Joseph Pacher Site Vice President

a joint venture of _______

R.E. Ginna Nuclear Power Plant, LLC 1503 Lake Road Ontario, New York 14519-9364

585.771.5200 585.771.3943 Fax joseph.pacher@cengllc.com

December 21, 2011

U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: R.E. Ginna Nuclear Power Plant Docket No. 50-244, 72-67 (ISFSI)

Emergency Action Level Changes

- REFERENCE: (a) Nuclear Energy Institute (NEI) 99-01, Revision 5, "Methodology for Development of Emergency Action Levels," dated February 2008 (ADAMS Accession No. ML080450149)
 - (b) NUMARC/NESP-007, Revision 2, "Methodology for Development of Emergency Action Levels", dated January 1992 (ADAMS Accession No. ML041120174)

R.E. Ginna Nuclear Power Plant requests Nuclear Regulatory Commission (NRC) approval for the adoption of revised Emergency Action Levels (EALs) for use at the R.E. Ginna Nuclear Power Plant in accordance with 10 CFR Part 50, Appendix E, Section IV(B)(1). The revised EALs are based on Reference (a). Current R.E. Ginna EALs are based primarily on reference (b).

NRC approval is requested by December 31, 2012, with the EAL changes being implemented within one year after approval. The implementation of the revised EALs will be based on site activities allowing for emergency responder training and familiarization as part of the implementation. Site activities that must be coordinated with implementation of the revised EALs include scheduled refueling outages, initial licensing examinations and annual examinations of licensed operators.

The proposed EAL schemes were developed using the generic development guidance from NEI 99-01, Revision 5 with differences and deviations based upon design criteria applicable to the site as well as licensee preferences for terminology, format, and other licensee desired modifications to the generic EAL scheme provided in NEI 99-01 Revision 5. The instrumentation used to determine EAL entry criteria was evaluated for appropriateness, ranges of indication, and set points as part of the upgrade project.

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Attachment (1) provides the EAL Technical Bases (strike out version) with Attachment (2) providing the EAL Technical Bases (clean version). The Technical Bases document provides an explanation and rationale for each EAL. Attachment (3) provides the EAL Comparison Matrix, providing a line-by-line comparison of the EALs contained in NEI 99-01, Revision 5 to the proposed R.E. Ginna EALs. Attachment (4) contains the Radiation Monitor Supporting Calculations. Attachment (5) contains the EAL Wallchart.

Should you have questions regarding this matter, please contact Mr. Thomas Harding at (585) 771-5219 or Thomas.HardingJr@cengllc.com.

Very truly yours,

/ Joseph E. Pacher

STATE OF NEW YORK:

: TO WIT: COUNTY OF WAYNE:

I, Joseph E. Pacher, being duly sworn, state that I am Vice President, R.E. Ginna Nuclear Power Plant, LLC (Ginna LLC), and that I am duly authorized to execute and file this request on behalf of Ginna LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Ginna LLC employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

1 30

Subscribed and sworn before me, a Notary Public in and for the State of New York and County

this <u>21st</u> day of <u>December</u>, 2011. of MONROE

WITNESS my Hand and Notarial Seal:

My Commission Expires:

12-21-14

SHARON L. MILLER Notary Public, State of New York Registration No. 01MI6017755 Monree Geunty Commission Expires December 81, 89____

Notary Public

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Attachments: (1)

- EAL Technical Bases (strike out version) EAL Technical Bases
 - (2)
 - (3)
 - EAL Comparison Matrix Radiation Monitor Supporting Calculations (4)

- EAL Wallchart (5)
- W.M. Dean, NRC CC: D.V. Pickett, NRC Resident Inspector, NRC (Ginna)

ATTACHMENT (1)

1

EAL TECHNICAL BASES (Strike Out Version)

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ACRONYMS & ABBREVIATIONS

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	Critical Safety Function	
	Critical Safety Function Status Tree	
	Direct Current	$W^{(0)}$
DHR	Decay Heat Removal	
Disch	Discharge	
DOT	Department of Transportation	And the second
EAL	Emergency Action Level	
ECCS	Emergency Core Cooling System	n Net t
ECL.	Emergency Classification Level	
ED	Department of Transportation Emergency Action Level Emergency Core Cooling System Emergency Classification Level Emergency Director Emergency Operations Facility Emergency Operating Procedure Environmental Protection Agency	
EOF	Emergency Operations Facility	- 1.5 P.1.2
EOP	Emergency Operating Procedure	
EPA	Environmental Protection Agency	1
EPG	Emergency Procedure Guideline	
EPRI	Environmental Protection Agency Emergency Procedure Guideline Electric Power Research Institute Emergency Response Guideline Emergency Plan Implementing Procedure	and the second secon
ERG	Emergency Response Guideline	and the second secon
EPIP	Emergency Plan Implementing Procedure	
FOF	Endibeered Salely Feature	
ESW	Emergency Service Water Federal Aviation Administration Federal Bureau of Investigation Federal Emergency Management Agency Final Safety Analysis Report General Emergency	
FAA	Federal Aviation Administration	 A set of the set of
FBI	Federal Bureau of Investigation	
FEMA	Federal Emergency Management Agency	
FSAR	Final Safety Analysis Report	
GE	General Emergency	• • • • • • • • •
НОО	Headquarters (NRC) Operations Officer	
HPSI	Final Safety Analysis Report General Emergency Headquarters (NRC) Operations Officer High Pressure Safety Injection Initiating Condition nination of External Events (Generic Letter 88-20)	· · · ·
1C	Initiating Condition	
IPEEEIndividual Plant Exar	nination of External Events (Generic Letter 88-20)	······································
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ACRONYMS & ABBREVIATIONS (continued)

ISFSI	Independent Spent Fuel Storage Installation Effective Neutron Multiplication Factor Limiting Condition of Operation Licensee Event Report Loss of Coolant Accident Low Pressure Safety Injection Light Water Reactor Main Steam Isolation Valve Main Steam Line MilliRoentgen Megawatt	
Keff	Effective Neutron Multiplication Factor	
LCO	Limiting Condition of Operation	· • · ·
LER	Licensee Event Report	
LOCA	Loss of Coolant Accident	
LPSI	Low Pressure Safety Injection	
LWR	Light Water Reactor	
MSIV		
MSL		
mR	milliRoentgen	
MW		
MWS	Miscellaneous Waste System	
NEI	Nuclear Energy Institute Nuclear Energy Institute Nuclear Power Plant	
NESP		
NPP	Nuclear Power Plant	
NRC		
NSSS	Nuclear Steam Supply System	
NORAD	National Environmental Studies Project Nuclear Power Plant Nuclear Regulatory Commission Nuclear Steam Supply System North American Aerospace Defense Command Nuclear Management and Resources Council Operating Basis Earthquake Owner Controlled Area Off-site Dose Calculation Manual Off-site Response Organization Once Through Core Cooling Protected Area Protective Action Guideline Point of Adding Heat Pressurized Water Reactor	
NUMARC	Nuclear Management and Resources Council	•
OBE	Operating Basis Earthquake	
OCA	Owner Controlled Area	
ODCM	Off-site Dose Calculation Manual	
OR0	Off-site Response Organization	•
ОТСС	Once Through Core Cooling	
PA	Protected Area	
PAG	Protective Action Guideline	
РОАН		
PRA/PSA	Probabilistic Risk Assessment / Probabilistic Safety Assessment	
PWR	Pressurized Water Reactor Pounds per Square Inch Gauge Roentgen	
PSIG	Pounds per Square Inch Gauge	
R	Roentgen	
RCC	Reactor Control Console	
RCIC		
RCS	Roentgen Reactor Control Console Reactor Core Isolation Cooling Reactor Coolant System	
rem	Roentgen Equivalent Man Radiological Effluent Technical Specifications	
	Reactor Protection System	
RPV		

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ACRONYMS & ABBREVIATIONS (continued)

RVLIS	Reactor Vessel Level Indicating System	and the second
RWCU	Reactor Vessel Level Indicating System	and an england and the
	Site Area Emergency	
SBO	Station Blackout. Steam Generator	n an an tha Britan Anna an Anna Anna Anna Anna Anna Ann
SG		
SI	Safety Injection	, etter transformet etter som etter som etter
SPDS	Safety Parameter Display System	经国际股票款 机合合物 化磷酸盐 的复数
SRO	Senior Reactor Operator	and the state of the
SSE	Safe Shutdown Farthquake	
TEDE	Total Effective Dose Equivalent	et av av dri avde ar tee groene
TOAF		e per la presenta en
	Technical Support Center	
UE	Unusual Event	and the second
WE	Unusual Event Westinghouse Electric	ter en en ser ser ser en ser en en en ser en se
WOG		
WRNGM		
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PURPOSE 1.0

This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the EAL Upgrade Project for the R. E. Ginna Nuclear Power Plant (Ginna). It should be used to facilitate review of the Ginna EALs and provide historical documentation for future reference. Decision-makers responsible for implementation of EPIP-1-0 "Ginna Station Event Evaluation and Classification" and the Emergency Action Level Matrix may use this document as a technical reference in support of EAL interpretation. This information may assist the Emergency Director in making classifications, particularly those involving judgment or multiple events. The basis information may also be useful in training, for explaining event classifications to off-site officials, and for facilitating regulatory review and approval of the classification scheme.

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

2.0 DISCUSSION

2.1 Background

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

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

NEI 99-01 (NUMARC/NESP-007) Revision 4 was subsequently issued for industry implementation. Enhancements over earlier revisions included:

· Consolidating the system malfunction initiating conditions and example emergency action levels which address conditions that may be postulated to occur during plant shutdown conditions.

