUNCTION

SG2(cont)

Under the conditions of this IC, efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed. Although there are capabilities away from the reactor control console, such as standby liquid control and actions to insert control rods per EP-2A, the continuing parameter degradation indicates that these capabilities have not been effective. This situation could be a precursor for a core melt sequence.

The extreme challenge to the ability to cool the core is intended to mean that the reactor vessel water level cannot be restored and maintained above Minimum Steam Cooling RPV Water Level as described in the EOP bases.

Another consideration is the inability to initially remove heat during the event. Considerations include inability to remove heat via the main condenser, or via the suppression pool.

In the event either of these challenges exist at a time that the reactor has not been brought below the power associated with the safety system design (APRM downscale) a core melt sequence could 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.

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SYSTEM MALFUNCTION

SG3

Initiating Condition -- GENERAL EMERGENCY

Loss of RPV inventory **affecting** fuel clad integrity **with** containment challenged with irradiated fuel in the RPV

Operating Mode Applicability:

Mode 4Cold Shutdown Mode 5Refueling

Emergency Action Level:

- 1. RPV level:
 - a. <-167 in. for > 30 minutes
 - <u>or</u>
 - b. RPV level cannot be monitored with indication of core uncovery for >30 minutes

AND

- 2. a. Containment closure is not established
 - <u>or</u>
 - b. Containment pressure >22 psig

<u>or</u>

c. Containment hydrogen concentration >19%

<u>or</u>

d. Any EP-4 radiation monitor reading above the Max Safe Value

Basis:

EAL 1 represents the inability to restore and maintain RPV level to above the top of active fuel. Fuel damage could occur if RPV level cannot be restored, because decay heat will cause boiling, further reducing the RPV level.

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SYSTEM MALFUNCTION

SG3(cont)

A number of variables, such as initial vessel level, or the amount of decay heat can have a significant impact on heat removal capability and any challenge to the fuel clad barrier. Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, conservatively, 30 minutes was chosen.

As water level in the RPV lowers, the dose rate above the core will increase. The dose rate due to this core shine is expected to result in increasing Containment High Range Monitor indication and possible alarm. Additionally, 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.

The General Emergency is declared on the occurrence of the loss or imminent loss of function of <u>all</u> <u>three</u> barriers. Based on the above discussion, Reactor Pressure Boundary barrier failure resulting in core uncovery for 30 minutes or more may cause fuel clad failure. With the containment breached or challenged, 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.

In EAL 2 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. Shutdown contingency plans provide for re-establishing containment closure following a loss of heat removal or RPV inventory functions. If the closure is re-established prior to exceeding the level threshold of EAL 1, escalation to General Emergency would not occur.

The pressure at which containment is considered challenged per the Emergency Operating Procedures is 22 psig.

The EP-4 Maximum Safe radiation monitor values are used are used to provide indication of increased release that may be indicative of a challenge to secondary containment.

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.

Attachment 5

to

GNRO-2003/00067

GGNS NEI 99-01, Rev. 4 to Plant Specific Correlations, Differences, Deviations, and Justifications

Grand Gulf Nuclear Station

NEI 99-01, Rev 4

То

Plant Specific

Correlations,

Differences, Deviations,

and Justifications

General Notes:

NEI 99-01 Operating Modes:

Power Operation Startup Hot Standby Hot Shutdown Cold Shutdown Refueling Defueled

Grand Gulf Operating Modes: 1------ Power Operation

Power Operation
 Startup
 Hot Shutdown
 Cold Shutdown
 Refueling
 D ------ Defueled

Note: The Hot Standby Mode is only applicable to PWRs

Abnormal Rad Levels / Radiological Effluent

This section contains the correlation between NEI 99-01 and Grand Gulf ICs and EALs in the Abnormal Rad Levels / Radiological Effluent Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding Grand Gulf IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.
NEI 99-01: AU1

Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Radiological Effluent Technical Specifications for 60 Minutes or Longer

Applicability: All

Grand Gulf: AU1

Unplanned release of gaseous or liquid radioactivity to the environment that exceeds $2 \times ODCM$ limit for ≥ 60 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

Grand Gulf uses the Offsite Dose Calculation Manual (ODCM) instead of the Radiological Effluent Technical Specifications (RETS)

Deviations:

VALID reading on any effluent monitor that exceeds two times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer

Applicability: All

Grand Gulf: AU1, EAL #1

Liquid release > 4 x High High Alarm set point G17-RR-R521 with failure of G17-F355 to close for \ge 60 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

The setpoint is established by the ODCM to alarm at 50% of the TRM limit. Thus four times the setpoint corresponds to two times the TRM limit.

Deviations:

VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 60 minutes or longer

Applicability: All

Grand Gulf: AU1, EAL #2

High High Alarm on one or more of the following:

- a. OG Radwst Vent-----(P601-19A-A8)
- b. FH Area Vent-----(P601-19A-C11)
- c. Ctmt Vent-----(P601-19A-G9)
- d. Turb Bldg Vent ----- (P601-19A-F11)

AND

Summation of all monitors (including SBGT A & B) exceeds **2 x TRM Spec. limit** (6.11.4) for ≥ 60 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

The setpoint for each of the listed release paths is established by the ODCM to alarm at 25% of the TRM Spec. limit. Use of the High High Alarm for any one of the release pathways provides early warning of a potential radiological release. Requiring a summation of all monitors including the non-routine SBGT release pathway ensures that all release pathways are considered when calculating the total release. Use of two times the TRM Spec. limit ensures consistency with AU1.

Deviations:

Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 60 minutes or longer, in excess of two times (site-specific technical specifications).

Applicability: All

Grand Gulf: AU1, EAL #3

Confirmed sample analysis for gaseous or liquid release exceeds $2 \times TRM$ Spec limit (6.11.1, 6.11.2, 6.11.4, 6.11.5, or 6.11.6) for \geq 60 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

VALID reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background sustained for 60 minutes or longer [for sites having telemetered perimeter monitors]

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not have telemetered perimeter monitors

Deviations:

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 60 minutes or longer [for sites having such capability]

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not use automatic dose assessment

Deviations:

NEI 99-01: AU2

Unexpected Increase in Plant Radiation

Applicability: All

Grand Gulf: AU2

Unexpected increase in plant radiation

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

VALID (site-specific) indication of uncontrolled water level decrease in the reactor refueling cavity, spent fuel pool, or fuel transfer canal with all irradiated fuel assemblies remaining covered by water.

AND

Unplanned VALID (site-specific) Direct Area Radiation Monitor reading increases

Applicability: All

Grand Gulf: AU2, EAL #2

Valid indication of uncontrolled water level decrease in Aux Bldg Fuel Pools **or** Upper Ctmt Pools with irradiated fuel assemblies remaining covered by water

AND

a. Valid alarm on any of the following:

Ctmt 209 Airlock ------(P844-1A-A1)

Ctmt Fuel Hdlg Area-----(P844-1A-A3)

Aux Bldg Fuel Hdlg Area -----(P844-1A-A4)

<u>Or</u>

b. survey indicates increased radiation level in the associated area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AU2, EAL#1 is implemented by Grand Gulf AU2, EAL#2 (Formatting only)

Deviations:

Unplanned VALID Direct Area Radiation Monitor readings increases by a factor of 1000 over normal* levels.

*Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.

Applicability: All

Grand Gulf: AU2, EAL #1

Valid Area Radiation Monitor or survey indicates an unplanned increase in plant radiation levels by a factor of 1000 or full scale

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AU2, EAL#2 is implemented by Grand Gulf AU2, EAL#1 (Formatting only)

Some of the Area Radiation Monitors installed at Grand Gulf do not have sufficient range to allow the determination of an increase by a factor of 1000. Therefore for these ARMs "full scale" is conservatively used in lieu of the factor of 1000.

Deviations:

NEI 99-01: AA1

Any UNPLANNED Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Radiological Effluent Technical Specifications for 15 Minutes or Longer

Applicability: All

Grand Gulf: AA1

Unplanned release of gaseous or liquid radioactivity to the environment that exceeds **20 x ODCM** limit for **≥15 minutes**

Applicability: 1, 2, 3, 4, 5, D

Differences:

Grand Gulf uses the Offsite Dose Calculation Manual (ODCM) instead of the Radiological Effluent Technical Specifications (RETS).

Deviations:

When the NEI 99-01 factor of 200 was used it was discovered that the resulting Alert threshold value was much closer to the Site Area Emergency threshold than to the Unusual Event threshold. A factor of 20 was used in lieu of 200 to provide a more logical and evenly spacing of the thresholds in this category. Using a factor of 20 results in an approximate increase of a factor of 10 between all four classification levels which implements the perceived intent of this Initiating Condition.

VALID reading on any effluent monitor that exceeds 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer.

Applicability: All

Grand Gulf: AA1, EAL #1

Liquid release >40 x High High Alarm set point on G17-RR-R521 with failure of G15-F355 to close for ≥ 15 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

The setpoint is established by the ODCM to alarm at 50% of the TRM limit. Thus forty times the setpoint corresponds to twenty times the TRM limit. Use of twenty times the TRM Spec. limit ensures consistency with Grand Gulf AA1.

Deviations:

VALID reading on one or more of the following radiation monitors that exceeds the reading shown for 15 minutes or longer:

(site-specific list)

Applicability: All

Grand Gulf: AA1, EAL #2

High High Alarm on one or more of the following:

- a. OG Radwst Vent-----(P601-19A-A8)
- b. FH Area Vent-----(P601-19A-C11)
- c. Ctmt Vent-----(P601-19A-G9)
- d. Turb Bldg Vent ------(P601-19A-F11)

AND

Summation of all monitors (including SBGT A & B) exceeds **20 x TRM Spec limit** (6.11.4) for ≥ 15 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

The setpoint for each of these release paths is established by the ODCM to alarm at 25% of the TRM Spec. limit. Use of the High High Alarm for any one of the release pathways provides early warning of a potential radiological release. Requiring a summation of all monitors including the non-routine SBGT release pathway ensures that all release pathways are considered when calculating the total release. Use of twenty times the TRM Spec. limit ensures consistency with AA1.

Deviations:

Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 times (site-specific technical specifications).

Applicability: All

Grand Gulf: AA1, EAL #3

Confirmed sample analysis for gaseous or liquid release exceeds 20 x TRM Spec limit (6.11.1, 6.11.2, 6.11.4, 6.11.5 or 6.11.6) for ≥ 15 minutes

Applicability: 1, 2, 3, 4, 5, D

Differences:

Use of twenty times the TRM Spec. limit ensures consistency with Grand Gulf AA1

Deviations:

VALID reading on perimeter radiation monitoring system greater than 10 mR/hr above normal background sustained for 15 minutes or longer [for sites having telemetered perimeter monitors]

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not have telemetered perimeter monitors

Deviations:

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 15 minutes or longer [for sites having such capability]

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not use automatic dose assessment

Deviations:

NEI 99-01: AA2

Damage to Irradiated Fuel or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.

Applicability: All

Grand Gulf: AA3

Damage to irradiated fuel <u>or</u> loss of water level that has <u>or</u> will result in the uncovering of irradiated fuel outside the RPV

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA2 is implemented by Grand Gulf AA3 (Formatting only)

Deviations:

A VALID (site-specific) alarm or reading on one or more of the following radiation monitors: (site-specific monitors)

Refuel Floor Area Radiation Monitor

Fuel Handling Building Ventilation Monitor

Refueling Bridge Area Radiation Monitor

Applicability: All

Grand Gulf: AA3, EAL #1

Potential spent fuel damaging event with Alarm on one or more of the following:

- a. Ctmt Vent-----(P601-19A- G9)
- b. FH Area Vent-----(P601-19A-C11)
- c. Ctmt 209 Airlock ------(P844-1A-A1)
- d. Ctmt Fuel Hdlg Area-----(P844-1A-A3)
- e. Aux Bldg Fuel Hdlg Area ----- (P844-1A-A4)

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA2, EAL#1 is implemented by Grand Gulf AA3, EAL#1 (Formatting only)

NEI 99-01 bases for Example EAL #1 clearly states that application of this EAL requires understanding of actual radiological conditions present in the vicinity of the monitor. The words "Potential spent fuel damaging event with" were added to the Grand Gulf EAL to capture this EAL to capture the "Damage to irradiated fuel" wording in NEI AA2.