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٠	Initiating conditions and	example emergency action levels that fully address.	
	conditions that may be p	postulated to occur at permanently Defueled Stations and	. · ·
	Independent Spent Fuel	I Storage Installations (ISFSIs).	
٠		roduct barrier EAL threshold for a Site Area Emergency.	
Subse	equently, Revision 5 of NI	EI 99-01 has been issued which incorporates resolutions to	
nume	rous implementation issu	ies including the NRC EAL FAQs. Using NEI 99-01 Revision	
5 Fina	al, February 2008 (ADAM	IS Accession Number ML080450149), Ginna conducted an	
EAL i	mplementation upgrade p	project that produced the EALs discussed herein.	۲ [.] .
2.2	Fission Product Barriers		
Many	of the EALs derived from	n the NEI methodology are fission product barrier based.	
Inati	is, the conditions that defi	ine the EALs are based upon loss or potential loss of one or	
more	of the three lission produ	ici damers. Loss and Polential Loss signify the relative	
dama	ige and threat of damage	to the barrier. "Loss' means the barrier no longer assures	
conta	inment of radioactive mat	terials; "Potential Loss" implies an increased probability of	
barrie	er loss and decreased cer	tainty of maintaining the barrier.	an Albana An Albana
		rriers are:	
	bundle tubes that contai	el Clad barrier consists of the zircalloy or stainless steel fuel	56 - 1 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5
Β.	Reactor Coolant System and its connections up to	n (RCS): The RCS Barrier includes the RCS primary side to and including the pressurizer safety and relief valves, and and including the primary isolation valves.	2 - 1 - 1 - 1
C.	and connections up to a This barrier also include	The Containment Barrier includes the containment building and including the outermost containment isolation valves. As the main steam, feedwater, and blowdown line extensions t building up to and including the outermost secondary side	
• •			
2.3	•	on Based on Fission Product Barrier Degradation	
	•	ases for event classification related to fission product barrier	
IOSS C	or potential loss:	(b) A set of the se	•
14	nusual Event:	a a construction of a statement of the second of the second of the statement of the statement of the second of t	

Unusual Event:

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<u>Alert:</u>	$(1-1)^{-1} = (1-1)^{-1}$	$(1,1)^{1} (\alpha_{1},\alpha_{2},\alpha_{3}$	$\mathcal{S}_{i} = \{ (i,j) \in \mathcal{S}_{i} : j \in \mathcal{S}_{i} : j \in \mathcal{S}_{i} : j \in \mathcal{S}_{i} : j \in \mathcal{S}_{i} \} $
Any loss or any potential loss o	of either Fuel Clad o	r RCS	en de la faite de la constant de la
<u>Site Area Emergency:</u>	en e		and the second s
Loss or potential loss of any tw	o barriers	and the state of the second	and the second second second
General Emergency:			$(1,1)^{(n-1)}$, $(1,1)^{(n-$
Loss of any two barriers and lo	ss or potential loss	of third barrier	an the second state of a second state of the second state of the second state of the second state of the second

2.4 EAL Relationship to EOPs and Critical Safety Function Status

Where possible, the EALs have been made consistent with and utilize the conditions defined in the Ginna Emergency Operating Procedure (EOP) network. While the symptoms that drive operator actions specified in the EOPs are not indicative of <u>all</u> possible conditions which warrant emergency classification, they define the symptoms, independent of initiating events which indicate reactor plant safety and/or fission product barrier integrity are threatened. When these symptoms are clearly representative of one of the NEI 99-01 Rev. 5 Initiating Conditions, they have been utilized as an EAL. This permits rapid classification of emergency situations based on plant conditions without the need for additional evaluation or event diagnosis. Although some of the EALs presented here are based on conditions defined in the EOPs, classification of emergencies using these EALs is not dependent upon EOP entry or execution. The EALs can be utilized independently or in conjunction with the EOPs.

2.5 Symptom-Based vs. Event-Based Approach

To the extent possible, the EALs are symptom-based. That is, the action level threshold is defined by values of key plant operating parameters that identify emergency or potential emergency conditions. This approach is appropriate because it allows the full scope of variations in the types of events to be classified as emergencies. However, a purely symptom-based approach is not sufficient to address all events for which emergency can be

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ascribed have also been utilized as EALs since they may be indicative of potentially more serious conditions not yet fully realized.

2.6 EAL Organization

The Ginna EAL scheme includes the following features: 44 Provide a constant of the sector states and the sector for the sector

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

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

 Within each of the above three groups, assignment of EALs to categories/subcategories – category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user.
 Subcategories are used as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The Ginna EAL categories/subcategories and their relationship to NEI 99-01 Rev. 5 Recognition Categories are listed below.

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EAL Groups, Categories and Subcategories and financial and the second and the second state of the second second

Any Operating Mode: 1 - Offsite Rad Conditions R - Abnormal Rad Release / Rad Effluent 1 - Offsite Rad Conditions & Spent Fuel Events 3 - CR/CAS/SAS Rad 1 - Natural or Destructive Phenomena Affecting Plant Safety 2 - Fire or Explosion 8 - Security 3 - Hazardous Gas 6 - Judgment - Control Room Evacuation 6 - Judgment 1 - Loss of AC Power 3 - Criticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 5 - System Malfunction 1 - Loss of AC Power 3 - Free of Lead Degradation 8 - RCS Leakage F - Fission Product Barrier Degradation 1 - Loss of AC Power 2 - Cold Shutdown / Refueling System 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Level 4 - RCS Temperature 5 - Contronunications 1 - Loss of AC Power 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality	EAL Group/Category	EAL Subcategory	}
R - Abnormal Rad Release / Rad Effluent 1 - Offsite Rad Conditions 2 - Onsite Rad Conditions & Spent Fuel Events 3 - CR/CAS/SAS Rad 4 - Security 5 - Control Room Evacuation 6 - Judgment 6 - Judgment 1 - Loss of AC Power 2 - Conticultions 3 - RCS Leakage 7 - Fuel Clab Degradation 8 - Recurrity 8 - Recurrity 9 - Judgment 9 - System Malfunction 1 - Loss of AC Power 2 - Cottol Bound 9 - Free Clab Degradation 8 - Roc Scalage 7 - Fuel Clab Degradation 8 - Roc Scalage 1 - Loss of AC Power 2 - Loss of DC Power 3 - Orticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 5 - Stystem Malfunction 6 - Communications 7 - Fuel Clad Degradation 8 - RCS Leakage 1 - Loss of AC Power 2 - Loss of DC Power 3 - State Receiver 4 - RCS Leakage 1 - Loss of AC Power 2 - Loss of DC Power 3 - RCS Leakag			
H - Hazards and Other Conditions 3 - CR/CAS/SAS Rad H - Hazards and Other Conditions 1 - Natural or Destructive Phenomena Affecting Plant Safety 2 - Fire or Explosion S - Control Room Evacuation 6 - Judgment 6 - Judgment 1 - Loss of AC Power 2 - Criticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions S - System Malfunction 1 - Loss of AC Power 2 - Criticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 7 - Fuel Clad Degradation 8 - RCS Leakage None 1 - Loss of AC Power 2 - Loss of DC Power 1 - Loss of AC Power 3 - Criticality & RPS Failure 1 - Loss of AC Power 4 - Inability to Reach or Maintain Shutdown Conditions 1 - Loss of AC Power 5 - Loss of DC Power 1 - Loss of AC Power 6 - Cord Shutdown / Refueling System 1 - Loss of AC Power 1 - Loss of DC Power 1 - Loss of AC Power 2 - Loss of DC Power 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC Power 3 - RCS Leakage 1 - Loss of AC P			
H - Hazards and Other Conditions 1 - Natural or Destructive Phenomena Affecting Plant Safety 1 - Natural or Destructive Phenomena 2 - Fire or Explosion 3 - Hazardous Gas 3 - Hazardous Gas 4 - Security 4 - Security 5 - Control Room Evacuation 6 - Judgment 5 - Control Room Evacuation 6 - Judgment 1 - Loss of AC Power 2 - Loss of DC Power 3 - Gritcality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 5 - Fuel Clad Degradation 8 - RCS Leakage None 1 - Loss of AC Power 1 - Loss of AC Power 2 - Loss of DC Power 3 - Huterial or Barrier Degradation 8 - RCS Leakage 1 - Loss of AC Power 2 - Loss of DC Power 3 - RCS Leakage 6 - Coold Shutdown / Refueling System 1 - Loss of AC Power 3 - RCS Level 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality 4 - RCS Temperature 7 - Cold Shutdown / Refueling System 1 - Loss of AC Power 9 - RCS Level 4 - RCS Temperature 9 - Communications 6 - Inadvertent Criticality	R – Abnormal Rad Release / Rad Effluent	1 – Offsite Rad Conditions 2 – Onsite Rad Conditions & Spent Fuel Events	l sbuttor a gubit i vili i tronom
H - Hazards and Other Conditions 1 - Natural or Destructive Phenomena Affecting Plant Safety 2 - Fire or Explosion - And		3 – CR/CAS/SAS Rad	
4 - Security 9400 and 5 - Control Room Evacuation 5 - Control Room Evacuation 6 - Judgment 6 - Judgment 6 - Security Hot Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation S - System Malfunction 1 - Loss of AC Power 6 - Control Room Evacuation F - Fission Product Barrier Degradation None 6 - Communications Cold Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation Cold Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation Cold Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation Cold Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation Cold Conditions: 1 - Loss of AC Power 6 - Control Room Evacuation Cold Shutdown / Refueling System 1 - Loss of AC Power 6 - Control Room Evacuation Malfunction 2 - Loss of DC Power 6 - Inadvertent Criticality 6 - Inadvertent Criticality Cold Conditions: 2 - Loss of AC Power 7 - RCS Leevel 7 - RCS Leevel 4 - RCS Temperature 5 - Communications 7 - RCS Leevel 7 - RCS Leevel 4 - RCS Temperature 5 - Communications 7 - Inadvertent Criticality 7 - RC		2 - Fire or Explosion _ reader and reader to the second states	et i la litta de la composición de
E - ISFSI None		4 - Security (1900) (2000) (2000) (2000) (2000) 5 - Control Room Evacuation	
Hot Conditions: 1 - Loss of AC Power 4 - Loss of DC Power 4 - Inability to Reach or Maintain Shutdown Conditions S - System Malfunction 1 - Loss of AC Power 4 - Inability to Reach or Maintain Shutdown Conditions S - Instrumentation 6 - Communications 7 - Fuel Clad Degradation B - RCS Leakage None 4 - RCS Temperature Cold Conditions: 1 - Loss of AC Power 4 - RCS Temperature C - Cold Shutdown / Refueling System 1 - Loss of AC Power 4 - RCS Temperature S - RCS Level 4 - RCS Temperature 4 - RCS Temperature S - Inadvertent Criticality 4 - RCS Temperature 4 - RCS Temperature			
S - System Malfunction 1 - Loss of AC Power 2 - Loss of DC Power 3 - Criticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 5 - Instrumentation 6 - Communications 7 - Fuel Clad Degradation 8 - RCS Leakage None Cold Conditions: 1 - Loss of AC Power C - Cold Shutdown / Refueling System 1 - Loss of AC Power Malfunction 2 - Loss of DC Power 3 - RCS Leevel 4 - RCS Temperature 5 - Communications 5 - Communications Cold Shutdown / Refueling System 1 - Loss of AC Power Malfunction 2 - Loss of DC Power 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality 6 - Inadvertent Criticality 4 - RCS Temperature	E – ISFSI		
2 - Loss of DC Power 3 - Criticality & RPS Failure 4 - Inability to Reach or Maintain Shutdown Conditions 5 - Instrumentation 6 - Communications 7 - Fuel Clad Degradation 8 - RCS Leakage None Cold Conditions: C - Cold Shutdown / Refueling System Malfunction 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality	Hot Conditions:		1. 44 8 ¹ x 11.5 17 1
5 - Instrumentation 6 - Communications 7 - Fuel Clad Degradation 8 - RCS Leakage 8 - RCS Leakage None Cold Conditions: 1 - Loss of AC Power 2 - Loss of DC Power 3 - RCS Level 3 - RCS Level 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality 2 - Loss of AC Power	S - System Malfunction	2 – Loss of DC Power	
6 - Communications 7 - Fuel Clad Degradation 8 - RCS Leakage None Cold Conditions: C - Cold Shutdown / Refueling System 1 - Loss of AC Power 2 - Loss of DC Power 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality			and the second second
F - Fission Product Barrier Degradation None		6 – Communications	
Cold Conditions: C - Cold Shutdown / Refueling System Malfunction 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality	۰	0 - NOO Ecunage	
Cold Conditions: 1 - Loss of AC Power Malfunction 2 - Loss of DC Power 3 - RCS Level 4 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality	F Fission Product Barrier Degradation	None of the second state of the second state of the second	a second the second second
C - Cold Shutdown / Refueling System 1 - Loss of AC Power Malfunction 2 - Loss of DC Power 3 - RCS Level 3 - RCS Temperature 5 - Communications 6 - Inadvertent Criticality		. All all shows the set of 1985. I	
3 – RCS Level 4 – RCS Temperature 5 – Communications 6 – Inadvertent Criticality Constraints and the second state of the se	C – Cold Shutdown / Refueling System	1 – Loss of AC Power	
4 - RCS Temperature A - RCS Temperature 5 - Communications A - Inadvertent Criticality 6 - Inadvertent Criticality A - A - A - A - A - A - A - A - A - A -	Malfunction	2 – Loss of DC Power	(1) 102 - 21 - 23 - 40 P - P
6 – Inadvertent Criticality (2004) (2		4 - RCS Temperature	the State Street State
	· · · · · · · · · · · · · · · · · · ·		
and the second secon		$(-1)^{n-1} = (2\gamma)^{n-1} + (2\gamma$	e de la construcción de la defini
		the second second second second second	and a state of the state of the