Deviations:

Water level less than (site-specific) feet for the reactor refueling cavity, spent fuel pool and fuel transfer canal that will result in irradiated fuel uncovering

Applicability: All

Grand Gulf: AA3, EAL #2

Valid indication of uncontrolled water level decrease in Aux Bldg Fuel Pools <u>or</u> Upper Ctmt Pools that has <u>or</u> will result in irradiated fuel assemblies becoming uncovered

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA2, EAL#2 is implemented by Grand Gulf AA3, EAL#2 (Formatting only)

Grand Gulf does not have installed level indication that would allow direct reading of a level that would uncover irradiated fuel. An uncontrolled water level decrease would be detected long before fuel uncovering actually occurs. Combining this with a judgment that fuel has or will become uncovered meets the intent of the NEI EAL.

Deviations:

NEI 99-01: AA3

Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

Applicability: All

Grand Gulf: AA2

Release of radioactive material <u>or</u> increases in radiation levels within the facility that **impedes** operation of systems required to maintain <u>or</u> establish safe operations <u>or</u> cold shutdown

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA3 is implemented by Grand Gulf AA2 (Formatting only)

Deviations:

VALID (site-specific) radiation monitor readings GREATER THAN 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions:

(Site-specific) list

Applicability: All

Grand Gulf: AA2, EAL #1

Valid radiation level ≥ 15 mR/hr in the Control Room

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA3, EAL#1 is implemented by Grand Gulf AA2, EAL#1 (Formatting only)

Deviations:

VALID (site-specific) radiation monitor readings GREATER THAN <site specific> values in areas requiring infrequent access to maintain plant safety functions.

(Site-specific) list

Applicability: All

Grand Gulf: AA2, EAL #2

Valid radiation level ≥ 80 R/hr in RHR A, B, C, HPCS, LPCS, or RCIC room <u>and</u> access is required

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AA3, EAL#2 is implemented by Grand Gulf AA2, EAL#2 (Formatting only)

Specified that EAL is only met if access is required to maintain plant safety function.

Deviations:

NEI 99-01: AS1

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

Applicability: All

Grand Gulf: AS1

Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds **100 mR TEDE or 500 mR CDE Thyroid** for the actual or projected duration of the release using actual meteorology.

Applicability: 1, 2, 3, 4, 5, D

Differences:

The words "using actual meteorology" are included in the Grand Gulf IC because they are included in the NEI AS1 example EAL #2 and to provide wording consistency with Grand Gulf AS! And AG1. The Grand Gulf dose assessment computer program uses actual meteorology when calculating dose projections.

Deviations:

VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:

(site-specific list)

Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1.While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

NA

Deviations:

Grand Gulf has multiple ground level release points instead of a single elevated release point. The Alarm Response Instruction for each release point directs the performance of a summation of release points, to determine total release, upon receipt of the HI-HI Alarm, which is set at 25% of TRM 6.11.4 instantaneous dose limit at site boundary. Each release point is monitored by both low range and high range radiation monitors. The low range monitors are used to meet AU1 EAL#2 and AA1 EAL#2 (See bases for AU1 EAL#2 and AA1 EAL#2 for more information). The low range radiation monitors will peg out high before the Site Area Emergency threshold is reached, therefore the high range radiation monitors must be used for both the Site Area and General Emergency classifications. The summation of the multiple high range radiation monitors must be performed by the dose assessment software.

Activation of the dose assessment computer has been repeatedly demonstrated to be less than 10 minutes during drills and exercises. At Site Area Emergency radiation levels, the low range radiation monitoring instruments would be pegged high requiring use of the dose assessment computer to perform the required summation. Thus for Site Area Emergency and above, dose assessment results are always available at the time of declaration, therefore NEI 99-01 EAL #1 is not implemented as allowed by NEI 99-01 EAL #1 Note.

Grand Gulf Nuclear Station

Grand Gulf dose assessment computers are available in five (5) different locations. Three of these locations have backup battery power supplies and/or have emergency diesel generator backup power. Procedural guidance exists to provide continuous dose assessment in the event one or more of the dose assessment computer stations fails. Each dose assessment station is inter-connected to the PDS such that when activated, it continuously obtains required data and performs dose assessments once every 60 seconds or instantly upon demand.

Dose assessment using actual meteorology indicates doses greater than 100 mR TEDE or 500 mR thyroid CDE at or beyond the site boundary.

Applicability: All

Grand Gulf: AS1, EAL #1 & #2

- 1. Dose projection of ≥ 100 mR TEDE at or beyond site boundary based on plant or field team data
- 2. Dose projection of ≥ 500 mR CDE Thyroid at or beyond site boundary based on plant or field team data

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AS1, EAL#2 is implemented by Grand Gulf AS1, EAL#1 & #2 (Formatting only)

The words "using actual meteorology" are not included in the Grand Gulf EAL because they were included in IC AS1 and to provide wording consistency with Grand Gulf AS1, EAL #1 & #2 and AG1, EAL #1 & #2. The Grand Gulf dose assessment computer program uses actual meteorology when calculating dose projections.

Deviations:

A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 100 mR/hr. [for sites having telemetered perimeter monitors]

Applicability: All Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not have telemetered perimeter monitors

Deviations:

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 500 mR for one hour of inhalation, at or beyond the site boundary.

Applicability: All

Grand Gulf: AS1, EAL #1 & #2

- Dose projection of ≥ 100 mR TEDE at or beyond site boundary based on plant or field team data
- Dose projection of ≥ 500 mR CDE Thyroid at or beyond site boundary based on plant or field team data

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AS1, EAL#4 is implemented by Grand Gulf AS1, EAL#1 & #2 (Formatting only)

A dose projection must be performed using field team data in order to evaluate the projected dose associated with a field reading. Dose assessment stations will always be manned prior sending monitoring teams into the field. Therefore Grand Gulf EALs #1 & #2 satisfy this EAL.

Deviations:

NEI 99-01: AG1

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE or 5000 mR Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology.

Applicability: All

Grand Gulf: AG1

Offsite dose resulting from an actual <u>or</u> imminent release of gaseous radioactivity exceeds **1000 mR TEDE or 5000 mR CDE Thyroid** for the actual <u>or</u> projected duration of the release using actual meteorology.

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer:

(site-specific list)

Note: If dose assessment results are available at the time of declaration, the classification should be based on EAL #2 instead of EAL #1. While necessary declarations should not be delayed awaiting results, the dose assessment should be initiated / completed in order to determine if the classification should be subsequently escalated.

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

None

Deviations:

Grand Gulf has multiple ground level release points instead of a single elevated release point. The Alarm Response Instruction for each release point directs the performance of a summation of release points, to determine total release, upon receipt of the HI-HI Alarm, which is set at 25% of TRM 6.11.4 instantaneous dose limit at site boundary. Each release point is monitored by both low range and high range radiation monitors. The low range monitors are used to meet AU1 EAL#2 and AA1 EAL#2 (See bases for AU1 EAL#2 and AA1 EAL#2 for more information). The low range radiation monitors will peg out high before the Site Area Emergency threshold is reached, therefore the high range radiation monitors must be used for both the Site Area and General Emergency classifications. The summation of the multiple high range radiation monitors must be performed by the dose assessment software.

Activation of the dose assessment computer has been repeatedly demonstrated to be less than 10 minutes during drills and exercises. At Site Area Emergency radiation levels, the low range radiation monitoring instruments would be pegged high requiring use of the dose assessment computer to perform the required summation. Thus for Site Area Emergency and above, dose assessment results are always available at the time of declaration, therefore NEI 99-01 EAL #1 is not implemented as allowed by NEI 99-01 EAL #1 Note.

Grand Gulf Nuclear Station

Grand Gulf dose assessment computers are available in five (5) different locations. Three of these locations have backup battery power supplies and/or have emergency diesel generator backup power. Procedural guidance exists to provide continuous dose assessment in the event one or more of the dose assessment computer stations fails. Each dose assessment station is inter-connected to the PDS such that when activated, it continuously obtains required data and performs dose assessments once every 60 seconds or instantly upon demand.

Dose assessment using actual meteorology indicates doses greater than 1000 mR TEDE or 5000 mR thyroid CDE at or beyond the site boundary.

Applicability: All

Grand Gulf: AG1, EAL #1 & #2

- Dose projection of ≥ 1000 mR TEDE at <u>or</u> beyond site boundary based on plant <u>or</u> field team data
- 2. Dose projection of ≥ 5000 mR CDE Thyroid at <u>or</u> beyond site boundary based on plant <u>or</u> field team data

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AG1, EAL#2 is implemented by Grand Gulf AG1, EAL#1 & #2. (Formatting only)

The words "using actual meteorology" are not included in the Grand Gulf EAL because they were included in AG1. The Grand Gulf dose assessment computer program uses actual meteorology when calculating dose projections.

Deviations:

A VALID reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 1000 mR/hr. [for sites having telemetered perimeter monitors]

Applicability: All

Grand Gulf: NA

None

Applicability: N/A

Differences:

Grand Gulf does not have telemetered perimeter monitors

Deviations:

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 500 mR for one hour of inhalation, at or beyond the site boundary.

Applicability: All

Grand Gulf: AG1, EAL #1 & #2

- 1. Dose projection of ≥ 1000 mR TEDE at or beyond site boundary based on plant or field team data
- 2. Dose projection of ≥ 5000 mR CDE Thyroid at or beyond site boundary based on plant or field team data

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI AG1, EAL#\$ is implemented by Grand Gulf AG1, EAL#1 & #2 (Formatting only)

A dose projection must be performed using field team data in order to evaluate the field reading. Dose assessment stations will always be manned prior sending monitoring teams into the field. Therefore Grand Gulf EALs #1 & #2 satisfy this EAL.

Deviations:

Cold Shutdown / Refueling System Malfunction

This section contains the correlation between NEI 99-01 and Grand Gulf ICs and EALs in the Cold Shutdown / Refueling System Malfunction Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding Grand Gulf IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

The Cold Shutdown Operating Mode does not meet the same criteria used to establish previous NEI "Recognition Categories". Recognition Categories are based on events not operating modes. Therefore the Cold Shutdown/ Refueling System Malfunctions were combined with the System Malfunction recognition category to address human factors issues and make the System Malfunction recognition category consistent with the remaining recognition categories. Changing the numbering format does not create a deviation from NEI 99-01.

NEI 99-01: CU1

RCS Leakage

Applicability: Cold Shutdown

Grand Gulf: SU4

Unplanned loss of RPV inventory

Applicability: 4

Differences:

NEI CU1 is implemented by Grand Gulf SU4 (Formatting only)

Changed "RCS Leakage" to "Unplanned loss of RPV inventory" to be consistent with terminology used in other EALs.

Deviations:

Unidentified or pressure boundary leakage greater than 10 gpm

Applicability: Cold Shutdown

Grand Gulf: SU4, EAL #1

RPV water level cannot be restored and maintained above 11.4 in.

Applicability: 4

Differences:

NEI CU1, EAL #1 is implemented by Grand Gulf SU4, EAL #1 (Formatting only)

Deviations:

There is no practical method at Grand Gulf to monitor for 10 gpm leakage while in Mode 4. Normal leakage detection systems may not be available because Technical Specifications does not require leakage detection systems to be operable in Mode 4. Normal maintenance that occurs in Mode 4 will often preclude the use of leakage detection systems either due to excessive in-leakage from the maintenance or due to the addition of temporary sump pumps. RPV level control in Mode 4 also precludes use of a RPV level decrease rate of change. Therefore a RPV water level of 11.4 in. was chosen to implement this EAL. 11.4 in. is the level for the automatic reactor scram and the shutdown cooling system automatic isolation. Both of these have annuciators which will alert the operator to the condition. In addition at -41.6 in. a Primary Containment Isolation will occur should leakage be from a source other than the Shutdown Cooling system. Use of level in Mode 4 instead of a leakage rate is consistent with all other Mode 4 & 5 Reactor Pressure Boundary Leakage EALs.

Should RPV level continue to decrease escalation to an Alert would occur if level decreased to -150.3 in. per SA4.
NEI 99-01: CU1, Example EAL #2

Identified leakage greater than 25 gpm

Applicability: Cold Shutdown

Grand Gulf: SU4, EAL #1

RPV water level cannot be restored and maintained above 11.4 in.

Applicability: 4

Differences:

NEI CU1, EAL #2 is implemented by Grand Gulf SU4, EAL #1 (Formatting only)

Deviations:

There is no practical method at Grand Gulf to monitor for 25 gpm leakage while in Mode 4. Normal leakage detection systems may not be available because Technical Specifications does not require leakage detection systems to be operable in Mode 4. Normal maintenance that occurs in Mode 4 will often preclude the use of leakage detection systems either due to excessive in-leakage from the maintenance or due to the addition of temporary sump pumps. RPV level control in Mode 4 also precludes use of a RPV level decrease rate of change. Therefore a RPV water level of 11.4 in. was chosen to implement this EAL. 11.4 in. is the level for the automatic reactor scram and the shutdown cooling system automatic isolation. Both of these have annuciators which will alert the operator to the condition. In addition at -41.6 in. a Primary Containment Isolation will occur should leakage be from a source other than the Shutdown Cooling system. Use of level in Mode 4 instead of a leakage rate is consistent with all other Mode 4 & 5 Reactor Pressure Boundary Leakage EALs.