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The primary tool for determining the emergency classification level is the EAL	In a second second second second second
Classification Matrix. The user of the EAL Classification Matrix may (but is not re-	quired to)
consult the EAL Technical Bases Document in order to obtain additional informat	ion in the protocol and the second
concerning the EALs under classification consideration. The user should consult	Sections
2.7 & 2.8, and Attachments 1 & 2 of this document for such information.	••
2.7 Technical Bases Information	an an an straight suites
EAL technical bases are provided in Attachment 1 for each EAL according to EA	L group
(Any, Hot, Cold), EAL category (R, E, C, H, S and F) and EAL subcategory. A su	mmary
explanation of each category and subcategory is given at the beginning of the tec	chnical
bases discussions of the EALs included in the category. For each EAL, the follow	/ing
information is provided:	
Category Letter & Title	and the second second second
Subcategory Number & Title	·····································
Initiating Condition (IC)	$(x_1, y_2, y_3) = (x_1, y_2, y_3) + (x_2, y_3) + (x_3, $
Site-specific description of the generic IC given in NEI 99-01 Rev. 5.	1.1 ¹⁰ - 1
EAL Identifier (enclosed in rectangle)	$\theta = \frac{1}{2} \left(\frac{1}{2} \left(\frac{1}{2} - \frac{1}{2} \right) \right) \left(\frac{1}{2} \left(\frac{1}{2} - \frac{1}{2} \right) \right) \left(\frac{1}{2} - \frac{1}{2} \right) \left(\frac{1}{2} -$
Each EAL is assigned a unique identifier to support accurate communication	of the
emergency classification to onsite and offsite personnel. Four characters defin	
EAL identifier:	dina kanadir di Maridia Ara
1. First character (letter): Corresponds to the EAL category as described	above (R,
E, C, H, S or F)	
2. Second character (letter): The emergency classification (G, S, A or U)	the second second second
G = General Emergency S ≂ Site Area Emergency	an an an an an an Arran an Arran an Arran
A = Alert	C MINER IN P
U = Unusual Eventativ agent twatteretter kalteraterete State er de land	s putot na provinsi se provinsi territa se provinsi
3. Third character (number): Subcategory number within the given catego	ry: A start and the second second
Subcategories are sequentially numbered beginning with the number of	ne (1). lf

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a category does not have a subcategory, this character is assigned the number	
one (1).	
4. Fourth character (number): The numerical sequence of the EAL within the EAL	e della 1919 - 1919
subcategory. If the subcategory has only one EAL, it is given the number one	and the second second second second
(1).	the trace of the construction of the construct
Classification (enclosed in rectangle):	n de talen en de la composition de la
Unusual Event (U), Alert (A), Site Area Emergency (S) or General Emergency (G)	· · · · · · · · · · · · · · · · · · ·
EAL (enclosed in rectangle)	•
Wording of the EAL as it appears in the EAL Classification Matrix as a second state of the second state of	ang the suit of the state of the
Mode Applicability	a se la arere que com
One or more of the following plant operating conditions comprise the mode to which	and the second first
each EAL is applicable: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot	and the second second second
Standby, 5 - Cold Shutdown, 6 - Refuel, D - Defueled, or All. (See Section 2.8 for	n de la companya de l La companya de la comp
operating mode definitions)	
Basis:	
A Generic basis section provides a description of the rationale for the EAL as provided	· · · · ·
in NEI 99-01 Rev. 5. This is followed by a Plant-Specific basis section that provides	
Ginna-relevant information concerning the EAL If the EAL wording contains a defined	
term, the definition of the term is included at the end of the plant-specific basis	
discussion.	e tre ser e
Ginna Basis Peference(s)	
Site-specific source documentation from which the EAL is derived	·
2.8 Operating Mode Applicability (Based on Technical Specifications Table 1.1-1)	
1 <u>Power Operation</u>	
Reactor shutdown margin is less than Technical Specification minimum required	
(K _{eff} \geq 0.99) and greater than 5% rated thermal power (excluding decay heat).	
the standard standard and the standard standard standard standard standard standard standard standard standards	•

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2	Startup	6
	Reactor shutdown margin is less than Technical Specification minimum required and a state of the state of the second	••
	$K_{eff} \ge$ 0.99) and less than or equal to 5% rated thermal power (excluding decay $k_{eff} = 0.000$) and $k_{eff} = 0.000$ and $k_{eff} = 0.000$	
	neat)	· 🗘
3	Hot Shutdown	•
	Reactor shutdown margin greater than Technical Specification minimum required a^{-1} is $a = a a a a b = a$	
	K _{eff} < 0.99) with coolant temperature (Tavg) greater than or equal to 350°F.	
4	Hot Standby	
	Reactor shutdown margin greater than Technical Specification minimum required	
	(k _{eff} < 0.99) with coolant temperature (Tavg) less than 350°F and greater than 200°F, rest at the part of the second seco	•
	(all reactor vessel head closure bolts fully tensioned). The approximation of the approximation of the second s	1
5	Dold Shutdown	
	Reactor shutdown margin greater than Technical Specification minimum required to state or state state of the second	
	K _{eff} < 0.99) with coolant temperature (Tavg) less than or equal to 200°F (all reactor compared as the second	·
	vessel head closure bolts fully tensioned). Has the stranges and short on the results of the professioned and the strangest	·• •
6	Refuel Construction of the second of the second	
	One or more reactor vessel head closure bolts less than fully tensioned.	
D	Defueled	
	All reactor fuel removed from reactor pressure vessel (full core off load during	. · ·
	refueling or extended outage), and have not a protection of the second second second second protection and the second s	×.
The p	nt operating mode that exists at the time that the event occurs (prior to any	. ;+
	ve system or operator action being initiated in response to the condition) should be	
comp	ed to the mode applicability of the EALs. If a lower or higher plant operating mode of the state of the state of the	
is rea	ned before the emergency classification is made, the declaration shall be based on the second state of the stat	
the m	de that existed at the time the event occurred. The construction of a sector of a construction of the terms of the sector of the se	
2.9	/alidation of Indications, Reports and Conditions	, h
	s and Fission Product Barrier thresholds assume valid indications. All emergency	:
	cations shall be based upon valid indications, reports or conditions. An indication,	

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•		
report, or condition is considered to be valid when it is verified by (1) an instrument		•
channel check, or (2) indications on related or redundant indicators, or (3) by direct		
observation by plant personnel, such that doubt related to the indicator's operability, the	4	
condition's existence, or the report's accuracy is removed. Implicit in this definition is the	3	
need for timely assessment.	and the second second	
2.10 Planned vs. Unplanned Events in the second sec	and the second	
Planned evolutions involve preplanning to address the limitations imposed by the		
condition, the performance of required surveillance testing, and the implementation of		۰.
specific controls prior to knowingly entering the condition in accordance with the specific	sen de la composition	
requirements of the site's Technical Specifications. Activities, planned or unplanned, which		
	$(\alpha,\beta) \in L^\infty(\mathbb{R}^n)^{1/2}(\mathbb{R}^n)$	
may result in an EAL threshold being met or exceeded. Planned evolutions to test,		
manipulate, repair or perform maintenance or modifications to systems and equipment that	e e e e e e e e e e e e e e e e e e e	
result in an EAL value being met or exceeded are not subject to classification and Research and		
activation requirements as long as the evolution proceeds as planned and is within the	e ha set da t	
operational limitations imposed by the specific operating license. However, these	8 C]	•
conditions may be subject to the reporting requirements of 10 CFR 50.72.		
2.11 Classifying Transient Events		
For some events, the condition may be corrected before a declaration has been made.		
The key consideration in this situation is to determine whether or not further plant damage		
occurred while the corrective actions were being taken. In some situations, this can be a subscription	•••••••••	
readily determined in other situations, further analyses may be necessary (e.g., coolant	· . : · · · ·	۰.
radiochemistry following an ATWS event, plant structural examination following an		. 7
earthquake, etc.). Classify the event as indicated and terminate the emergency once	. Kalendari eta	
assessment shows that there were no consequences from the event and other termination		
criteria are met.	· · · · ·	
Existing guidance for classifying transient events addresses the period of time of event	4. ¹ 2	
recognition and classification (15 minutes). However, in cases when EAL declaration	la di Na tanàna amin'ny fi	
criteria may be met momentarily during the normal expected response of the plant,		

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declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a statistic statist . result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are the state of the applicable and the guidance of NUREG-1022; Event Reporting Guidelines (10 CFR 50.72) (1985) and the guidance of NUREG-1022; Event Reporting Guidelines (10 CFR 50.72) (1985) and 50.73, should be applied. and but rs, should be applied.
2.12 Multiple Simultaneous Events and Imminent EAL Thresholds and the distribution of the first of

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. Or, an Alert and a Site Area Emergency is a Site Area Emergency. Further guidance is provided in RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events.

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

2.13 Emergency Classification Level Downgrading

Another important aspect of usable EAL guidance is the consideration of what to do when the risk posed by an emergency is clearly decreasing. A combination approach involving recovery from General Emergencies and some Site Area Emergencies and termination from Unusual Events, Alerts, and certain Site Area Emergencies causing no long term plant damage appears to be the best choice. Downgrading to lower emergency classification levels adds notifications but may have merit under certain circumstances.

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		na an a
3.0	REFERENCES	$(x,y) \in \{x_1, y_2, \dots, y_n\}$ is a set of the set of th
3.1	Developmental	$\phi_{1}(x) = -2\pi i \phi_{1}(x) \phi_{2}(x) + 2\pi i \phi_{1}(x) + 2\pi i \phi_{2}(x) + 2\pi i \phi_$
	3.1.1 NEI 99-	01 Rev. 5 Final, Methodology for Development of Emergency
	Action I	Levels, February 2008, ADAMS Accession Number ML080450149
	Nuclea	r Energy Institute (NEI) 99-01, Methodology for Development of
	Emerge 2005)	ency Action Levels Revision 4, Dated January 2003 (December 12, between the second s
		07-02 Clarification of NRC Guidance for Emergency Notifications Quickly Changing Events, February 2, 2007.
	During	
3.2	Implementing	gradite per av general provinsion of the state of a state of the sta
	3.2.1 EPIP-1-0	, Ginna Station Event Evaluation and Classification
	3.2.2 EAL Com 3.2.3 EAL Mate	n <mark>parison Matrix</mark> , and a second second of the spectrum of the second seco
		a e a ser en
3.3	Commitments	
	None	a deba de la compositiva de la deba de servicio de presenta de la deba de presenta de la compositiva de la comp A la compositiva de la compositiva de la deba de la compositiva de la deba de la compositiva de la compositiva d
		ار می از گرده های گرد. از می میشند به ایند ولیس در اینکه در آن می گردی از میگرد. مهر آز آن در آن گردی از آن گریه کار در در آن اینکه میگرد. کار آن می وهرای آن از آن میگرد میگرد کرد میگرد و میگر
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		uwa na 1965 mili ang ikang tang kanala na bana pananan tang kanala na tang kanala na tang kanala na bana kanala
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4.0 DEFINITIONS (ref. 3.1.1 except as noted)	
Affecting Safe Shutdown	e Natasir (1946)
Event in progress has adversely affected functions that are necessary to bring the plant to and maintain it in the applicable hot or cold shutdown condition. Plant condition applicability is determined by Technical Specification LCOs in effect.	
Example 1: Event causes damage that results in entry into an LCO that requires the plant to be placed in hot shutdown. Hot shutdown is achievable, but cold shutdown is, not. This event is not "affecting safe shutdown."	esta de la serie Recurso aportes
Example 2: Event causes damage that results in entry into an LCO that requires the plant to be placed in cold shutdown. Hot shutdown is achievable, but cold shutdown is achievable, but cold shutdown is achievable. This event is "affecting safe shutdown."	
Airliner/Large Aircraft	
Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).	a fi shigi shini
Bomb	n an
Refers to an explosive device suspected of having sufficient force to damage plant	
Civil Disturbance	
A group of people violently protesting station operations or activities at the site.	an States
Confinement Boundary	
The barrier(s) between areas containing radioactive substances and the environment.	en av die 1800 - Verste an
Containment Closure	Sec. Sugar
The site-specific procedurally defined actions taken to secure containment (primary or secondary for BWR) and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. <u>As applied to Ginna, Containment Closure is the action or condition that ensures Containment and its ensures Containment and its ensurement of the action of the a</u>	•
associated systems, structures of components (SSC), as listed in 0-2.3.1A, provide a	
functional barrier to fission product release.	
Explosion and the second	
A rapid, violent, unconfined combustion, or catastrophic failure of pressurized/energized equipment that imparts energy of sufficient force to potentially damage permanent structures, systems, or components.	e en
	na siyan gu wala. Dan shekar si na sa
An attempt to cause an action at the station by threat of force.	· .

E	EPAD-XX [MERGENCY ACTION LEVEL Revision [Draft H]	
	CHNICAL BASES DOCUMENT Page 22 of 336	
Faulted		
In a steam generator, the existe uncontrolled drop in steam gene depressurized.	ence of secondary side leakage that results in an erator pressure or the steam generator being completely	and a state of the second s The State Second seco State Second s
Fire		
or overheated electrical equipm	eat and light. Sources of smoke such as slipping drive belts ient do not constitute fires. Observation of flame is arge quantities of smoke and heat are observed.	n se de la construcción de la const La construcción de la construcción d
Hostage	$(\delta_{1},\delta_{2},\delta_{3},\delta_{3}) = C_{1} \frac{1}{2} (\delta_{1},\delta_{2}) + \delta_{2} \frac{1}{2} (\delta_{2},\delta_{3}) + \delta_{3} \frac{1}{2} (\delta_{3},\delta_{3}) + \delta_{3} $	$1 = \frac{1}{2} \sum_{i=1}^{n} $
A person(s) held as leverage ag station.	gainst the station to ensure that demands will be met by the	
Hostile Action		211月~1月~1月~1月日前 ^{14年} ~1月
attack by air, land, or water usin used to deliver destructive force Hostile action should not be cor acts that are not part of a conce	erted attack on the NPP <u>Ginna</u> . Non-terrorism-based EALs n activities (i.e., this may include violent acts between	n and Status - Status - Status Anno Status - Status Anno Status - Status Anno Status - Status
Hostile Force		
One or more individuals who are and deception, equipped with su destruction.	e engaged in a determined assault, overtly or by stealth uitable weapons capable of killing, maiming, or causing	
Imminent	ϕ_{i} is the second	
Mitigation actions have been ine successful, and trended informa imminent timeframes are specif	effective, additional actions are not expected to be ation indicates that the event or condition will occur. Where fied, they shall apply.	an Antan Antan Ingerika (Ingerika) karpe∛ Antan
Intrusion		
The act of entering without auth indication of intrusion into that a	norization. Discovery of a bomb in a specified area is area by a hostile force.	e seste de
Independent Spent Fuel Stora	age Installation (ISFSI)	
A complex that is designed and	constructed for the interim storage of spent nuclear fuel associated with spent fuel storage.	and a second second Second second
Normal Levels	and the second sec	
	Ls, the highest reading in the past twenty-four hours	······

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	CONTRACTOR EPAD-XX
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	Normal Plant Operations
	Activities at the plant site associated with routine testing, maintenance, or equipment operations, in accordance with normal operating or administrative procedures. Entry into abnormal or emergency operating procedures, or deviation from normal security or radiological controls posture, is a departure from Normal Plant Operations.
ł	Owner Controlled Area
	The site-specific facilities and property outside the the security Protected Area fence.
1	Projectile
1	An object directed toward a Nuclear Power Plant that could cause concern/for its of the second state of th
	Protected Area
	The site specific area which normally encompasses all controlled areas within the security
ł	RCS Intact
	The RCS should be considered intact when the RCS pressure boundary is in its normal
	condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams).
1	Ruptured
	In a steam generator, existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection.
	Sabotage
	Deliberate damage, mis-alignment, or mis-operation of plant equipment with the intent to render the equipment inoperable. Equipment found tampered with or damaged due to malicious mischief may not meet the definition of sabotage until this determination is made by security supervision.
1	Safety-Related Structures, Systems and Components (as defined in 10CFR50.2)
	Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:
	(1) The integrity of the reactor coolant pressure boundary;
	(1) The integrity of the reactor coolant pressure boundary; (2) The capability to shut down the reactor and <i>maintain</i> it in a safe shutdown condition;
	(3) The capability to prevent or mitigate the consequences of accidents which could
	result in potential offsite exposures.
	Security Condition

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

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Significant Transient		tu k	1. C. S. S.	-;	
An unplanned event involving one or more of the following: (1) automatic turbine runback greater than 25% thermal reactor power, (2) electrical load rejection greater than 25% full	toria Atras		1 (1 - 41) 	يق 1 4 ماريد	
electrical load, (3) reactor trip, <u>or (4) safety injection activation, or (5) thermal power</u> oscillations greater than 10%	{	Comment [A1	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
Site Boundary					
The Site Boundary is approximately a 0.3-mile radius around the reactor.					
Strike Action				1	
Work stoppage within the Protected Area by a body of workers to enforce compliance with demands made on (site specific)Ginna. The strike action must threaten to interrupt Normal Plant Operations.	• • • • • • • • • • • • • • • • • • •		1992 - 9 129 - 1993 - 9 1985 - 1995 - 9		
Unisolable	•				
A breach or leak that cannot be promptly isolated from the Main Control Board.					
Unplanned					
A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.					
parameter change or an event that is not the result of an intended evolution and requires corrective or mitigative actions.				·• . •	
Valid	• • •			· .	
An indication, report, or condition, is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.	4.) 4.) 4. (·· · ·	· · ·		
Visible Damage			• •	•	
Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture, cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.					

Vital Area

Typically aAny site specific areas, normally within the <u>Ginna</u> Protected Area, that contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

could directly or indirectly endanger the public health and safety by exposure to radiation.

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GINNA-TO-NEI 99-01 EAL CROSS-REFERENCE 5.0

This cross-reference is provided to facilitate association and location of a Ginna EAL within the NEI 99-01 IC/EAL identification scheme. Further information regarding the development of the Ginna EALs based on the NEI guidance can be found in the EAL 1.12. Comparison Matrix. 1 8 3.5

GINNA	NEI	99-01		•	1 214 - 1 1
EAL	IC	Example EAL			1990 - 1990 -
RU1.1	AU1	1, 2	1		
RU1.2	AU1	3		۲	i in an
RU2.1	AU2	1	ļ ;	· · · · · · · · · · · · · · · · · · ·	e l'herre a re e no e l'
RU2.2	AU2	2	1	- 	
RA1.1	AA1	1	. .	•	
RA1.2	AA1	3			
RA2.1	AA2	2]		
RA2.2	AA2	1] *		
RA3.1	AA3	1,		•	t i i i
RS1.1	AS1	1			
RS1.2	AS1	2	+ 	.'	n an
RS1.3	AS1	4		• ••	· · · · · · · · · · · · · · · · · · ·
RG1.1	AG1	1]		
RG1.2	AG1	2]	an an Ang t	
RG1.3	AG1	·4 · · · ·]		
EU1.1	E-HU1	1		· ;• ;	
CU1.1	CU3	1] .	j. L	
					· · · ·

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GINNA	NEI	99-01	an a
EAL	IC	Example EAL	ا المحمد العلي في التي التي المحمد العمام التي التي المحمد العلم المحمد العلم المحمد العلم المحمد الع المحمد المحمد
CU2.1	CU7		
CU3.1	CU1	1	an a
CU3.2	CU2	1	
CU3.3	CU2	2	
CU4.1	CU4	1 .	
CU4.2	CU4	2 .'	
CU5.1	CU6	1, 2	
CU6.1	CU8	2	
CA1.1	CA3	1	
CA3.1	CA1	1, 2	
CA4.1	CA4	1, 2	
CS3.1	CS1	1.	
CS3.2	CS1	2	
CS3.3	CS1	3	
CG3.1	CG1	1	
FU1.1	FU1	1	
FA1.1	FA1	.1	
FS1.1	FS1	1	
FG1.1	FG1	1	
HU1.1	HU1	1.	
HU1.2	HU1	2	
HU1.3	HU1	3	
HU1.4	HU1	4] · ·

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GINNA	NEI 99-01		-		
EAL	IC	Example EAL		· · · · · · · · · · · · · · · · · · ·	
HU1.5	HU1	5		۰ ۲ ۱۰	1. CDR1
HU2.1	HU2	1		ti ti t	•
HU2.2	HU2	2	- · ·	1	
HU3.1	HU3	1] .		Y AR
HU3.2	HU3	2 ;	1		
HU4.1	HU4	1, 2, 3			د. تىمىت
HU6.1	HU5	1	•		: • <u>•</u> .8
HA1.1	HA1	1		112	
HA1.2	HA1	2		n de la de la de Referencia November	
HA1.3	HA1	3		1	200 - 200 2014 - 2014
HA1.4	HA1	4 ;		5 F 1	
HA1.5	HA1	:6	- ·	. .	n an shinin shi A shinin shinin shi
HA1.6	HA1	5	1		
HA2.1	HA2	1	1		ان المعالم المراجع المانية. المراجع المراجع الم
HA3.1	HA3	1	1.	en e	· · · · ·
HA4.1	HA4	1,2,	1.	n an ge	i i c
HA5.1	HA5	1	-].	n mar i sur Li se de Coloris	*
HA6.1	HA6	1		<	n an
HS4.1	HS4	1	-		
HS5.1	HS2	1	1		
HS6.1	HS3	1	1		
HG4.1	HG1	1	1		
HG4.2	HG1	2	1		