Should RPV level continue to decrease escalation to an Alert would occur if level decreased to -150.3 in. per SA4.

NEI 99-01: CU2

UNPLANNED Loss of RCS Inventory with Irradiated Fuel in the RPV

Applicability: Refueling

Grand Gulf: SU5

Unplanned loss of RPV inventory with irradiated fuel in the RPV

Applicability: 5

Differences:

NEI CU2 is implemented by Grand Gulf SU5 (Formatting only)

Changed RCS to RPV to reflect BWR terminology.

Deviations:

NEI 99-01: CU2, Example EAL #1

UNPLANNED RCS level decrease below the RPV flange for >15 minutes

Applicability: Refueling

Grand Gulf: SU5, EAL #1

Unplanned RPV level decrease below the RPV flange for > 15 minutes

Applicability: 5

Differences:

NEI CU2, EAL #1 is implemented by Grand Gulf SU5, EAL #1 (Formatting only) Changed RCS to RPV to reflect BWR terminology.

Deviations:

NEI 99-01: CU2, Example EAL #2

a. Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

AND

b. RPV level cannot be monitored

Applicability: Refueling

Grand Gulf: SU5, EAL #2

a. Loss of RPV inventory

and

b. RPV level cannot be monitored

Applicability: 5

Differences:

NEI CU2, EAL #2 is implemented by Grand Gulf SU5, EAL #2 (Formatting only)

It does not matter what means are used to determine that inventory is being lost therefore specific means for determining loss of inventory are not included in the Grand Gulf EAL.

Deviations:

NEI 99-01: CU3

Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU1

Loss of all offsite power to ESF busses for > 15 Minutes

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU3 is implemented by Grand Gulf SU1 (Formatting only)

Applicability includes modes 1, 2, and 3 as well as modes 4 and 5 because Grand Gulf SU! Also implements NEI SU1.

Deviations:

NEI 99-01: CU3, Example EAL #1

a. Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

b. At least (site-specific) emergency generators are supplying power to emergency busses

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU1, EAL #1

Loss of power from ESF-11 and ESF-21 and ESF-12 transformers for >15 Minutes

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU3, EAL #1 is implemented by Grand Gulf SU1, EAL #1 (Formatting only)

The second part of the NEI 99-01 Example EAL "At least (site-specific) emergency generators are supplying power to emergency busses" is not required because loss of power to the indicated ESF transformers for >15 minutes requires the declaration of <u>at least</u> an Unusual Event regardless of the condition to the emergency diesel generators.

If the diesel generators are available and supplying the ESF busses within 15 minutes after the loss of the ESF transformers, then declaration of an Unusual Event is required. If the diesel generators are not supplying the ESF busses within 15 minutes after the loss of the ESF transformers then the event escalates to an Alert classification per NEI 99-01 CA3 and Grand Gulf SA2.

Deviations:

NEI 99-01: CU4

UNPLANNED Loss of Decay Heat Removal Capability with Irradiated Fuel in the RPV

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU6

Unplanned loss of decay heat removal capability with irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CU4 is implemented by Grand Gulf SU6 (Formatting only)

Deviations:

NEI 99-01: CU4, Example EAL #1

An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU6, EAL #1

An unplanned event results in RCS temperature >200°F

Applicability: 4, 5

Differer ces:

NEI CU4, EAL #1 is implemented by Grand Gulf SU6, EAL #1 (Formatting only)

200°F is the Grand Gulf cold shutdown temperature limit.

Deviations:

NEI 99-01: CU4, Example EAL #2

Loss of all RCS temperature and RPV level indication for > 15 minutes

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU6, EAL #2

Loss of all reactor coolant temperature <u>and</u> RPV level indication for > 15 minutes

Applicability: 4, 5

Differences:

NEI CU4, EAL #2 is implemented by Grand Gulf SU6, EAL #2 (Formatting only)

Deviations:

NEI 99-01: CU5

Fuel Clad Degradation

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU10

Fuel Clad Degradation.

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU5 is implemented by Grand Gulf SU10 (Formatting only)

Applicability also includes modes 1, 2, and 3 as well as modes 4 and 5 because Grand Gulf SU9 also implements NEI SU4.

Deviations:

NEI 99-01: CU5, Example EAL #1

(Site-specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU10, EAL #1

Offgas isolation due to valid Offgas Post Treatment monitor signal. (1H13-P601-19A-C8)

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU5, EAL #1 is implemented by Grand Gulf SU10, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CU5, Example EAL #2

(Site-specific) coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU10, EAL #2

Coolant sample activity >4.0 µCi/ml l¹³¹ dose equivalent

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU5, EAL #2 is implemented by Grand Gulf SU10, EAL #2 (Formatting only)

Deviations:

NEI 99-01: CU6

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU9

Unplanned loss of all onsite or offsite communications capabilities

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU6 is implemented by Grand Gulf SU9 (Formatting only)

Applicability also includes modes 1, 2, and 3 as well as modes 4 and 5 because Grand Gulf SU8 also implements NEI SU6.

Deviations:

NEI 99-01: CU6, Example EAL #1

Loss of all (site-specific list) onsite communications capability affecting the ability to perform routine operations

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU9, EAL #1

Unplanned loss of all onsite communications equipment (See **Table S1**)

	Table S1 Onsite Communications Equipment	
Plant Rac Plant Pag Sound Po In-plant to	dio System ging System owered Phones elephones	

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU6, EAL #1 is implemented by Grand Gulf SU9, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CU6, Example EAL #2

Loss of all (site-specific list) offsite communications capability

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU9, EAL #2

Unplanned loss of all offsite communications equipment (See Table S2)

<u>Table S2</u> Onsite Communications Equipment	
All telephone lines (commercial & fiber optics) Satellite phone OHL NRC phones (ENS, HPN, MCL, RSCL, PMCL) Cellular Phones UHF Radios	

Applicability: 1, 2, 3, 4, 5

Differences:

NEI CU6, EAL #2 is implemented by Grand Gulf SU9, EAL #2 (Formatting only)

Deviations:

NEI 99-01: CU7

UNPLANNED Loss of Required DC Power for Greater than 15 Minutes

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU2

Unplanned loss of required DC power for >15 Minutes

Applicability: 4, 5

Differences:

NEI CU7 is implemented by Grand Gulf SU2 (Formatting only)

Deviations:

NEI 99-01: CU7, Example EAL #1

UNPLANNED Loss of Vital DC power to required DC busses based on (sitespecific) bus voltage indications

AND

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU2, EAL #1

Unplanned reduction in 11DA and 11DB voltage to <105 VDC

AND

Unable to restore **either** 11DA <u>or</u> 11DB battery charger within **15 minutes** after reaching **105 VDC**

Applicability: 4, 5

Differences:

NEI CU7, EAL #1 is implemented by Grand Gulf SU2, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CU8

Inadvertent Criticality

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU7

Inadvertent criticality

Applicability: 3, 4, 5

Differences:

NEI CU8 is implemented by Grand Gulf SU7 (Formatting only)

Applicability also includes mode 3 because Grand Gulf SU6 also implements NEI SU8.

Deviations:

NEI 99-01: CU8, Example EAL #1

An UNPLANNED extended positive period observed on nuclear instrumentation

Applicability: Cold Shutdown, Refueling

Grand Gulf: SU7, EAL #1

An unplanned sustained positive period observed on nuclear instrumentation

Applicability: 3, 4, 5

Differences:

NEI CU8, EAL #1 is implemented by Grand Gulf SU7, EAL #1 (Formatting only)

Extended change to sustained because it better describes critical period characteristic.

Deviations:

NEI 99-01: CU8, Example EAL #2

An UNPLANNED sustained positive startup rate observed on nuclear Instrumentation

Applicability: Cold Shutdown, Refueling

Grand Gulf: N/A

None

Applicability: N/A

Differences:

The Grand Gulf nuclear instrumentation does not provide startup rate indication. Startup rate indication is only applicable to PWRs.

Deviations:

NEI 99-01: CA1

Loss of RCS Inventory

Applicability: Cold Shutdown

Grand Gulf: SA4

Loss of RCS inventory with irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CA1 is implemented by Grand Gulf SA4 (Formatting only)

NEI 99-01 contains two ICs (CA1 & CA2) that deal with "Loss of RCS inventory". CA1 is applicable in the Cold Shutdown mode whereas CA2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CA1 & CA2 deals with different means available for monitoring RCS inventory and level. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. Therefore both NEI CA1 & CA2 are implemented in Grand Gulf SA4.

NEI CA1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CA2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore omission of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CA1.

Deviations:

NEI 99-01: CA1, Example #1

Loss of RCS inventory as indicated by RPV level less than {site-specific level}.

(low-low ECCS actuation setpoint) (BWR)

Applicability: Cold Shutdown

Grand Gulf: SA4, EAL #1

Loss of RPV inventory as indicated by RPV level >-150.3 in (Level 1)

Applicability: 4, 5

Differences:

NEI CA1, EAL #1 is implemented by Grand Gulf SA4, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CA1, Example #2

Loss of RCS inventory as indicated by unexplained {site-specific} sump and tank level increase

<u>AND</u>

RCS level cannot be monitored for > 15 minutes

Applicability: Cold Shutdown

Grand Gulf: SA4, EAL #2

Loss of RPV inventory

and

RPV level cannot be monitored for >15 minutes

Applicability: 4, 5

Differences:

NEI CA1, EAL #2 is implemented by Grand Gulf SA4, EAL #2 (Formatting only)

It does not matter what means are used to determine that inventory is being lost therefore specific means for determining loss of inventory are not included in the Grand Gulf EAL.

Deviations:

NEI 99-01: CA2

Loss of RCS Inventory With Irradiated Fuel in the RPV

Applicability: Refueling

Grand Gulf: SA4

Loss of RCS inventory with irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CA2 is implemented by Grand Gulf SA4 (Formatting only)

NEI 99-01 contains two ICs (CA1 & CA2) that deal with "Loss of RCS inventory". CA1 is applicable in the Cold Shutdown mode whereas CA2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CA1 & CA2 deals with different means available for monitoring RCS inventory and level. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. Therefore both NEI CA1 & CA2 are implemented in Grand Gulf EAL SA4.

NEI CA1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CA2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore omission of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CA1.

Deviations:

NEI 99-01: CA2, Example #1

Loss of RCS inventory as indicated by RPV level less than {site-specific level}.

(low-low ECCS actuation setpoint) (BWR)

Applicability: Refueling

Grand Gulf: SA4, EAL #1

Loss of RPV inventory as indicated by RPV level >-150.3 in (Level 1)

Applicability: 4, 5

Differences:

NEI CA2, EAL #1 is implemented by Grand Gulf SA4, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CA2, Example #2

Loss of RCS inventory as indicated by unexplained {site-specific} sump and tank level increase

<u>AND</u>

RCS level cannot be monitored for > 15 minutes

Applicability: Refueling

Grand Gulf: SA4, EAL #2

Loss of RPV inventory

and

RPV level cannot be monitored for >15 minutes

Applicability: 4, 5

Differences:

NEI CA2, ELA #2 is implemented by Grand Gulf SA4, EAL #2 (Formatting only)

It does not matter what means are used to determine that inventory is being lost therefore specific means for determining loss of inventory are not included in the Grand Gulf EAL.

Deviations:

NEI 99-01: CA3

Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses

Applicability: Cold Shutdown, Refueling, Defueled

Grand Gulf: SA2

Loss of all offsite and onsite AC Power to Div I & II ESF Busses

Applicability: 4, 5, D

Differences:

NEI CA3 is implemented by Grand Gulf SA2 (Formatting only)

Deviations:

NEI 99-01: CA3, Example EAL #1

Loss of power to (site-specific) transformers

AND

Failure of (site-specific) emergency generators to supply power to emergency busses

AND

Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power

Applicability: Cold Shutdown, Refueling, Defueled

Grand Gulf: SA2, EAL #1

Loss of power to 15AA and 16AB busses

AND

Failure to restore power to **either** 15AA <u>or</u> 16AB bus within **15 minutes** from the time of loss of **both** offsite <u>and</u> onsite AC power

Applicability: 4, 5, D

Differences:

NEI CA3, EAL #1 is implemented by Grand Gulf SA2, EAL #1 (Formatting only)

The Grand Gulf EAL utilizes the words "Loss of power to ESF busses" in lieu of the NEI Example EAL "Loss of power to (site specific) transformers and Failure of (site-specific) emergency generators to supply power to emergency busses" in order to simplify this EAL.