2.165.8 EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 28 of 336

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GINNA NEI 99		99-01			
EAL	IC	Example EAL			
HG6.1	HG2	1 7			
SU1.1	SU1	1		1	
SU3.1	SU8	2			
SU4.1	SU2	<u>1</u>	±		
SU5.1	SU3	:1	ξα. ²		
SU6.1	SU6	1,2			
SU7.1	SU4	2	, 4 , 1 , 4 , 1	· .	
SU7.2	SU4	1		•	
SU8.1	SU5	1, 2		΄, ,	
SA1.1	SA5	1		·· · ·	
SA3.1	SA2	1			
SA5.1	SA4	1			
SS1.1	SS1	1		•	
SS2.1	SS3	1			
SS3.1	SS2	1 '	•	- , ,	
SS5.1	SS6	1	<u>}.</u>	3 . 1	
SG1.1	SG1	1	, . .		
SG3.1	SG2	·1	1 A.	•	
	I	- I	· · · · · · · · · · · · · · · · · · ·		

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EPAD-XX EMERGENCY ACTION LEVEL (ACTION LEVEL) (Control Revision [Draft H]) TECHNICAL BASES DOCUMENTAL ACTION (Control Revision (Draft H))

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6.0. ATTACHMENTS

- 6.1 Attachment 1, Emergency Action Level Technical Bases
- 6.2 Attachment 2, Fission Product Barrier Loss / Potential Loss Matrix and Basis

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ATTACHMENT 1

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EMERGENCY ACTION LEVEL TECHNICAL BASES

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Category R – Abnormal Rad Release / Rad Effluent	n transmission a presigni
EAL Group: ANY (EALs in this category are applicable to a set if the star	Landelline (Constant Source) and
any plant condition, hot or cold.)	, an an 1916 - in the south and an an the state
Many EALs are based on actual or potential degradation of fission product barriers	1 i.i.
because of the elevated potential for offsite radioactivity release. Degradation of fission	N
product barriers though is not always apparent via non-radiological symptoms. Therefo	ore,
direct indication of elevated radiological effluents or area radiation levels are appropriat	ate of the two local states with the
symptoms for emergency classification.	n an
At lower levels, abnormal radioactivity releases may be indicative of a failure of	na an an ann ann an
containment systems or precursors to more significant releases. At higher release rate	es, 12
offsite radiological conditions may result which require offsite protective actions. Elevat	ated
area radiation levels in plant may also be indicative of the failure of containment system	ms
or preclude access to plant vital equipment necessary to ensure plant safety.	
Events of this category pertain to the following subcategories:	
1. Offsite Rad Conditions	
Direct indication of effluent radiation monitoring systems provides a rapid assessme	nent
mechanism to determine releases in excess of classifiable limits. Projected offsite	
doses, actual offsite field measurements or measured release rates via sampling	
indicate doses or dose rates above classifiable limits.	n dan series de la companya de la co
2. Onsite Rad Conditions & Spent Fuel Events	na anti-anti-anti-anti-anti-anti-anti-anti-
Custoined concerning and which have been af the second of the second s	n an
Sustained general area radiation levels in excess of those indicating loss of control	
radioactive materials or those levels which may preclude access to vital plant areas	IS · · · ·
also warrant emergency classification.	
3. CR/CAS Rad	

Sustained general area radiation levels which may preclude access to areas requiring continuous occupancy also warrant emergency classification.

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				EPAD	-XX
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				Page 32 of	-
	1201/10/12				
Category:	R – Abnormal Rad	Release / R	ad Effluent		an an tha ann an tha
Subcategory:	1 – Offsite Rad Co	nditions		and a special part	en letter state die
Initiating Condition:	ANY release of ga	seous or liqu	id radioactivity	to the environme	nt 😥 .
0	greater than 2 time				• •
EAL:		performance de la	et inder der eine	ing a start of	enan en la companya de la companya de
		<u> </u>	<u> </u>	<u></u>	
RU1.1 Unusual	Event				
				- 6. Call 246 (* 1976) - COlombia (* 1976)	
ANY gaseous or liquid	monitor reading > 1	able R-1 col		60 min. (Note 2)	
	wait until the applicable to	me has elanced	but should declare	the event as soon on it	
	t wait until the applicable till e release duration has exce				
	ary, assume that the relea				
	and the release start time			and the factor of the second	 Transfer States (1997)
T	able R-1 Effluent Mor	nitor Classifica	ation Thresholds)	
Monitor	GE	SAE	Alert	UE	
Gaseous	I				n an airte an 1841 an an an an
CNMT Vent Noble Gas	N/A	N/A	, NA	7.4E+6 cpm w/ 1 fan 5.1E+6 cpm w/ 2 fans	and the second
CNMT Vent Noble Gas Hi Rang	e 1.8E+2 μC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	ŅA	and the state of the second
(R-12A - 7/9) Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm	
(R-14)			· .		
Plant Vent Noble Gas Hi Range (R-14A - 7/9)	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/∞	N/A	
Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm	r 1
(R-15) Air Ejector Noble Gas Hi Range	,				
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A	an an an an Artan an
Main Steam Line (R-31/R-32)	· · ·		· · ·•	to do a to a to	and the second
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr	
1 Safety	2.3E+3 mR/hr 1.1E+3 mR/hr	2.3E+2 mR/hr 1.1E+2 mR/hr	2.3E+1 mR/hr 1.1E+1 mR/hr	3.7E+0 mR/hr N/A	 A state of the sta
2 Safety 3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A	Martina and a second
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A	
Liquid					
Liquid Radwaste Effluent (R-18)	N/A	N/A	N/A	3.6E+5 cpm with no isolation	
SFP HX Effluent	•	1 A. 1			n ann a shear a sheathair a sa an s
(R-20A)	N/A	N/A	NA	4.0E+4 cpm	
(R-20B) Turbine Bidg Fir Drains	N/A · ·	N/A:	••• N/A •••	5.2E+3 cpm	a development de la construction de
(R-21)	N/A	N/A	N/A	5.0E+4 cpm	the second s
Hi Cond Waste		L	1	with no isolation	H
(R-22)	N/A	N/A	N/A	9.2E+4 cpm	

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9.2E+4 cpm with no isolation

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Mode Applicability:

All

Basis:

<u>Generic</u>

[Refer to Appendix A for a detailed basis of the radiological effluent IC/EALs.]

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

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

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. [These controls are located in the Off-site Dose Calculation Manual (ODCM), and for plants that have not implemented Generic Letter 89-01, in the Radiological Effluent Technical Specifications (RETS).] The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

-----[Some sites may find it advantageous to address gaseous and liquid releases with separate EALs.]

The 2x RETS-ODCM limit multiples are specified-in AU1 and AA1 only to distinguish between nonemergency 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 ODCM for 30 minutes does not meet the threshold.]

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

---<u>EAL #1</u>

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the IC established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

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

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[The ODCM establishes a methodology The ODCM specifies default source terms a determined annual average meteorology in compliance with the regulatory commitment methodology.]	nd, for gaseous releases, prescribes th the most limiting downwind sector for s	o uso of pro- howing
— <u>EAL #2</u>		
This EAL addresses radioactivity releas monitor readings to exceed the threshold id discharge permit. This value may be associ release path.	entified in the IC established by the rad	ioactivity
[In either case, the value is established compliance with the RETS. Indexing the EA the EAL will never be less than the setpoint	L to the ODCM setpoints in this manne established by a specific discharge per	r insuros that an anna an an anna an anna an anna an an
— <u>EAL #3</u>	an a	(a) Stable Comparison (Comparison) (Compa
This EAL addresses uncontrolled release on unmonitored pathways, e.g., spills of rad leakage in river water systems, etc.		
<u> </u>		
	e site specific value for EAL #5,is based	d on a release
{As provided in the ODCM / RETS, pron	ated over 8766 hours, multiplied by two	-and-roundod.
(500 : 8766 × 2 = 0.114).]	to me, but you want to a series	na 1995 - Angel Stand, and an
EAL #1 and #2 directly correlate with the be used in showing compliance with the OE EALs #4 and #5 are a function of actual me annual average value. Thus, there will likely	CM and is used in calculating the alarn teorology, which will likely be different fi	<mark>lis required to</mark> Tsotpoints, and a solution of the trade of a solution of the
 The underlying basis of this EAL involve implied by the uncontrolled release. Exceed release. 		of the plant
Plant-Specific	na stransformation († 1997) 1997 - Brande Stander, 1997) 1997 - Andre Stander, Stander, Stander Stander, 1997 1997 - Brande Stander, 1997 - Stander Stander, 1997	
Monitor indications are derived from rele	ease limits determined by the ODCM	methodology

and specified offsite dose criteria (ref. 1). These values are summarized in Reference 2.

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A radiation monitor reading is	valid when a release path is established. If the release path
	solated, the radiation monitor reading is not valid for
classification.	an a
Ginna Basis Reference(s):	
	Plant Off-Site Dose Calculation Manual (ODCM) 01 Technical Basis for the Ginna Effluent Monitor EALs)
3. NEI 99-01 AU1	
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	a da servición de la composition de la La composition de la
	ий. Солония и служает солония и простоят на селота в селотории и служает на солонии и солонии. Селотории и служает солонии селотории и служает со солонии и солонии и служает в солонии и служает в селотории
	kkey or johne och transformen and transformen och som och som entre kar var transformen af som och som och som etter erken och etter förste och entre som och etter och etter etter etter etter och etter och etter och etter var och etter och etter och etter och etter och etter etter och etter och etter och etter och etter och etter
	a karanta (j. 1997). Sa a karanta da karanta da karanta da karanta karanta (karanta) Karanta (j. 1997). Sa a karanta da karanta da karanta da karanta karanta karanta (j. 1977). Karanta da karanta

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		EMER		ACTION LE	EVEL	' · · · · F	Revision [I	Draft H]				
		TECHN	ICAL BAS	ES DOCU	MENT		Page 36	6 of 336	5.			
Categ	ory:	R – Abnorma	al Rad Rel	ease / Rad	d Effluent	•		· •	19.25	;	•	· ·
Subca	tegory:	1 – Offsite R	ad Conditi	ions	\$ • i · · ·	÷ 11	1960 - 1 999	с. 1. ты тыс. -	, 1 , 12, 1			1.510
Initiati	ng Condition:								t <u>1</u>			
EAL:		3					•	. *				
RU1.2	Unusual	Event		1. TA					• .	$f_{i} = e_{i} f_{i} = 1$	• • •	2
	ned sample ana e rates > 2 x P-9				s indicate	concer	ntrations c	r	. ~ •	••••	· · ·	
Note 2:	The ED should no determined that the of data to the contu- release is detected	e release duration ary, assume that t	has exceeded he release du	d, or will likely ration has exc	exceed, the a	applicable	time. In the a	absence	•			

Mode Applicability:

All

Basis:

Generic

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

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

Nuclear power plants incorporate features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, or control and monitor intentional releases. *[These controls are located in the Off site Dose Calculation Manual (ODCM), and for plants that have not implemented Generic Letter-89-01, in the Radiological Effluent Technical Specifications (RETS).]* The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.

The <u>RETS-2x P-9 (ODCM) limit</u> multiples are specified in <u>AU1 and AA1</u> only to distinguish between non-emergency conditions, and from each other. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

	· · ·		EPAD-XX	
ז		N LEVEL Revisio OCUMENT Page		
{Releases should not be prorate for 30 minutes does not meet the		ple, a release exceeding 4x P-	<u>9 (</u> ODCM <u>)</u>	
This EAL includes any release for release that exceeds the conditi setpoints, etc.) on the applicable	ons (e.g., minimum dilutio			and the second second
—— <u>EAL #1</u>	North B.	R CORES AND		
This EAL addresses radioac monitor readings to exceed the t		natever reason, cause effluent⊣ HG: gasta contractor (Contractor)	radiation	an Nasara Sinta ta ta set 1997 - Sawatan Sinta ta ta seta
This EAL is intended for site pathways for which a discharge	s that have established e permit would not normal	ffluent monitoring on non-routir y be prepared	ne release d'haart van Martheride van en ag e	n <mark>ed a clina a 38</mark> 1651 National antes derigent
[The ODCM establishes a m The ODCM specifies default set determined annual average met compliance with the regulatory of methodology.]	nethodology for determin urce torms and, for gasec eorology in the most limit commitments. This EAL s	ing offluont radiation monitor sc ous roleases, proscribos the use ling downwind sector for showi hould bo determined using this	o of pro- 9 of pro- 1 g	anergala (n. 1944), eta eta esta da La helikoaren eta eta da hotekoa Anara (n. 2014), herendoarea (h. 1947)
<u>EAL #2</u>		ا مېرې د مېرې ور مېرې د مېرې د مېرې د مېرې . د وال مېرې د افراد مېرې د مېرې د مېرې ور		
This EAL addresses radioac monitor readings to exceed the discharge permit. This value ma release path.	tivity releases, that for whether the second s	natever reason, cause effluent i IC established by the radioacti	radiation ivity inuous	n ganatu shi kata. Mata shirif na Mga
— [In oither case, the value is c compliance with the RETS. Inde the EAL will never be less than t	xing the EAL to the ODC	M setpoints in this manner insu	ntstend® periods Lin – statistication uros that	a de Status a de Status Se de Status de Status Se de Status de Status Se de Status de Status
<u>— EAL #3</u>				
This EAL addresses uncontrolle unmonitored pathways, e.g., spi in river water systems, etc.				

- EALs #4 and #5

-----The 0.10 mR/hr value in EAL #4, and the site specific value for EAL #5, is based on a release rate not exceeding 500 mrem per year.

-----[As provided in the ODCM / RETS, prorated over 8766 hours, multiplied by two, and rounded. (500 : 8766 \times 2 = 0.114).]

EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints. EALs #4 and #5 are a function of actual meteorology, which will likely be different from the limiting annual average value. Thus, there will likely be a numerical inconsistency.

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-The underlying basis of this EAL involves the degradation in the level of safety of the plant implied by the uncontrolled release. Exceeding EAL #4 or #5 is an indication of an uncontrolled release. ان الافراد المحافظ باليوني العمر وعلى منه المحافظ معني توازي العامية المعاور والعربي المحافظ اليون. والمريز المحافي المحافظ بالعلم المعلمات اليون المحافظ بالمحافظ المحافظ المحافظ ويدعه مريز محاصل ما العال العال والمحافظ المريضة المحافظ بالمحافظ Plant-Specific

Offsite Dose Calculation Manual (ODCM) release limits are specified in Technical Procedure P-9 (ref. 1).

. . . .

Releases in excess of two times the site ODCM (ref. 2) instantaneous limits that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes. Therefore, it is not intended that the release be averaged over 60 minutes. For example, a release of 4 times the ODCM limit for 30 minutes does not exceed this initiating condition. Further, the ED 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.

Ginna Basis Reference(s):

1. P-9 Radiation Monitoring System

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- 2. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 3. NEI 99-01 AU1

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		EPAD-XX			
		EMERGENCY ACTION LEVEL Revision [Draft H]			
		TECHNICAL BASES DOCUMENT			
Category:		R – Abnormal Rad Release / Rad Effluent	et agenzation in the specifi		
Subcategory	<i>r</i> :	1 – Offsite Rad Conditions	,		
Initiating Co	ndition:	ANY release of gaseous or liquid radioactivity to the environment			
		greater than 200 times the ODCM for 15 minutes or longer			
EAL:					
RA1 1	Alert				

į		AIGIT	111	· · · · · · · · · · · · · · · · · · ·		6 10 Y 10 Y 10					
	ANY gased	ous monitor read	ling > Table	R-1 columi	n "Alert" for ≥	15 min. (Not	te 2)	ы т .,	, sa l	• • • •	•
ľ											

The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown. . 13 Note 2: release is detected and the release start time is unknown.

Table R	1 Effluent Mo	nitor Classifica	ation Thresholds	6	1 State of the second s
Monitor	GE	SAE	Alert	UE	
Gaseous					
CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan	
(R-12)		5 A 4 53	11 A.	5.1E+6 cpm w/ 2 fans	,
CNMT Vent Noble Gas Hi Range	1.8E+2 µC/cc :	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A N/A	The set of the concern of the set of
(R-12A - 7/9)					المتحولية الأجراب المراجع والمراجع
Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm	
(R-14)			1		
Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A	
(R-14A - 7/9)			-		
Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm	
(R-15)					
Air Ejector Noble Gas Hi Range					, , , , , , , , , , , , , , , , , , , ,
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A -	
Main Steam Line		· .			
(R-31/R-32)			1.2.1		
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr	A CARLES AND A CARLES AND A
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3,7ETU mitonr	
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A	Standard (1976) (1920) Standard (1986)
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A	· ·
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A	
Liquid					
Liquid Radwaste Effluent	• N/A	N/A	N/A	3.6E+5 cpm	
(R-18)	1			with no isolation	
SFP HX Effluent					1
(R-20A)	N/A	N/A	N/A	4.0E+4 cpm	
(R-20B)	N/A	N/A	. N/A	5.2E+3 cpm	
Turbine Bldg Fir Drains					
(R-21)	N/A	N/A	N/A	5.0E+4 cpm	
Hi Cond Waste	1		· ·	with no isolation	
(R-22)	N/A	N/A	N/A	9.2E+4 cpm	
				with no isolation	

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	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 40 of 336	
	Mode Applicability:	attanti andar
	All superstations and	a second a s
	Basis:	and the state of the
	Generic Contract of the second s	
	[Refer to Appendix A for a detailed basis of the radiological offluent IC/EALs.]	
1	The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.	na na sa
ł	This IC-EAL addresses an actual or substantial potential decrease in the level of safety of the plant as indicated by a radiological release that exceeds regulatory commitments for an extended period of time.	an an an Arrange ann an Arrange ann Arrange ann an Arrange
	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. <i>[Those controls are located in the Off site Dese Calculation Manual (ODCM), and for plants that have not implemented Generic Letter 89-01, in the Radiological Effluent Technical Specifications (RETS).]</i> The occurrence of extended, uncontrolled radioactive releases to the environment is indicative of a degradation in these features and/or controls.	
	[Some-sites may find it advantageous to address gaseous and liquid releases with separate EALs.]	
	—The RETS multiples are value of 1% (10 mrem) of the EPA PAG threshold (in lieu of 200 times the ODCM release rate limit) is specified in AU1 and AA1 only to distinguish between non-emergency conditions provide a realistic escalation path between the Unusual Event and Site Area Emergency classifications for gaseous releases, and from each other. While these multiplesthese thresholds obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.	
	[To onsure a realistic near linear oscalation path, a value should be selected roughly half way between the AU1-value and the value calculated for AS1 value. The value will be based on radiation monitor readings to exceed 200 times the Technical Specification limit and releases are not terminated within 15 minutes. The ODCM establishes a methodology for determining offluent radiation monitor setpoints. The ODCM establishes a methodology for determining offluent radiation monitor setpoints. 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. This EAL can be determined using this methodology if appropriate.]	
	[Releases should not be prorated or averaged. For example, a release exceeding 600x ODCM for 5 minutes does not meet the threshold.] This EAL includes any release for which a radioactivity discharge permit was not prepared, or a	

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

	EMERGENCY ACTION LEVEL Revision [Draft]; TECHNICAL BASES DOCUMENT Revision Page 41 of 336	
<u>EAL #1</u>	$p_{1}(t) = -1$. We have the set of the se	
This EAL is intended for site bathways for which a discha	es that have established effluent monitoring on non-routine release rge permit would not normally be prepared.	and
Plant-Specific		
he values shown corresp	bond to a dose of 10 mrem in one hour at the site boundary.	
Ionitor indications are ca	Iculated (ref. 2) based on annual average X/Q dispersion factors	
rom the ODCM (ref. 2 <u>1</u>) a	and a source term representative of accident conditions; For the	
		· · · · · · · · · · · · · · · · · · ·
	Safety Valves precludes the use of any single default value for cases, adjustments are made for expected flow rates.	A Charles to the
radiation monitor readin	g is valid when a release path is established. If the release path	an ta an tagair a shin
	en isolated, the radiation monitor reading is not valid for	
lassification.		4 ·
Ginna Basis Reference(s . R. E. Ginna Nuclear P	ower Plant Off-Site Dose Calculation Manual (ODCM)	na tak
Ginna Basis Reference(s . R. E. Ginna Nuclear P . CALC-2011-0020, NEI Emergency Action Lev	ower Plant Off-Site Dose Calculation Manual (ODCM) 99-01 Technical Basis for the Ginna Effluent Monitor	gen dit gengen en en
Ginna Basis Reference(s I. R. E. Ginna Nuclear P 2. CALC-2011-0020, NEI	ower Plant Off-Site Dose Calculation Manual (ODCM) 99-01 Technical Basis for the Ginna Effluent Monitor rels (EALs)	ant di agradi a tit Receiver di accessione
Ginna Basis Reference(s . R. E. Ginna Nuclear P 2. CALC-2011-0020, NEI Emergency Action Lev	ower Plant Off-Site Dose Calculation Manual (ODCM) 99-01 Technical Basis for the Ginna Effluent Monitor rels (EALs) As the second second Second second second Second second second Second second secon	entes estas en entes Reconstantes en estas en entes Antes en estas en estas en estas Antes estas en estas en estas Antes estas en estas en estas
Ginna Basis Reference(s . R. E. Ginna Nuclear P 2. CALC-2011-0020, NEI Emergency Action Lev	Sover Plant Off-Site Dose Calculation Manual (ODCM) 99-01 Technical Basis for the Ginna Effluent Monitor rels (EALs) The Second State Provide the Ginna Effluent Monitor Second State Provide the Ginna Effluent Second State Provide the Ginna Second State Provide	unt di gradi a sta Romania di anti- contante di anti-
Ginna Basis Reference(s . R. E. Ginna Nuclear P . CALC-2011-0020, NEI Emergency Action Lev	 Sover Plant Off-Site Dose Calculation Manual (ODCM) 199-01 Technical Basis for the Ginna Effluent Monitor relation to the book data of the Ginna Effluent Monitor relation to the book data of the Ginna Effluent Monitor of the book data of the Ginna Effluent Monitor of the book data of the Ginna Effluent Monitor of the book data of the b	ant di gradi a si ti Romani e compositi a si ti Sociale e compositi di compositi contra si compositi di compositi compositi di compositi di compositi