Deviations:

NEI 99-01: CA4

Inability to Maintain Plant in Cold Shutdown with Irradiated Fuel in the RPV

Applicability: Cold Shutdown, Refueling

Grand Gulf: SA5

Inability to maintain plant in cold shutdown with irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CA4 is implemented by Grand Gulf SA5 (Formatting only)

Deviations:

NEI 99-01: CA4, Example EAL #1

With CONTAINMENT CLOSURE <u>and</u> RCS integrity <u>not</u> established an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.

Applicability: Cold Shutdown, Refueling

Grand Gulf: SA5, EAL #1

An **unplanned** event results in reactor coolant temperature **>200** °F without CTMT <u>and</u> Reactor Pressure Boundary integrity

Applicability: 4, 5

Differences:

NEI CA4, EAL #1 is implemented by Grand Gulf SA5, EAL #1 (Formatting only)

Changed RCS integrity to Reactor Pressure Boundary integrity.

Changed RCS temperature to reactor coolant temperature

Deviations:

NEI 99-01: CA4, Example EAL #2

With CONTAINMENT CLOSURE established <u>and</u> RCS integrity <u>not</u> established <u>or</u> RCS inventory reduced an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 20 minutes¹.

¹Note: if an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

Applicability: Cold Shutdown, Refueling

Grand Gulf: SA5, EAL #2

An **unplanned** event results in reactor coolant temperature >200 °F for >20 minutes ^{See} Note with CTMT integrity and without Reactor Pressure Boundary integrity

Note: If a decay heat removal system is in operation within this time frame and reactor coolant temperature is being reduced then this EAL is not applicable

Applicability: 4, 5

Differences:

NEI CA4, EAL #2 is implemented by Grand Gulf SA5, EAL #2 (Formatting only)

There is no reference to RCS reduced inventory in the Grand Gulf EAL because that type of operation is only applicable to PWRs.

Changed RCS temperature to reactor coolant temperature.

Changed RCS integrity to Reactor Pressure Boundary integrity.

Deviations:

NEI 99-01: CA4, Example EAL #3

An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 60 minutes¹ or results in an RCS pressure increase of greater than {site specific} psig.

¹Note: if an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

Applicability: Cold Shutdown, Refueling

Grand Gulf: SA5, EAL #3

An **unplanned** event results in reactor coolant temperature >200 °F for >60 minutes ^{See} ^{Note} or results in RPV pressure increase > 10 psig

Note: If a decay heat removal system is in operation within this time frame and reactor coolant temperature is being reduced then this EAL is not applicable

Applicability: 4, 5

Differences:

NEI CA4, EAL #3 is implemented by Grand Gulf SA5, EAL #3 (Formatting only)

Changed RCS temperature to reactor coolant temperature.

Changed RCS pressure to RPV pressure.

Deviations:

NEI 99-01: CS1

Loss of RPV Inventory Affecting Core Decay Heat Removal Capability

Applicability: Cold Shutdown

Grand Gulf: SS4

Loss of RPV inventory **affecting** core decay heat removal capability **with** irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CS1 is implemented by Grand Gulf SS4 (Formatting only)

NEI 99-01 contains two ICs (CS1 & CS2) that deal with "Loss of RCS inventory". CS1 is applicable in the Cold Shutdown mode whereas CS2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CS1 & CS2 deals with different means available for monitoring RCS inventory and level. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. Therefore both NEI CS1 & CS2 are implemented in Grand Gulf SS4.

NEI CS1 does not include the words "with irradiated fuel in the RPV" which are contained in NEI CS2. By definition irradiated fuel is in the RPV in the Cold Shutdown mode. Therefore omission of "with irradiated fuel in the RPV" does not alter the intent or concept of NEI CS1.

Deviations:

NEI 99-01: CS1, Example EAL #1

With CONTAINMENT CLOSURE not established:

a. RPV inventory as indicated by RPV level less than {site-specific level}

((6" below the low-low ECCS actuation setpoint)	(BWR)
((6" below the bottom ID of the RCS loop)	(PWR)

<u>OR</u>

b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

Applicability: Cold Shutdown

Grand Gulf: SS4 EAL #1

Loss of RCS inventory

<u>AND</u>

RPV level cannot be monitored for >30 minutes

Applicability: 4, 5

Differences:

NEI CS1, EAL #1 is implemented by Grand Gulf SS4, EAL #1 (Formatting only)

There are two NEI CS1 Example EALs. EAL #1 is applicable when containment closure is not established and EAL #2 is applicable when containment closure is established. The "b." parts of both Example EALs are identical. Therefore if RPV level cannot be monitored for >30 minutes with a loss of RCS inventory, the b. part of each NEI Example EAL is met regardless of containment closure.

The Grand Gulf SS4 EAL #1 has implemented the "b." parts of the NEI Example EAL #1 & #2 as a single EAL without conditioning it on containment closure.

Deviations:

NEI 99-01: CS1, Example EAL #2

With CONTAINMENT CLOSURE established

a. RPV inventory as indicated by RPV level less than TOAF

<u>OR</u>

- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by either:
 - Unexplained {site-specific} sump and tank level increase
 - Erratic Source Range Monitor Indication

Applicability: Cold Shutdown

Grand Gulf: SS4 EAL #2

RPV level <-156.3 in with containment closure not established

<u>OR</u>

RPV level <-167 in with containment closure established

Applicability: 4, 5

Differences:

NEI CS1, EAL #2 is implemented by Grand Gulf SS4, EAL #2 (Formatting only)

There are two NEI CS1 Example EALs. #1 is applicable when containment closure is not established and #2 is applicable when containment closure is established.

The Grand Gulf SS4 EAL #2 has implemented the "a." parts of the NEI Example EAL #1 & #2 as a single EAL with two parts conditioning each part on containment closure status.

Deviations:

NEI 99-01: CS2

Loss of RPV Inventory Affecting Core Decay Heat Removal Capability with irradiated fuel in the RPV

Applicability: Refueling

Grand Gulf: SS4

Loss of RPV inventory affecting core decay heat removal capability **with** irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CS2 is implemented by Grand Gulf SS4 (Formatting only)

NEI 99-01 contains two ICs (CS1 & CS2) that deal with "Loss of RCS inventory". CS1 is applicable in the Cold Shutdown mode whereas CS2 is applicable in the Refueling Mode. The NEI basis explains that the difference between CS1 & CS2 deals with different means available for monitoring RCS inventory and level. Since the concern in this EAL is loss of inventory, it does not matter what means are used to determine that inventory is being lost. Therefore both NEI CS1 & CS2 are implemented in Grand Gulf SS4.

Deviations:
NEI 99-01: CS2, Example EAL #1

With CONTAINMENT CLOSURE not established:

a. RPV inventory as indicated by RPV level less than {site-specific level}

(6	" below the low-low ECCS actuation setpoint)	(BWR)
(6	" below the bottom ID of the RCS loop)	(PWR)

<u>OR</u>

b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

Applicability: Refueling

Grand Gulf: SS4 EAL #1

Loss of RCS inventory

AND

RPV level **cannot** be monitored for **>30 minutes**

Applicability: 4, 5

Differences:

NEI CS2, EAL #1 is implemented by Grand Gulf SS4, EAL #1 (Formatting only)

There are two NEI CS2 Example EALs. #1 is applicable when containment closure is not established and #2 is applicable when containment closure is established. The "b." parts of both of the Example EALs are identical. Therefore if RPV level cannot be monitored for >30 minutes with a loss of RCS inventory, the b. part of each NEI Example EAL is met regardless of containment closure.

The Grand Gulf SS4 EAL #1 has implemented the "b." parts of the NEI Example EAL #1 & #2 as a single EAL without conditioning it on containment closure.

See the discussion for **CS1, Example EAL #2** for discussion regarding implementation of the "a." parts of the NEI CS2 Example EALs.

Deviations:

NEI 99-01: CS2, Example EAL #2

With CONTAINMENT CLOSURE established

a. RPV inventory as indicated by RPV level less than TOAF

<u>OR</u>

- b. RPV level cannot be monitored for > 30 minutes with a loss of RPV inventory as indicated by either:
 - Unexplained {site-specific} sump and tank level increase
 - Erratic Source Range Monitor Indication

Applicability: Refueling

Grand Gulf: SS4 EAL #2

RPV level <-156.3 in with containment closure not established

OR

RPV level <-167 in with containment closure established

Applicability: 4, 5

Differences:

NEI CS2, EAL #2 is implemented by Grand Gulf SS4, EAL #2 (Formatting only)

There are two NEI CS2 Example EALs. #1 is applicable when containment closure is not established and #2 is applicable when containment closure is established.

The Grand Gulf SS4 EAL #2 has implemented the "a." parts of the NEI Example EAL #1 & #2 as a single EAL with two parts conditioning each part on containment closure status.

Deviations:

NEI 99-01: CG1

Loss of RPV Inventory Affecting Fuel Clad Integrity with Containment Challenged with Irradiated Fuel in the RPV.

Applicability: Cold Shutdown, Refueling

Grand Gulf: SG3

Loss of RPV inventory **affecting** fuel clad integrity **with** containment challenged **with** irradiated fuel in the RPV

Applicability: 4, 5

Differences:

NEI CG1 is implemented by Grand Gulf SG3 (Formatting only)

Deviations:

NEI 99-01: CG1, Example EAL #1

Loss of RPV inventory as indicated by unexplained {site-specific} sump and tank level increase

Applicability: Cold Shutdown, Refueling

Grand Gulf: N/A

None

Applicability: N/A

Differences:

The NEI Example EAL #1 is redundant to the conditions described in NEI Example EALs #2 & #3. RPV level < than Top of Active Fuel (TAF) or the inability to monitor RPV level, with indication of core uncovery, for > 30 minutes are indicative of loss of RPV inventory regardless of how it is determined.

Deviations:

NEI 99-01: CG1, Example EAL #2

RPV Level:

a. less than TOAF for > 30 minutes

OR

- b. cannot be monitored with Indication of core uncovery for > 30 minutes as evidenced by one or more of the following:
 - Containment High Range Radiation Monitor reading > {site-specific} setpoint
 - Erratic Source Range Monitor Indication
 - Other {site-specific} indications

Applicability: Cold Shutdown, Refueling

Grand Gulf: SG3, EAL #1

RPV level:

a. <-167 in for > 30 minutes

<u>or</u>

b. cannot be monitored with indication of core uncovery for >30 minutes

Applicability: 4, 5

Differences:

NEI CG1, EAL #2 is implemented by Grand Gulf SG3, EAL #1 (Formatting only)

Deviations:

NEI 99-01: CG1, Example EAL #3

{Site specific} indication of CONTAINMENT challenged as indicated by one or more of the following:

- Explosive mixture inside containment
- Pressure above {site specific} value
- CONTAINMENT CLOSURE not established
- Secondary Containment radiation monitors above {site specific} value (BWR only)

Applicability: Cold Shutdown, Refueling

Grand Gulf: SG3, EAL #2

a. Containment closure is **not** established

or

b. Containment pressure >22 psig

or

c. Containment hydrogen concentration >19%

or

d. Any EP-4 radiation monitor reading above the Max Safe Value

Applicability: 4, 5

Differences:

NEI CG1, EAL #3 is implemented by Grand Gulf SG3, EAL #2 (Formatting only)

The Grand Gulf EP-4 procedure is the Secondary Containment Emergency Operating Procedure. The Maximum Safe Operating Water values are the highest parameter values at which equipment necessary for the safe shutdown of the plant is assumed to fail or personnel access necessary for the safe shutdown of the plant will be precluded.

Deviations:

Permanently Defueled Station Malfunction

This section is not applicable to or implemented at Grand Gulf.

Events Related to ISFSI Malfunction

This section is not applicable to or implemented at Grand Gulf.

Fission Product Barrier Degradation

Grand Gulf Nuclear Station

NEI 99-01: FU1

ANY Loss or ANY Potential Loss of Containment

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: FU1

Loss or Potential Loss of Primary Containment

Applicability: 1, 2, 3

Differences:

The Containment is referred to as the Primary Containment at Grand Gulf

"ANY" is omitted to provide consistency with wording in FS1 and FG1.

Deviations:

NEI 99-01: FA1

ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: FA1

Loss or Potential Loss of either Fuel Clad or Reactor Pressure Boundary

Applicability: 1, 2, 3

Differences:

The RCS is called the Reactor Pressure Boundary at Grand Gulf

"ANY" is omitted to provide consistency with wording in FS1 and FG1.

Deviations:

NEI 99-01: FS1

Loss or Potential Loss of ANY Two Barriers

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: FS1

Loss or Potential Loss of any two Fission Product Barriers

Applicability: 1, 2, 3

Differences:

None

Deviations:

NEI 99-01: FG1

Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: FG1

Loss of any two Fission Product Barriers with Loss or Potential Loss of third barrier

Applicability: 1, 2, 3

Differences:

None

Deviations:

Primary Coolant Activity Level

This (site-specific) value corresponds to 300 μ Ci/gm I₁₃₁ equivalent. Assessment by the NUMARC 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. The value expressed can be either in mR/hr observed on the sample or as uCi/gm results from analysis.

There is no equivalent "Potential Loss" EAL for this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Fuel Clad Barrier EAL #1

Primary Coolant Activity Level

Loss: Coolant activity >300 μ Ci/ml I¹³¹ dose equivalent

Potential Loss: None

Applicability: 1, 2, 3

Differences:

Grand Gulf uses μ Ci/ml I¹³¹ instead of uCi/gm

Deviations:

Reactor Vessel Water Level

The "Loss" EAL (site-specific) value corresponds to the level which is used in EOPs to indicate challenge of core cooling. Depending on the plant this may be top of active fuel or 2/3 coverage of active fuel. This is the minimum value to assure core cooling without further degradation of the clad. The "Potential Loss" EAL is the same as the RCS barrier "Loss" EAL #2 below and corresponds to the (site-specific) water level at the top of the active fuel. Thus, this EAL indicates a "Loss" of RCS barrier and a "Potential Loss" of the Fuel Clad Barrier. This EAL appropriately escalates the emergency class to a Site Area Emergency. If the "Loss" value is also the Top of Active Fuel, the "Potential Loss" value must be a value indicating a higher level also corresponding to a higher level indicated in the RCS barrier "Loss" EAL #2.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Fuel Clad Barrier EAL #2

Reactor Vessel Water Level

Loss: RPV water level cannot be restored above -192 in.

Potential Loss: RPV water level cannot be restored above -167 in.

Applicability: 1, 2, 3

Differences:

The -192 in. value used in the Loss part of the Grand Gulf EAL Corresponds to the Minimum Steam Cooling RPV Water Level (MSCRWL) utilized in the Alternate Level Control Contingency of the Grand Gulf EOPs. Water levels at or above this value assure Peak Cladding Temperature will not exceed 1500°F assuring adequate core cooling without degradation of the fuel clad.

The -167in. value corresponds to the Top of Active Fuel RPV Water Level and is the same level value used in the Reactor Pressure Boundary barrier "Loss" EAL. If there is indication of a leak in the drywell, this level indicates a "Loss" of Reactor Pressure Boundary and a "Potential Loss" of the Fuel Clad barriers.

Deviations:

Drywell Radiation Monitoring

The (site-specific) reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading should be calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μ Ci/gm dose equivalent I-131 or the calculated concentration equivalent to the clad damage used in EAL #1 into the drywell atmosphere. 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 EAL #4. Thus, this EAL indicates a loss of both Fuel Clad barrier and RCS barrier.

Caution: it is important to recognize that in the event the radiation monitor is sensitive to shine from the reactor vessel or piping, spurious readings will be present and another indicator of fuel clad damage is necessary or compensated for in the threshold value.

There is no "Potential Loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Fuel Clad Barrier EAL #3

Drywell Radiation Monitoring

Loss: >5000 R/hr

Potential Loss: None

Applicability: 1, 2, 3

Differences:

None

Deviations:

Other (Site-Specific) Indications

This EAL is to cover other (site-specific) indications that may indicate loss or potential loss of the Fuel Clad barrier, including indications from containment air monitors or any other (site-specific) instrumentation.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Fuel Clad Barrier EAL #4

Main Steam Line Radiation Monitoring

Loss: Main Steam Line Radiation level > Hi Hi Alarm Setpoint (P608-18A-C4, P608-19A-C4)

Potential Loss: None

Applicability: 1, 2, 3

Differences:

The function of the Main Steam Line Radiation Monitoring system is to detect increased MSL radiation level caused by fuel damage.

Deviations:

Emergency Director Judgment

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Fuel Clad barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost. (See also IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Fuel Clad Barrier EAL #5

Emergency Director Judgment

Loss: Other

Potential Loss: Other

Applicability: 1, 2, 3

Differences:

None

Deviations:

Drywell Pressure

The (site-specific) drywell pressure is based on the drywell high pressure set point which indicates a LOCA by automatically initiating the ECCS or equivalent makeup system.

There is no "Potential Loss" EAL corresponding to this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Reactor Pressure Boundary Barrier EAL #1

Drywell Pressure

Loss: >1.39 psig in the drywell with indications of a leak in the drywell

Potential Loss: None

Applicability: 1, 2, 3

Differences:

The NEI Example EAL implies that drywell pressure indicates a LOCA. Grand Gulf included "with indications of a leak in the drywell" in the Grand Gulf EAL to ensure this EAL is not Implemented under non-leak conditions. (i.e., loss of drywell cooling without reactor pressure boundary leak)

Deviations:

Reactor Vessel Water Level

This "Loss" EAL is the same as "Potential Loss" Fuel Clad Barrier EAL #2. The (site-specific) water level corresponds to the level which is used in EOPs to indicate challenge of core cooling. Depending on the plant this may be top of active fuel or 2/3 coverage of active fuel. This EAL appropriately escalates the emergency class to a Site Area Emergency. Thus, this EAL indicates a loss of the RCS barrier and a Potential Loss of the Fuel Clad Barrier.

There is no "Potential Loss" EAL corresponding to this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Reactor Pressure Boundary Barrier EAL #2

Reactor Vessel Water Level

Loss: RPV water level cannot be restored above -167 in. with indications of a leak in the drywell

Potential Loss: None

Applicability: 1, 2, 3

Differences:

The MSCRWL value of -192 in. is used in the Grand Gulf EAL to ensure consistency with the **Fuel Clad Barrier EAL #2.**

The words "with indications of a leak in the drywell" were added to provide consistency with **RCS Barrier EAL #1** and ensure this EAL is not implemented under non-leak conditions. (i.e., Loss of RPV inventory through SRVs greater than available makeup capability, SBO)

Deviations:

RCS Leak Rate

An unisolable MSL break is a breach of the RCS barrier. Thus, this EAL is included for consistency with the Alert emergency classification. The potential loss of RCS based on leakage is set at a level indicative of a small breach of the RCS but which is well within the makeup capability of normal and emergency high pressure systems. Core uncovery is not a significant concern for a 50 gpm leak, however, break propagation leading to significantly larger loss of inventory is possible. Many BWRs may be unable to measure an RCS leak of this size because the leak would likely increase drywell pressure above the drywell isolation set point. The system normally used to monitor leakage is typically isolated as part of the drywell isolation and is therefore unavailable. If primary system leak rate information is unavailable, other indicators of RCS leakage should be used.

Potential loss of RCS based on primary system leakage outside the drywell is determined from site-specific temperature or area radiation alarms low setpoint in the areas of the main steam line tunnel, main turbine generator, RCIC, HPCI, etc., which indicate a direct path from the RCS to areas outside primary containment. The indicators should be confirmed to be caused by RCS leakage. The area temperature or radiation low alarm setpoints are indicated for this example to enable an Alert classification. An unisolable leak which is indicated by a high alarm setpoint escalates to a Site Area Emergency when combined with Containment Barrier EAL 3 (after a containment isolation) and a General Emergency when the Fuel Clad Barrier criteria is also exceeded.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Reactor Pressure Boundary Barrier EAL #3

RCS Leak Rate

Loss: Unisolable RCIC or Main Steam Line break

Potential Loss: Unisolable RCS leakage >50 gpm

Applicability: 1, 2, 3

Differences:

None

Deviations:

Drywell Radiation Monitoring

The (site-specific) reading is a value which indicates the release of reactor coolant to the drywell. The reading should be calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i.e., within T/S) into the drywell atmosphere. This reading will be less than that specified for Fuel Clad Barrier EAL #3. Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad Barrier EAL #3, fuel damage would also be indicated.

However, if the site specific physical location of the drywell radiation monitor is such that radiation from a cloud of released RCS gases could not be distinguished from radiation from adjacent piping and components containing elevated reactor coolant activity, this EAL should be omitted and other site specific indications of RCS leakage substituted.

There is no "Potential Loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: N/A

Applicability: N/A

Differences:

The physical location of the Grand Gulf drywell radiation monitor prevents it from distinguishing the radiation source. This EAL is therefore omitted from the Grand Gulf implementation in accordance with the NEI guidance.

Deviations:

Other (Site-Specific) Indications

This EAL is to cover other (site-specific) indications that may indicate loss or potential loss of the RCS barrier.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Reactor Pressure Boundary Barrier EAL #4

Safety Relief Valves

Loss: SRV stuck open

Potential Loss: None

Applicability: 1, 2, 3

Differences:

None

Deviations:

Emergency Director Judgment

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost. (See also IC SG1, "Prolonged Loss of Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Reactor Pressure Boundary Barrier EAL #5

Emergency Director Judgment

Loss: Other

Potential Loss: Other

Applicability: 1, 2, 3

Differences:

None

Deviations:

Drywell Pressure

Rapid unexplained loss of pressure (i.e., not attributable to drywell spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity. Drywell pressure should increase as a result of mass and energy release into containment from a LOCA. Thus, drywell pressure not increasing under these conditions indicates a loss of containment integrity. This indicator relies on the operators recognition of an unexpected response for the condition and therefore does not have a specific value associated. The unexpected response is important because it is the indicator for a containment bypass condition. The (site-specific) PSIG for potential loss of containment is based on the containment drywell design pressure. Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. This applies to BWRs with Mark III containments, as well as Mark I and II containment designs when they are de-inerted.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Primary Containment Barrier EAL #1

Primary Containment Pressure

Loss: Unexplained loss of pressure following initial pressure increase

Potential Loss: >22 psig in Primary Containment

Hydrogen Concentration

Loss: None

Potential Loss: H_2 igniters de-energized and either Drywell $H_2 > 9\%$ or Containment H_2 in HDOL Unsafe Zone

Applicability: 1, 2, 3

Differences:

Grand Gulf has a Mark III containment design. In the Mark III containment design the Primary Containment is referred to as the Primary Containment not the Drywell as in the Mark I & II containment designs.

The use of 22 psig in the potential loss EAL instead of the design pressure of 15 psig ensures consistency with the Grand Gulf EOP Containment Control strategies and with Grand Gulf SG3. The NEI discussion for this EAL does not require the

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use of containment design pressure but that the site specific number should be based on the containment design pressure. Primary Containment pressure in excess of 22 psig challenges the ability to successfully vent the primary containment due to the primary containment vent valve design and is the bases for the Grand Gulf EOP actions.

The Grand Gulf EAL #2 adds hydrogen concentration and hydrogen igniter condition as a Drywell Pressure potential loss EAL. As long as the hydrogen igniter are energized, hydrogen concentration can only exceed the deflagration limits if the combustion of hydrogen had depleted the oxygen below the minimum concentration required to support combustion (inerted). Hydrogen concentration above the deflagration limits without hydrogen igniter energized is similar to a de-inerted Mark I or II containment.

Deviations:

Reactor Vessel Water Level

The entry into the Primary Containment Flooding emergency procedure indicates reactor vessel water level can not be restored and that a core melt sequence is in progress. EOPs direct the operators to enter Containment Flooding when Reactor Vessel Level cannot be restored to greater than a Site Specific value (generally 2/3 core height) or is unknown. Entry into Containment Flooding procedures is a logical escalation in response to the inability to maintain reactor vessel level.

The conditions in this potential loss EAL represent imminent core melt sequences which, if not corrected, could lead to vessel failure and increased potential for containment failure. In conjunction with and an escalation of the level EALs in the Fuel and RCS barrier columns, this EAL will result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the emergency operating procedures have been ineffective in restoring reactor vessel level above the RCS and Fuel Clad Barrier Threshold Values, there is not a "success" path and a core melt sequence is in progress. Entry into Containment flooding procedures is a logical escalation in response to the inability to maintain reactor vessel level.