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	EPAD-XX	
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Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:		Andrew Sterner (1987) and
nitiating Condition:	ANY release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer	
EAL:	greater than 200 times the Obow for To minutes or longer	
		n entre de la companya de la company
RA1.2 Alert	lyses for gaseous or liquid releases indicate concentrations or	
release rates > 200 x	P-9 limits for ≥ 15 min. (Note 2)	and a second state of the
	t wait until the applicable time has elapsed, but should declare the event as soon as it is	u La ser engliste a Vel
of data to the cont	e release duration has exceeded, or will likely exceed, the applicable time. In the absence rary, assume that the release duration has exceeded the applicable time if an ongoing duration because there is unknown.	and the second secon
	d and the release start time is unknown.	-
Mode Applicability: All	an far en 1997 e la casada el la seconda de la casada e la casada e la casada e la casada en la casada en la c Desender Marceler Marceler e de la casada en la	
Basis:	and the second	
Generic		
The Emergency Directo	should not wait until the applicable time has elapsed, but should declare	
This IC-EAL addresses as indicated by a radiolo of time. Nuclear power plants in the environment. Furthe releases, or control and <i>Doso Calculation Manua</i> <i>in the Radiological Efflu</i>	s determined that the condition will likely exceed the applicable time. an actual or substantial potential decrease in the level of safety of the plant gical release that exceeds regulatory commitments for an extended period corporate features intended to control the release of radioactive effluents to r, there are administrative controls established to prevent unintentional monitor intentional releases. [<i>These controls are located in the Off site</i> of (ODCM), and for plants that have not implemented Generic Lotter 89-01, part Technical Specifications (RETS).] ⁻ The occurrence of extended, releases to the environment is indicative of a degradation in these features	
{Some sites may find EALs.}	I it advantageous to address gaseous and liquid releases with separate	
E/(E0:]		

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ITo ensure a realistic near linear escalation path, a value should be selected roughly half way between the AU1 value and the value calculated for AS1 value. The value will be based on radiation monitor readings to exceed 200 times the Technical Specification limit and releases are not terminated within 15 minutes. The ODCM establishes a methodology for determining effluent radiation monitor setpoints. The ODCM specifies default-source terms and, for gaseous releases, proscribes the use of pro-determined annual average meteorology in the most limiting downwind sector for showing compliance with the regulatory commitments. This EAL can be determined 1. Mary M. St. John St. using this methodology if appropriate.] Releases should not be prorated or averaged. For example, a release exceeding 600x ODCM for the event of the average of the state of th 5 minutes does not meet the threshold.] and the second second second provide the second This EAL includes any release for which a radioactivity discharge permit was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable permit. A trade of the second state of the second s en esta a substance de la Recessión de Margh Martin de Marco de La comp EAL #1 This EAL is intended for sites that have established effluent monitoring on non-routine release

pathways for which a discharge permit would not normally be prepared. The second state of the second state

EAL #2

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the IC established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

المحاجة الشروبي في المراجع والمحاوم الشريقي والمحاج المرويين الم In either case, the value is established by the ODCM to warn of a release that is not in compliance with the RETS. Indexing the EAL to the ODCM setpoints in this manner insures that the EAL will never be less than the setpoint established by a specific discharge permit.] MARGARE PRAV

EAL #3

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

EALs #4 and #5

The 10.0 mR/hr value in EAL #4, and the site specific value for EAL #5, is based on a release rate not exceeding 500 mrem per year.

[As provided in the ODCM / RETS, prorated over 8766 hours, multiplied by 200, and rounded. (500 : 8766 × 200 - 11.4)].

EAL #1 and #2 directly correlate with the IC since annual average meteorology is required to be used in showing compliance with the ODCM and is used in calculating the alarm setpoints. EALs #4 and #5 are a function of actual meteorology, which will likely be different from the limiting annual average value. Thus, there will likely be a numerical inconsistency.

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The underlying basis of this EAL involves the degradation in the level of safety of the plant implied by the uncontrolled release. Exceeding EAL #4 or #5 is an indication of an uncontrolled release.

Plant-Specific

Offsite Dose Calculation Manual (ODCM) release limits are specified in Technical Procedure P-9 (ref. 1).

Releases in excess of two hundred times the site ODCM (ref. 2) instantaneous limits that continue for 15 minutes or longer represent an uncontrolled situation and hence, a 3 potential significant degradation in the level of safety. The final integrated dose (which is Start 1 very low in the Alert emergency class) is not the primary concern here; it is the degradation . . in plant control implied by the fact that the release was not isolated within 15 minutes. Therefore, it is not intended that the release be averaged over 15 minutes. For example, a release of 400 times the ODCM limit for 7.5 minutes does not exceed this initiating condition. Further, the ED 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.

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)

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3. NEI 99-01 AA1

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C -1	togory.	R – Abnormal Rad	Delegas / D	ed Effluent		
Ua	tegory:	R - Abnormal Rad	Release / Ra	ao Emuent		
Su	bcategory:	1 – Offsite Rad Co	nditions			
Init	tiating Condition:	Offsite dose resulti gaseous radioactiv thyroid CDE for the using actual meteo	ity exceeds facture actual or pro	100 mRem TEI	DE or 500 mRem	
EA	Ł:					· · · · · · · · · · · · · · · · · · ·
				in an atanan kalendari ku	an dhu com fut com attac 	en Millouer, een wegnigten ook oor oor die ge Ter plaat te Milloegenaamse oor ook oor
RS	1.1 Site Area Er	nergency	n i station a sub- Alta a film			(2) An and the Construction of the Construc
						(2.5) (1.5) (1.5) (2.5) (2.5) (2.5) (2.5) (2.5) (2.5) (2.5) (2.5)
AN	Y gaseous monitor	reading > Table R-1	column "SA	E" for ≥ 15 min	. (Note 1)	
	Do not delay de	claration awaiting de	neo seeseem	nent results		
	-	•			:	
		ent results are avail				
	assessment inst	tead of radiation mot	nitor values (see EAL RS1.	2)	
Note	1 The ED should not	wait until the applicable tir	ne has elansed	but should declare t	he event as soon as it is	
1100		condition will likely exceed			ne event as soon as it is	
		able D.4. Efficient Man		Al		:
		able R-1 Effluent Mon	The second s			
	Monitor	GE	SAE	Alert	UE	:
	Gaseous CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan	· ·
	(R-12) CNMT Vent Noble Gas Hi Rang	e 1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	5.1E+6 cpm w/ 2 fans N/A	
	(R-12A - 7/9)	· · · · · · · · · · · · · · · · · · ·	1.02.1 00.00	1.02.10 µ0.00	100	
	Plant Vent Noble Gas (R-14)	N/A	N/A	N/A	6.0E+5 cpm	· ·
	Plant Vent Noble Gas Hi Range (R-14A - 7/9)	2.1E+1 µC/∞	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A	
	Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm	· · · · · · · · · · · · · · · · · · ·
	(R-15)	the store	Car in the	1 1 1 1 Con 1		mittan set che sur stati
	Air Ejector Noble Gas Hi Range	•				1
	(R-48) Main Steam Line	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A	•
	(R-31/R-32)					
	1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr	
	1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr	
	2 Safety	1 1E+3 mR/hr	1 1E+2 mB/hr	1 1E+1 mB/hr	N/A	the second se

7.7E+0 mR/hr

5.7E+0 mR/hr

N/A

N/A

N/A

N/A

N/A

N/A

N/A

3.6E+5 cpm with no isolation

4.0E+4 cpm

5.2E+3 cpm

5.0E+4 cpm with no isolation

9.2E+4 cpm

with no isolation

3 Safety

4 Safety

SFP HX Effluent (R-20A)

(R-21) Hi Cond Waste (R-22)

Liquid Radwaste Effluent (R-18)

(R-20B) Turbine Bidg Flr Drains

Liquid

7.7E+2 mR/hr

5.7E+2 mR/hr

N/A

N/A

N/A

N/A

N/A

7.7E+1 mR/hr

5.7E+1 mR/hr

N/A

N/A

N/A

N/A

N/A

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Mode Applicability:		$(e^{i\theta}) = e^{i\theta}$	1	a de la composición d	· · ·		
All			1.1 1		•		1999 A. A.
Basis:		• • • • •			4 . .		
Generic	and the second	n an an Colorada. A shekarar					
				tatt see			
This IC-EAL addresses radioac that exceed 10% of the EPA Pr associated with the failure of pla	otective Action Guides (F	PAGs). Releases o	of this magnitud		Alta est	• •	
[Whilo thoso failuros aro add addrossos events which may no important to noto that for the mo be large uncertainties associate	ot be able to be classified ore severe accidents the	d on the basis of pl release may be u	lant status alor nmonitored or	no. It is .	an a		<u></u>
	quivalent (CEDE), or as t e IC/EALs, the dose quar od in lieu of "sum of ED id dose conversion factor lity IC/EALs need to be c	he thyroid commit ntity total offoctive DE and CEDE" T rs. However, some	ted dose equiv dose equivale The EPA PAG states have a	alont nt (TEDE), guidanco locidod to			
{The TEDE dose is set at 1 established in consideration of I						•	- t
—— <u>EAL #1</u>	р • — — — —			.			
The site specific monitor list in a release pathways.	EAL #1 shouldTable R-1	include <u>s</u> effluent n	nonitors on all	potential			
[The monitor roading EALs calculatos from the dose values real time, it is suggested that a based on a site specific bounds in one hour, whichever is more analyses indicate a longer or sh activity is released, the longer o	s specified in the IC. Sine release duration of one f ary (or beyond) dose of 1 limiting (as was done for horter duration for the pe	te doses are gener hour be assumed, 00 mrem whole bo FEALs #2 and #4). riod in which the si	rally not monite and that the E ody or 500 mre -If individual si	orod in ALs bo om thyroid ito		·· · ·	
[The moteorology used should roading EALs. The same source as long as it maintains a realistic classifications. If propor oscalat calculated values are unrealistic assessment values does not ex calculations.1	e torm (noblo gasos, pan ic and noar linoar oscalat tions do not rosult from th cally high, or if corrolation	ticulatos, and halo tion botwoon tho E to uso of tho same n botwoon tho valu	gens) may als EALs for the fou source torm, ues and dose	o bo usod u r if tho .1	•		

÷., EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT, Page 47 of 336

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

Plant-Specific

The values shown correspond to a dose of 100 mrem in one hour at the site boundary. Monitor indications are calculated (ref. 2) based on annual average X/Q dispersion factors from the ODCM (ref. 21) and a source term representative of accident conditions. For the main steam line monitors (R-31/32), the variability of results based upon the number of ARVs and/or Main Steam Safety Valves precludes the use of any single default value for these monitors. For these cases, adjustments are made for expected flow rates.