Severe accident analysis (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation with the reactor vessel in a significant fraction of the core damage scenarios, and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow emergency operating procedures to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within the time provided. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be, ineffective.

There is no "loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Primary Containment Barrier EAL #3

RPV Water Level

Loss: None

Potential Loss: Entry into SAP 1, 5 or 6

Applicability: 1, 2, 3

Differences:

The Grand Gulf Severe Accident Procedures (SAPs) implement the Primary Containment Flooding strategy referred to in the NEI discussion. Limiting the EAL to entry into SAP 1, 5 or 6 identifies plant conditions that potentially could challenge primary containment integrity.

Deviations:

Containment Isolation Failure or Bypass

This EAL is intended to cover the inability to isolate the containment when containment isolation is required. In addition, the presence of area radiation or temperature alarms high setpoint indicating unisolable primary system leakage outside the drywell are covered after a containment isolation. The indicators should be confirmed to be caused by RCS leakage. Also, an intentional venting of primary containment for pressure control per EOPs to the secondary containment and/or the environment is considered a loss of containment. Containment venting for temperature or pressure when not in an accident situation should not be considered.

There is no "Potential Loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Primary Containment Barrier EAL #4

Primary Containment Isolation Failure or Bypass

Loss: Inability to isolate Primary Containment when isolation required

OR

Primary Containment venting required by SAPs

Potential Loss: None

Applicability: 1, 2, 3

Differences:

The Grand Gulf EAL references primary containment venting required by the SAPs instead of the EOPs. Operation within the limits of the EOPs ensure continued adequate core cooling thus no significant radiological release is expected as a result of controlled venting in the EOPs. This implements the concept described in the last sentence of the NEI Primary Containment Barrier Example EAL #3 discussion.

Deviations:

Significant Radioactive Inventory in Containment

The (site-specific) reading is a value which indicates significant fuel damage well in excess of that required for loss of RCS and Fuel Clad. As stated in Section 3.8, a major release of radioactivity requiring offsite 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. 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%. Unless there is a (site-specific) analysis justifying a higher value, it is recommended that a radiation monitor reading corresponding to 20% fuel clad damage be specified here.

There is no "Loss" EAL associated with this item.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Primary Containment Barrier EAL #5

Primary Containment Radiation Monitoring

Loss: None

Potential Loss: >11,500 R/Hr

Applicability: 1, 2, 3

Differences:

None

Deviations:

Other (Site-Specific) Indications

This EAL is to cover other (site-specific) indications that may indicate loss or potential loss of the containment barrier.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: N/A

Applicability: N/A

Differences:

None

Deviations:

Emergency Director Judgment

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost. (See also IC SG1, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power", for additional information.)

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: Primary Containment Barrier EAL #5

Emergency Director Judgment

Loss: Other

Potential Loss: Other

Applicability: 1, 2, 3

Differences:

None

Deviations:

Hazards and Other Conditions Affecting Plant Safety

This section contains the correlation between NEI 99-01 and Grand Gulf ICs and EALs in the Hazards and Other Conditions Affecting Plant Safety Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding Grand Gulf IC or EAL, and sufficient discussion to describe any difference or to justify any deviation. Grand Gulf has renamed this the Hazards and Malfunction Recognition Category.

NEI 99-01: HU1

Natural and Destructive Phenomena Affecting the PROTECTED AREA

Applicability: All

Grand Gulf: HU3

Natural or destructive phenomena affecting the Protected Area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU1 is implemented by Grand Gulf HU3 (Formatting only)

Deviations:

NEI 99-01: HU1, Example EAL #1

(Site-Specific) method indicates felt earthquake.

EAL #1 should be developed on site-specific basis. Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Method of detection can be based on instrumentation, validated by a reliable source, or operator assessment. 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. For most plants with seismic instrumentation, the seismic switches are set at an acceleration of about 0.01g.

Applicability: All

Grand Gulf: HU3, EAL #1

Verified earthquake detected by in plant seismic instrumentation.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU1, EAL #1 is implemented by Grand Gulf HU3, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HU1, Example EAL #2

Report by plant personnel of tornado or high winds greater than (site-specific) mph striking within PROTECTED AREA boundary

EAL #2 is based on the assumption that a tornado striking (touching down) or high winds within the PROTECTED AREA may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. The high wind site specific value in EAL#2 should be based on site-specific FSAR design basis. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

Applicability: All

Grand Gulf: HU3, EAL #2

Tornado observed in the protected area.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU1, EAL #2 is implemented by Grand Gulf HU3, ELA #2 (Formatting only)

There is no site-specific value used for high winds in the Grand Gulf EAL. The highest recorded wind speed of record in the Grand Gulf area is 69 mph. This value is below the hurricane minimum sustained wind speed of 74 mph. According to the Hurricane Research Division of the Atlantic Oceanographic and Meteorological Laboratory, damage due to wind speeds of 74 to 95 mph is expected to be limited "primarily to shrubbery, tree, foliage, and unanchored homes. No real damage to other structures." The UFSAR only discusses the "Design Bases Tornado" and does not discuss hurricane force winds therefore only the reference to tornado was retained in the EAL.

Deviations:
Vehicle crash into plant structures or systems within PROTECTED AREA boundary

EAL #3 is intended to address crashes of vehicle types large enough to cause significant damage to plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant VITAL AREA, the event may be escalated to Alert.

Applicability: All

Grand Gulf: HU3, EAL #3

Vehicle crash into a power block structure

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU1, EAL #3 is implemented by Grand Gulf HU3, EAL #3 (Formatting only)

All power block structures at grand Gulf are within the Protected Area and contain functions and systems needed for safe shutdown.

Deviations:

Report by plant personnel of an unanticipated EXPLOSION within PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment

For EAL #4 only those Explosions of sufficient force to damage permanent structures or equipment within the PROTECTED AREA should be considered. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the EXPLOSION with reports of evidence of damage is sufficient for declaration. The Emergency director also needs to consider any security aspects of the EXPLOSION, if applicable.

Applicability: All

Grand Gulf: HU3, EAL #4

NEI HU1, EAL #4 is implemented by Grand Gulf HU3, ELA #4 (Formatting only)

Explosion within the protected area causing damage to power block structure or equipment

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

Report of turbine failure resulting in casing penetration or damage to turbine or generator seals

EAL #5 is intended to address main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. 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 and HU3. 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. This EAL is consistent with the definition of a NOUE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by missiles generated by the failure or by the radiological releases for a BWR, or in conjunction with a steam generator tube rupture, for a PWR. These latter events would be classified by the radiological ICs or Fission Product Barrier ICs.

Applicability: All

Grand Gulf: HU3, EAL #5

Main turbine failure resulting in visual turbine casing, or generator seal damage

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU1, EAL #5 is implemented by Grand Gulf HU3, EAL #5 (Formatting only)

Deviations:

Uncontrolled flooding in (site-specific) areas of the plant that has the potential to affect safety related equipment needed for the current operating mode.

EAL #6 addresses the effect of flooding caused by internal events such as component failures, equipment misalignment, or outage activity mishaps. The site-specific areas include those areas that contain systems required for safe shutdown of the plant, that are not designed to be wetted or submerged. Escalation of the emergency classification is based on the damage caused or by access restrictions that prevent necessary plant operations or systems monitoring. The plant's IPEEE may provide insight into areas to be considered when developing this EAL.

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

Grand Gulf does not have any areas that can flood and affect safety related equipment.

Deviations:

(Site-Specific) occurrences affecting the PROTECTED AREA

EAL #7 covers other site-specific phenomena such as hurricane, flood, or seiche. These EALs can also be precursors of more serious events. In particular, sites subject to severe weather as defined in the NUMARC station blackout initiatives, should include an EAL based on activation of the severe weather mitigation procedures (e.g., precautionary shutdowns, diesel testing, staff call-outs, etc.).

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

Hurricane force winds have never been recorded in the Grand Gulf area.

Grand Gulf does not have any areas that can flood and affect safety related equipment.

Grand Gulf is not subject to seiche.

Deviations:

NEI 99-01: HU2

FIRE Within PROTECTED AREA Boundary Not Extinguished Within 15 Minutes of Detection.

Applicability: All

Grand Gulf: HU4

Fire within power block not extinguished within 15 Minutes of detection.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU2 is implemented by Grand Gulf HU4 (Formatting only)

All power block structures are within the protected area boundary.

Deviations:

FIRE in buildings or areas contiguous to any of the following (site-specific) areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:

(Site-specific) list

Applicability: All

Grand Gulf: HU4, EAL #1

FIRE in power block not extinguished within 15 minutes of either:

a. Man control room notification

or

b. verification of annunciators

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU2, EAL #1 is implemented by Grand Gulf HU4, EAL #1 (Formatting only)

Deviations:

NEI 99-01; HU3

Release of Toxic or Flammable Gases Deemed Detrimental to Normal Operation of the Plant.

Applicability: All

Grand Gulf: HU5

Release of toxic or flammable gases deemed detrimental to normal operation of the plant.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU3 is implemented by Grand Gulf HU5 (Formatting only)

Deviations:

Report or detection of toxic or flammable gases that has or could enter the site area boundary in amounts that can affect NORMAL PLANT OPERATIONS

Applicability: All

Grand Gulf: HU5, EAL #1

Determination of toxic, oxygen displacing or flammable gases in amount sufficient to disrupt normal plant operation

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU3, EAL1 is implemented by Grand Gulf HU5, EAL #1 (Formatting only)

Added oxygen displacing to be more encompassing.

Deviations:

Report by Local, County or State Officials for evacuation or sheltering of site personnel based on an offsite event.

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

There are no industries near the Grand Gulf site that could result in a need for evacuation or sheltering.

Deviations:

NEI 99-01: HU4

Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

Applicability: All

Grand Gulf: HU1

Confirmed security event which indicates a potential degradation in the level of safety of the plant

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU4 is implemented by Grand Gulf HU1 (Formatting only)

Deviations:

Security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

Grand Gulf: HU1, EAL #2

Site Security Code Yellow (Armed adversary attempting to or has entered company property)

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU4, EAL #1 is implemented by Grand Gulf HU1, EAL #2 (Formatting only)

Site Security code system developed for rapid information transfer in fast moving security events.

Deviations:

A credible site specific security threat notification

Applicability: All

Grand Gulf: HU1, EAL #1

A credible threat notification received from, or validated by, a trustworthy source (FBI, NRC, Claiborne County Sheriff's Office, Plant Management, Site Security, Etc.) Example: A report from Site Security of an unauthorized attempted PA entry should be considered a credible threat.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU4, EAL #2 is implemented by Grand Gulf HU1, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HU5

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of a NOUE.

Applicability: All

Grand Gulf: HU2

Conditions exist which in the judgment of the emergency director warrant declaration of an Unusual Event.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU5 is implemented by Grand Gulf HU2 (Formatting only)

Deviations:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Applicability: All

Grand Gulf: HU2, EAL #1

Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HU5, EAL #1 is implemented by Grand Gulf HU2, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HA1

Natural and Destructive Phenomena Affecting the Plant VITAL AREA

Applicability: All

Grand Gulf: HA4

Natural or destructive phenomena affecting a plant Vital Area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1 is implemented by Grand Gulf HA4 (Formatting only)

Deviations:

(Site-Specific) method indicates Seismic Event greater than Operating Basis Earthquake (OBE).

Applicability: All

Grand Gulf: HA4, EAL #1

Verified earthquake detected by in plant seismic instrumentation greater than OBE

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1, EAL #1 is implemented by Grand Gulf HA4, EAL #1 (Formatting only)

Deviations:

Tornado or high winds greater than (site-specific) mph within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures / equipment or Control Room indication of degraded performance of those systems

- Reactor Building
- Intake Building
- Ultimate Heat Sink
- Refueling Water Storage Tank
- Diesel Generator Building
- Turbine Building
- Condensate Storage Tank
- Control Room
- Other (Site-Specific) Structures.

Applicability: All

Grand Gulf: HA4, EAL #2

Tornado observed in Protected Area resulting in visual damage to a vital area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1, EAL #2 is implemented by Grand Gulf HA4, EAL #2 (Formatting only)

There is no site-specific value used for high winds in the Grand Gulf EAL. The highest recorded wind speed of record in the Grand Gulf area is 69 mph. This value is below the hurricane minimum sustained wind speed of 74 mph. According to the Hurricane Research Division of the Atlantic Oceanographic and Meteorological Laboratory, damage due to wind speeds of 74 to 95 mph is expected to be limited "primarily to shrubbery, tree, foliage, and unanchored homes. No real damage to other structures." The UFSAR only discusses the "Design Bases Tornado" and does not discuss hurricane force winds therefore only reference to tornado was retained in the EAL.

Deviations:

Vehicle crash within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to any of the following plant structures or equipment therein or control indication of degraded performance of those systems:

- Reactor Building
- Intake Building
- Ultimate Heat Sink
- Refueling Water Storage Tank
- Diesel Generator Building
- Turbine Building
- Condensate Storage Tank
- Control Room
- Other (Site-Specific) Structures.

Applicability: All

Grand Gulf: HA4, EAL #3

Vehicle crash into a vital area structure resulting in visual damage to vital area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1, EAL #3 is implemented by Grand Gulf HA4, EAL #3 (Formatting only)

Deviations:

Turbine failure-generated missiles result in any VISIBLE DAMAGE to or penetration of any of the following plant areas: (site-specific) list.

Applicability: All

Grand Gulf: HA4, EAL #5

Main turbine failure-generated missiles resulting in visual damage to vital area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1, EAL #4 is implemented by Grand Gulf HA4, EAL #5 (Formatting only)

Deviations:

Uncontrolled flooding in (site-specific) areas of the plant that results in degraded safety system performance as indicated in the control room or that creates industrial safety hazards (e.g., electric shock) that precludes access necessary to operate or monitor safety equipment.

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

Grand Gulf does not have any areas that can flood and affect safety related equipment.

Deviations:

(Site-Specific) occurrences within PROTECTED AREA boundary and resulting in VISIBLE DAMAGE to plant structures containing equipment necessary for safe shutdown, or has caused damage as evidenced by control room indication of degraded performance of those systems.

Applicability: All

Grand Gulf: HA4, EAL #4

Explosion within the Protected Area causing visual damage to vital area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA1, EAL #6 is implemented by Grand Gulf HA4, EAL #4 (Formatting only)

Explosion is included in this EAL to provide consistency with NEI HU1, Example EAL #4. See discussion on NEI HA2 for additional information.

Deviations:

NEI 99-01: HA2

FIRE or EXPLOSION Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown.

Applicability: All

Grand Gulf: HA5

FIRE affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA2 is implemented by Grand Gulf HA5 (Formatting only)

Explosion was included in Grand Gulf HA4, EAL #4 to provide consistency with NEI HU1, Example EAL #4.

Deviations:

FIRE or EXPLOSION in any of the following (site-specific) areas:

(Site-specific) list

AND

Affected system parameter indications show degraded performance or plant personnel report VISIBLE DAMAGE to permanent structures or equipment within the specified area.

Applicability: All

Grand Gulf: HA5, EAL #1

Fire causing visual damage to plant safety equipment required to establish and maintain safe shutdown

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA2, EAL #1 is implemented by Grand Gulf HA5, EAL #1 (Formatting only)

Explosion was included in Grand Gulf HA4, EAL #4 to provide consistency with NEI HU1, Example EAL #4.

Deviations:

NEI 99-01: HA3

Release of Toxic or Flammable Gases Within or Contiguous to a VITAL AREA Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or Establish or Maintain Safe Shutdown.

Applicability: All

Grand Gulf: HA6

Release of toxic or flammable gases within or contiguous to a Vital Area which jeopardizes operation of safety systems required to establish or maintain safe shutdown.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA3 is implemented by Grand Gulf HA6 (Formatting only)

Deviations:

Report or detection of toxic gases within or contiguous to a VITAL AREA in concentrations that may result in an atmosphere IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH)

Applicability: All

Grand Gulf: HA6, EAL #1

Determination of toxic, oxygen displacing or flammable gasses in a vital area, that must be manned for safe operation of the plant, immediately dangerous to life and health or > lower flammability limit.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA3, EAL #1 is implemented by Grand Gulf HA6, EAL #1 (Formatting only)

Combined NEI HA3, Example EALs #1 & #2 into a single EAL in the Grand Gulf implementation

Deviations:

Report or detection of gases in concentration greater than the LOWER FLAMMABILITY LIMIT within or contiguous to a VITAL AREA

Applicability: All

Grand Gulf: HA6, EAL #1

Determination of toxic, oxygen displacing or flammable gasses in a vital area, that must be manned for safe operation of the plant, immediately dangerous to life and health or > lower flammability limit.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA3, EAL #2 is implemented by Grand Gulf HA6, EAL #1 (Formatting only)

Combined NEI HA3, Example EALs #1 & #2 into a single EAL in the Grand Gulf implementation

Deviations:

NEI 99-01: HA4

Confirmed Security Event in a Plant PROTECTED AREA.

Applicability: All

Grand Gulf: HA1

Confirmed security event in plant Protected Area

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA4 is implemented by Grand Gulf HA1 (Formatting only)

Deviations:

INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE

Applicability: All

Grand Gulf: HA1, EAL #1

Site Security Code Orange (Armed adversary attempting to or has crossed the Protected Area fence)

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA4, EAL #1 is implemented by Grand Gulf HA1, EAL #1 (Formatting only)

Site Security code system developed for rapid information transfer in fast moving security events.

Deviations:

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

Grand Gulf EAL #1 encompasses all security events as determined from the Safeguards Contingency Plan.

Deviations:

Grand Gulf Nuclear Station

NEI 99-01: HA5

Control Room Evacuation Has Been Initiated.

Applicability: All

Grand Gulf: HA3

Control room evacuation has been initiated.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA5 is implemented by Grand Gulf HA3 (Formatting only)

Deviations:

Entry into (site-specific) procedure for control room evacuation

Applicability: All

Grand Gulf: HA3, EAL #1

Control Room evacuation has been directed per 05-1-02-II-1, Shutdown from the Remote Shutdown Panel.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA5, EAL #1 is implemented by Grand Gulf HA3, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HA6

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert.

Applicability: All

Grand Gulf: HA2

Conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA6 is implemented by Grand Gulf HA2 (Formatting only)

Deviations:

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Applicability: All

Grand Gulf: HA2, EAL #1

Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA6, EAL #1 is implemented by Grand Gulf HA2, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HS1

Confirmed Security Event in a Plant VITAL AREA

Applicability: All

Grand Gulf: HS1

Confirmed security event in a plant Vital Area

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

INTRUSION into the plant VITAL AREA by a HOSTILE FORCE

Applicability: All

Grand Gulf: HS1, EAL #1

Site Security Code Red (Armed adversary has entered any power block building or vital area)

Applicability: 1, 2, 3, 4, 5, D

Differences:

Site Security code system developed for rapid information transfer in fast moving security events.

Deviations:
NEI 99-01: HS1, Example EAL

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision

Applicability: All

Grand Gulf: N/A

Applicability: N/A

Differences:

Grand Gulf EAL #1 encompasses all security events as determined from the Safeguards Contingency Plan.

Deviations:

NEI 99-01: HS2

Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

Applicability: All

Grand Gulf: HS3

Control Room evacuation has been initiated and plant control cannot be established.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA2 is implemented by Grand Gulf HA3 (Formatting only)

Deviations:

NEI 99-01: HS2, Example EAL #1

Control room evacuation has been initiated.

AND

Control of the plant cannot be established per (site-specific) procedure within (site-specific) minutes.

Applicability: All

Grand Gulf: HS3, EAL #1

Control Room evacuation has been directed per 05-1-02-II-1, Shutdown from the Remote Shutdown Panel and control of the plant cannot be established in < 15 minutes.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA2, EAL #1 is implemented by Grand Gulf HA3, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HS3

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of Site Area Emergency.

Applicability: All

Grand Gulf: HS2

Conditions exist which in the judgment of the Emergency Director warrant declaration of Site Area Emergency.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA3 is implemented by Grand Gulf HA2 (Formatting only)

Deviations:

NEI 99-01: HS3, Example EAL #1

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Applicability: All

Grand Gulf: HS2, EAL #1

Conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.

Applicability: 1, 2, 3, 4, 5, D

Differences:

NEI HA3, EAL #1 is implemented by Grand Gulf HA2, EAL #1 (Formatting only)

Deviations:

NEI 99-01: HG1

Security Event Resulting in Loss Of Physical Control of the Facility.

Applicability: All

Grand Gulf: HG1

Security event resulting in loss of physical control of the facility.

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

NEI 99-01: HG1, Example EAL #1

A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

Applicability: All

Grand Gulf: HG1, EAL #1

Loss of physical control of the Control Room due to a security event

or

Loss of physical control of the Remote Shutdown Panel due to a security event

or

Loss of physical control of adequate core cooling or reactivity control capability

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

NEI 99-01: HG2

Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency.

Applicability: All

Grand Gulf: HG2

Other conditions existing which in the judgment of the Emergency Director warrant declaration of General Emergency.

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

NEI 99-01: HG2, Example EAL #1

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Applicability: All

Grand Gulf: HG2, EAL #1

Other conditions exist which in the judgment of the Emergency Director indicate that events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

Applicability: 1, 2, 3, 4, 5, D

Differences:

None

Deviations:

System Malfunction

This section contains the correlation between NEI 99-01 and Grand Gulf ICs and EALs in the System Malfunction Recognition Category. It includes a statement of the NEI IC or EAL, a statement of the corresponding Grand Gulf IC or EAL, and sufficient discussion to describe any difference or to justify any deviation.

The Cold Shutdown/ Refueling System Malfunctions were combined with the System Malfunction recognition category to address human factors issues and make the System Malfunction recognition category consistent with the remaining recognition categories.

NEI 99-01: SU1

Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU1

Loss of all offsite power to ESF busses for > 15 Minutes

Applicability: 1, 2, 3, 4, 5

Differences:

Applicability includes modes 4 and 5 because Grand Gulf SU! Also implements NEI CU3.

Deviations:

NEI 99-01: SU1, Example EAL #1

Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

At least (site-specific) emergency generators are supplying power to emergency busses.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU1, EAL #1

Loss of power from ESF-11 and ESF-21 and ESF-12 transformers for >15 minutes

Applicability: 1, 2, 3, 4, 5

Differences:

Applicability includes modes 4 and 5 because Grand Gulf SU! Also implements NEI CU3.

Deviations:

NEI 99-01: SU2

Inability to Reach Required Shutdown Within Technical Specification Limits.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU11

Inability to reach required shutdown within technical specification time limits

Applicability: 1, 2, 3

Differences:

NEI SU2 is implemented by Grand Gulf SU11 (Formatting only)

Deviations:

NEI 99-01: SU2, Example EAL #1

Plant is not brought to required operating mode within (site-specific) Technical Specifications LCO Action Statement Time.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU11, EAL #1

Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time

Applicability: 1, 2, 3

Differences:

NEI SU2, EAL #1 is implemented by Grand Gulf SU11, EAL #1 (Formatting only)

Deviations:

NEI 99-01: SU3

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in The Control Room for Greater Than 15 Minutes

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU8

Unplanned loss of most or all safety system annunciation or indication in the control room for >15 minutes

Applicability: 1, 2, 3

Differences:

NEI SU3 is implemented by Grand Gulf SU8 (Formatting only)

Deviations:

NEI 99-01: SU3, Example EAL #1

UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU8, EAL #1

Unplanned loss of most or all safety system annunciators or indication on 1H13-P680, 1H13-P601 and 1H13-P870 for **>15 minutes**

Applicability: 1, 2, 3

Differences:

NEI SU3, EAL #1 is implemented by Grand Gulf SU8, EAL #1 (Formatting only)

Deviations:

NEI 99-01: SU4

Fuel Clad Degradation.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU10

Fuel Clad Degradation.

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU4 is implemented by Grand Gulf SU10 (Formatting only)

Applicability modes 4 and 5 included because Grand Gulf SU9 also implements NEI CU5.

Deviations:

NEI 99-01: SU4, Example EAL #1

(Site-specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU10, EAL #1

Offgas isolation due to valid Offgas Post Treatment monitor signal. (1H13-P601-19A-C8)

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU4, EAL #1 is implemented by Grand Gulf SU10, EAL #1 (Formatting only)

Applicability modes 4 and 5 included because Grand Gulf SU10 also implements NEI CU5.

Deviations:

NEI 99-01: SU4, Example EAL #2

(Site-specific) coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU10, EAL #2

Coolant sample activity >4.0 µCi/gm I-131 dose equivalent.