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.

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 $\sum_{i=1}^{n} (1 - i) \sum_{i=1}^{n} (1 - i) \sum_{i$ 1. Ginna Basis Reference(s): · . . · · · · 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM) 2.4 . 16 · · · · 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor Emergency Action Levels (EALs) . . .i •2 3. NEI 99-01 AS1

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	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H	•
	TECHNICAL BASES DOCUMENT	-
Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:	1 – Offsite Rad Conditions	. :
Initiating Condition:	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology	
EAL:		
RS1.2 Site Area	a Emergency]
	g actual meteorology indicates doses > 100 mRem TEDE or E at or beyond the site boundary	
Mode Applicability:	an a	
All	(March 1986) (2004) and 2004 and 2005 and 2007 and 200	Maria de la calencia de la trategió de
Basis:	나는 가지, 한 것이 가지, 말한 것이 가지, 것이 가지, 것이 있는 것이 가지, 것이 가지, 것이 있다. 	
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	States for a second official of the radiological officers (CEALs.) for a detailed basis of the radiological officent IC/EALs.)	an start an an gran a shift a lart a start a start an an an An shift an
	adioactivity releases that result in doses at or beyond the site boundary	
	PA Protective Action Guides (PAGs). Releases of this magnitude are e of plant systems needed for the protection of the public.	and the State and the state
		the second states and the second states are second states and the second states are se
addrosses events which	may not be able to be classified on the basis of plant status alone. It is	
	the more severe accidents the release may be unmonitered or there may sociated with the source term and/or meteorology.]	
-		An
the committed offective c (CDE). For the purpose c as defined in 10 CFR 20, provides for the use adul	oxprossed in terms of the sum of the offective dose equivalent (EDE) and lose equivalent (CEDE), or as the thyroid committed dose equivalent of these IC/EALs, the dose quantity total effective dose equivalent (TEDE), -is used in lieu of "sum of EDE and CEDE," The EPA PAG guidance t thyroid dose conversion factors. However, some states have decided to DE. Utility IC/EALs need to be consistent with these of the states involved y planning zone.]	
	et at 10% of the EPA PAG, while the 500 mrom thyroid CDE was ion of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.]	
— <u>EAL #1</u>		
— The site specific mon pathways.	itor list in EAL #1-should include effluent monitors on all potential release	

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based on a site specific boundary (or beyond) dose of 100 memory whole body or 500 mem thyroid in one hour, whichever is more limiting (as was done for EALs #2 and #4). If individual site	999 an an an Anna an An An an Anna an A An Anna an Anna	900 2003 - 194 2003 - 2003 2003 - 2004
ciassifications. If proper oscalations do not result from the use of the same source term, if the	national and the second second	
Since dose assessment is based on actual meteorology, whereas the monitor reading EAL is not, the results from these assessments may indicate that the classification is not warranted, or may indicate that a higher classification is warranted. For this reason, emergency implementing procedures should call for the timely performance of dose assessments using actual meteorology and release information. If the results of these dose assessments are available when the classification is made (e.g., initiated at a lower classification level), the dose assessment results override the monitor reading EAL.	tin konstrukturen L	ی (یک یک ی

Plant-Specific

The 100 mRem TEDE dose is set at 10% of the EPA PAG, while the 500 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

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Dose assessment may be performed by either manual or computer based methods (ref. 1,

2, 3).

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Definitions:			n ferrar en		· . · · . · ·
Site Boundary		· ·	مين مين موريد بر مار مين در د	.*	
The site boundary is	an diason and Pe	na shekara na shekara Na shekara na shekara n	n an tha an		4 - 23, ¹ 85
Ginna Basis Reference					
	y Dose Projections - Persona y Dose Projections - Manual	Method			
4. NEI 99-01 AS1	a di seconda di second Seconda di seconda di s Seconda di seconda di s		isenne unterpriter au Chérant tait aitigea	generativa – wa Na	· · · · ·
		o medo que estado Constante en estado	ala di Secula de Las priva S	- Maria an Andrea - Maria ang ang ang ang ang ang ang ang ang an	
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	ter et al construction de la construction de la construcción de la construcción de la construcción de la constr Construction de la construcción de l Construcción de la construcción de l	a de la constant de la constant Les constant de la constant de la constant de la constant de la constant de la Recentra de la constant de la const	na – Stra La F Sular La Stra Anna Stra Shiriti (La Robert Sular Robert S	na kala sa Marina Sangari ang Kalang Kalangari ang Kalang	1991 - 1 199 199
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	EMERGENCY ACTION LEVEL	Revision [Draft H]	
	TECHNICAL BASES DOCUMENT	Page 52 of 336	:
Category:	R – Abnormal Rad Release / Rad Effluent		1999 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
Subcategory:	1 – Offsite Rad Conditions		
Initiating Condition:	Offsite dose resulting from an actual or imm gaseous radioactivity exceeds 100 mRem T thyroid CDE for the actual or projected dura	EDE or 500 mRem	and the second
	using actual meteorology		and the second second second
EAL:		and strates."	e e prosta de la la composición
RS1.3 Site Area	a Emergency		
-	licate closed window dose rates > 100 mRem at or beyond the site boundary	h/hr expected to	
OR			
Analyses of field surve or beyond the site bou	y samples indicate thyroid CDE > 500 mRem ndary	for 1 hr of inhalation at	
		····•	

Mode Applicability:

All

Basis:

<u>Generic</u>

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

----<u>EAL #1</u>

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The monitor reading EALs should be determined using a dose assessment method that back calculates from the dose values specified in the IC. Since doses are generally not monitored in real-time, it is suggested that a release duration of one hour be assumed, and that the EALs be based on a site specific boundary (or beyond) dose of 100 mrem whole body or 500 mrem thyroid in one hour, whichever is more limiting (as was done for EALs #2 and #4). If individual site analyses indicate a longer or shorter duration for the period in which the substantial portion of the activity is released, the longer duration should be used.]

[The meteorology used should be the same as those used for determining AU1 and AA1 monitor reading EALs. The same source term (noble gases, particulates, and halogens) may also be used as long as it maintains a realistic and near linear escalation between the EALs for the four classifications. If proper escalations do not result from the use of the same source term, if the calculated values are unrealistically high, or if correlation between the values and dose assessment values does not exist, then consider using an accident source term for AS1 and AG1 calculations.]

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

Plant-Specific

Real time field surveys and sample analysis is performed by offsite field monitoring teams per EPIP-2-12 "Offsite Surveys" (ref. 1) and assessed for radiological dose consequences per EPIP-2-5 " Emergency Dose Projections - Personal Computer Method" (ref. 2).

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2 and #4). If individual site hich the substantial portion of the state product of the substantial portion of the state product of the substantial portion of the ptormining AU1 and AA1 monitor

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EPAD-XX Revision [Draft H] Page 54 of 336

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Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

- 1. EPIP-2-12 Offsite Surveys
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method
- 3. NEI 99-01 AS1

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		12.12			EPAD	-XX			
		EMERGEN	CY ACTION I	LEVEL	C Revision [Draf	ft-H1			
					ee: ∷Page 55 of,				
Cat	egory:	R – Abnormal Rad	Release / R	ad Effluent			Newser	$\{ \hat{C}_{k} = \{ \hat{C}_{k} \}$	
Sub	category:	1 - Offsite Rad Co	nditions					, 	
Initi	ating Condition:	Offsite dose result	ing from an a	ctual or immin	ent release of			17 6 3	
	•	gaseous radioactiv	vity greater th	an 1,000 mRe	m TEDE or 5,000				
		mRem thyroid CDI		•••	duration of the		•	na internet. San adart	
		release using actu	al meteorolog	ду				,	
EAL	_:				day to a low wat	ta antonati sum		14.	
		Emergency							
RG	1.1 General	Emergency	a en la sur d	 A state for the 	$(a^{*}b^{*}) \in U (a^{*}b^{*}) = U$		19 gr - 19 1	· ····	
AN	gaseous monitor	reading > Table R-	l column "GE	" for ≥ 15 min.	(Note 1)	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	142.23		
		claration awaiting d							
-	•	-							
•		ent results are avai						•	
	assessmentinsi	ead of radiation mo							
Note		wait until the applicable ti			the event as soon as it i	is .			
_	determined that the	condition will likely excee	d the applicable i	time		_			
<u>[</u>		able R-1 Effluent Mo		tion Thresholds			· ·		
Ĺ	Monitor	GE	SAE	Alert	UE			-	
	Gaseous CNMT Vent Noble Gas	NA	N/A	N/A	7.4E+6 cpm w/ 1 fan	· ·		:	
	(R-12)				5.1E+6 cpm w/ 2 fans	· .			
	CNMT Vent Noble Gas Hi Rang (R-12A - 7/9)	e 1.8E+2 μC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A				
	Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm			1	
	(R-14) Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A				
	(R-14A - 7/9)								

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Monitor	GE	SAE	Alert	UE
Gaseous				
CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan
(R-12)				5.1E+6 cpm w/ 2 fans
CNMT Vent Noble Gas Hi Range	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A
(R-12A - 7/9)				
Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm
(R-14)				۰.
Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A
(R-14A - 7/9)				
Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm
(R-15)				
Air Ejector Noble Gas Hi Range			1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	•
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A
Main Steam Line				
(R-31/R-32)				
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A
Liquid				
Liquid Radwaste Effluent	N/A	' N/A	N/A	3.6E+5 cpm
(R-18)				with no isolation
SFP HX Effluent				
(R-20A)	N/A	N/A	- N/A	4.0E+4 cpm
(R-20B)	N/A	N/A	N/A	5.2E+3 cpm
Turbine Bidg Fir Drains			•	
(R-21)	N/A	N/A	N/A	5.0E+4 cpm
Hi Cond Waste				with no isolation
(R-22)	N/A	N/A	N/A	9.2E+4 cpm
				with no isolation

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Mode Applicability:	$\phi = 0.5 \pm 2 \mu^{-1} h_{AC}$, $\phi = 2 \mu^{-1} h_{AC}$, $\phi = 2 \mu^{-1} h_{AC}$	e e
All	1997) - Santa S	and a state of the bar
Basis:	 A structure of the second secon	and the second
Generic	[1] A. S. M.	
	basis of the radiological offluent IC/EALs.]	
	•	· · · · · ·
that exceed the EPA Protective Action	eases that result in doses at or beyond the site boundary Guides (PAGs). Public protective actions will be necessary. ated with the failure of plant systems needed for the ve fuel damage.	rana La La L
addrosses events which may not be at	Hey other ICs, this IC provides appropriate diversity and No to be classified on the basis of plant status alone. It is pro accidents the release may be unmonitored or there may the source term and/or meteorology.]	n an an an an an an Arthur An An Arthur an Arthur An An Arthur an Arthur
the committed offective dose equivaler (CDE). For the purpose of these IC/EA as defined in 10 CFR 20, is used in lieu provides for the use adult thyroid dose	orms of the sum of the offective dose equivalent (EDE) and it (CEDE), or as