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU4, EAL #2 is implemented by Grand Gulf SU10, EAL #2 (Formatting only)

Applicability modes 4 and 5 included because Grand gulf SU10 also implements NEI CU5

Deviations:

NEI 99-01: SU5

RCS Leakage

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU3

Loss of RPV inventory

Applicability: 1, 2, 3

Differences:

NEI SU5 is implemented by Grand Gulf SU3 (Formatting only)

Deviations:

NEI 99-01: SU5, Example EAL #1

Unidentified or pressure boundary leakage greater than 10 gpm

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU3, EAL #1

Unidentified or pressure boundary leakage >10 gpm

Applicability: 1, 2, 3

Differences:

NEI SU5, EAL #1 is implemented by Grand Gulf SU3, EAL #1 (Formatting only)

Deviations:

NEI 99-01: SU5, Example EAL #2

Identified leakage greater than 25 gpm

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU3, EAL #2

Identified leakage >35 gpm

Applicability: 1, 2, 3

Differences:

NEI SU5, ELA #2 is implemented by Grand Gulf SU3, EAL #2 (Formatting only)

Deviations:

NEI 99-01: SU6

UNPLANNED Loss of All Onsite or Offsite Communications Capabilities

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SU9

Unplanned loss of all onsite or offsite communications capabilities

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU6 is implemented by Grand Gulf SU9 (Formatting only)

Applicability mode 4 and 5 included because Grand Gulf SU9 also implements NEI CU6.

Deviations:

NEI 99-01: SU6, Example EAL #1

Loss of all (site-specific list) onsite communications capability affecting the ability to perform routine operations

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU9, EAL #1

Loss of all onsite communications equipment (See **Table S1**)

Table S1 Onsite Communications Equipment	
Plant Radio System Plant Paging System Sound Powered Phones In-plant telephones	

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU6, EAL #1 is implemented by Grand Gulf SU9, EAL #1 (Formatting only)

Applicability mode 4 and 5 included because Grand Gulf SU9 also implements NEI CU6.

Deviations:

NEI 99-01: SU6, Example EAL #2

Loss of all (site-specific list) offsite communications capability

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SU8, EAL #2

Loss of all offsite communications equipment (See Table S2)

Table S2
Offsite Communications Equipment
All telephone lines (commercial and microwave)
All telephone lines (commercial and microwave)
NRC phones (ENS HPN MCL RSCL PMCL)
Cellular phones

Applicability: 1, 2, 3, 4, 5

Differences:

NEI SU6, EAL #2 is implemented by Grand Gulf SU8, EAL #2 (Formatting only)

Applicability mode 4 and 5 included because Grand Gulf SU3 also implements NEI CU6.

Deviations:

NEI 99-01: SU8

Inadvertent Criticality

Applicability: Hot Shutdown

Grand Gulf: SU7

Inadvertent criticality

Applicability: 3, 4, 5

Differences:

NEI SU8 is implemented by Grand Gulf SU7 (Formatting only)

Applicability mode 4 and 5 included because Grand Gulf SU7 also implements NEI CU8.

Deviations:

NEI 99-01: SU8, Example EAL #1

An UNPLANNED extended positive period observed on nuclear instrumentation.

Applicability: Hot Shutdown

Grand Gulf: SU7, EAL #1

An unplanned sustained positive period observed on nuclear instrumentation.

Applicability: 3, 4, 5

Differences:

NEI SU8, EAL #1 is implemented by Grand Gulf SU7, ELA #1 (Formatting only)

Applicability mode 4 and 5 included because Grand Gulf SU7 also implements NEI CU8.

Replaced "extended" with "sustained" because it better describes the critical period characteristics.

Deviations:

NEI 99-01: SU8, Example EAL #2

An UNPLANNED sustained positive startup rate observed on nuclear instrumentation

Applicability: Hot Shutdown

Grand Gulf: N/A

Applicability: N/A

Differences:

Startup rate indication is not used in the BWR design.

Deviations:

NEI 99-01: SA2

Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful.

Applicability: Power Operation, Startup

Grand Gulf: SA3

Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded **and** manual scram was successful.

Applicability: 1, 2

Differences:

NEI SA2 is implemented by Grand Gulf SA3 (Formatting only)

Deviations:

NEI 99-01: SA2, Example EAL #1

Indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic scram did not occur, and a successful manual scram occurred.

Applicability: Power Operations, Startup

Grand Gulf: SA3, EAL #1

Automatic scram failed to rapidly insert sufficient control rods to bring the reactor subcritical, **and** a manual scram was successful

Applicability: 1, 2

Differences:

NEI SA2, EAL #1 is implemented by Grand Gulf SA3, EAL #1 (Formatting only)

Added "to rapidly insert sufficient control rods to bring the reactor subcritical" to quantify the successful scram criteria. The NEI bases states that if sufficient control rods are inserted to bring the reactor subcritical on a scram, the scram is considered successful.

Deviations:

NEI 99-01: SA4

UNPLANNED Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a SIGNIFICANT TRANSIENT in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SA6

Unplanned loss of most or all safety system annunciation or indication in control room with either a significant transient in progress, **or** compensatory non-alarming indicators are **unavailable**

Applicability: 1, 2, 3

Differences:

NEI SA4 is implemented by Grand Gulf SA6 (Formatting only)

Deviations:

NEI 99-01: SA4, Example EAL #1

UNPLANNED loss of most or all (site-specific) annunciators or indicators associated with safety systems for greater than 15 minutes.

AND

Either of the following: (a or b)

a. A SIGNIFICANT TRANSIENT is in progress.

OR

b. Compensatory non-alarming indications are unavailable.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SA6, EAL #1

Unplanned loss of most or all safety system annunciators or indication on 1H13-P680 or 1H13-P601 or 1H13-P870 for **>15 minutes**

AND

Either:

a. A significant transient is in progress.

or

b. Compensatory non-alarming indications are unavailable.

Applicability: 1, 2, 3

Differences:

NEI SA4, EAL #1 is implemented by Grand Gulf SA6, EAL #1 (Formatting only)

Deviations:

NEI 99-01: SA5

AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SA1

AC power capability to Div I & II ESF busses reduced to a single power source for >15 minutes such that any additional single failure would result in loss of AC power to both Div I & II ESF busses.

Applicability: 1, 2, 3

Differences:

NEI SA4 is implemented by Grand Gulf SA1 (Formatting only)

Deviations:

NEI 99-01: SA5, Example EAL #1

AC power capability to site-specific essential busses reduced to a single power source for greater than 15 minutes

AND

Any additional single failure will result in station blackout.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SA1, EAL #1

AC power to 15AA and 16AB busses reduced to only one of the following sources for >15 minutes

a. ESF11 or ESF21 or ESF12 transformers

OR

b. DG11 or DG12 diesel generators

Applicability: 1, 2, 3

Differences:

NEI SA4, EAL #1 is implemented by Grand Gulf SA1, EAL #1 (Formatting only)

Deviations:

NEI 99-01: SS1

Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SS1

Loss of all offsite and onsite AC power to Div I & II ESF busses

Applicability: 1, 2, 3

Differences:

None

Deviations:

NEI 99-01: SS1, Example EAL #1

Loss of power to (site-specific) transformers

AND

Failure of (site-specific) emergency generators to supply power to emergency busses

AND

Failure to restore power to at least one emergency bus within (site-specific) minutes from the time of loss of both offsite and onsite AC power

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SS1, EAL #1

Loss of power to 15AA and 16AB busses

AND

Failure to restore power to **either** 15AA **or** 16AB bus within **15 minutes** from the time of loss of **both** offsite **and** onsite AC power

Applicability: 1, 2, 3

Differences:

None

Deviations:
Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SS3

Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was not successful.

Applicability: 1, 2, 3

Differences:

NEI SS2 is implemented by Grand Gulf SS3 (Formatting only)

Deviations:

NEI 99-01: SS2, Example EAL #1

Indication(s) exist that automatic and manual scram were not successful.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SS3, EAL #1

Automatic scram **and** a manual scram failed to rapidly insert sufficient control rods to bring the reactor subcritical

Applicability: 1, 2, 3

Differences:

NEI SS2, EAL #1 is implemented by Grand Gulf SS3, EAL #1 (Formatting only)

Added "to rapidly insert sufficient control rods to bring the reactor subcritical" to quantify the successful scram criteria. The NEI bases states that if sufficient control rods are inserted to bring the reactor subcritical on a scram, the scram is considered successful.

Deviations:

Loss of All Vital DC Power

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SS2

Loss of all vital DC power

Applicability: 1, 2, 3

Differences:

NEI SS3 is implemented by Grand Gulf SS2 (Formatting only)

Deviations:

NEI 99-01: SS3, Example EAL #1

Loss of All Vital DC Power based on (site-specific) bus voltage indications for greater than 15 minutes.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SS2, EAL #1

11DA and 11DB ≤105 VDC for >15 minutes

Applicability: 1, 2, 3

Differences:

NEI SS3, EAL #1 is implemented by Grand Gulf SS2, EAL #1 (Formatting only)

Deviations:

Complete Loss of Heat Removal Capability.

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SS5

Complete loss of heat removal capability.

Applicability: 1, 2, 3

Differences:

NEI SS4 is implemented by Grand Gulf SS5 (Formatting only)

Deviations:

NEI 99-01: SS4, Example EAL #1

Heat Capacity Temperature Limit Curve exceeded (BWR).

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SS5, EAL #1

Inability to maintain Suppression Pool temperature in the HCTL Safe Zone requiring Emergency Depressurization per EP-3

Applicability: 1, 2, 3

Differences:

NEI SS4, EAL #1 is implemented by Grand Gulf SS5, EAL #1 (Formatting only)

Deviations:

Inability to Monitor a SIGNIFICANT TRANSIENT in Progress

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SS6

Inability to monitor a significant transient in progress

Applicability: 1, 2, 3

Differences:

None

Deviations:

NEI 99-01: SS6, Example EAL #1

a. Loss of most or all (site-specific) annunciators associated with safety systems.

AND

b. Compensatory non-alarming indications are unavailable.

AND

c. Indications needed to monitor (site-specific) safety functions are unavailable.

AND

d. SIGNIFICANT TRANSIENT in progress.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SS6, EAL #1

a. **Unplanned** loss of most or all safety system annunciators or indication on 1H13-P680, 1H13-P601 and 1H13-P870 for **>15 minutes**

AND

b. Indications needed to monitor criticality **or** core heat removal **or** fission product barrier status are unavailable

AND

c. Significant transient in progress

AND

d. Compensatory non-alarming indications are unavailable

Applicability: 1, 2, 3

Differences:

None

Deviations:

Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power to Essential Busses

Applicability: Power Operation, Startup, Hot Shutdown

Grand Gulf: SG1

Prolonged Loss (>4 hrs) of all offsite and onsite AC power to Div I & II ESF busses.

Applicability: 1, 2, 3

Differences:

Grand Gulf has a 4 hour Station Blackout coping analysis.

Deviations:

NEI 99-01: SG1, Example EAL #1

Loss of power to (site-specific) transformers

AND

Failure of (site-specific) emergency diesel generators to supply power to emergency busses

AND

Either of the following: (a or b)

a. Restoration of at least one emergency bus within (site-specific) hours is not likely

OR

b. (Site-Specific) Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SG1, EAL #1

Loss of AC power to 15AA and 16AB busses,

AND

Either:

a. Restoration of AC power to either 15AA or 16AB within 4 hours is not likely

or

 b. Conditions are imminent that a Loss of two fission product barriers and loss or potential loss of third (FG1) is expected to occur prior to restoration of AC power to either 15AA or 16AB.

Applicability: 1, 2, 3

Differences:

None

Deviations:

Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.

Applicability: Power Operation, Startup

Grand Gulf: SG2

Failure of the reactor protection system to complete an automatic scram and manual scram was **not** successful and there is indication of an extreme challenge to the ability to cool the core

Applicability: 1, 2,

Differences:

None

Deviations:

NEI 99-01: SG2, Example EAL #1

Indications exist that automatic and manual scram were not successful.

AND

Either of the following: (a or b)

a. Indication(s) exists that the core cooling is extremely challenged.

OR

b. Indication(s) exists that heat removal is extremely challenged.

Applicability: Power Operations, Startup, Hot Shutdown

Grand Gulf: SG2, EAL #1

Automatic scram **and** manual failed to rapidly insert sufficient control rods to bring the reactor subcritical

AND

Either:

a. RPV parameters cannot be maintained within EP-2A limits

or

b. RPV pressure **and** suppression pool temperature cannot be maintained in the HCTL Safe Zone

Applicability: 1, 2, 3

Differences:

NEI SG2, EAL #1 is implemented by Grand Gulf SG2, EAL #1 (Formatting only)

Added "to rapidly insert sufficient control rods to bring the reactor subcritical" to quantify the successful scram criteria. The NEI bases states that if sufficient control rods are inserted to bring the reactor subcritical on a scram, the scram is considered successful.

Deviations: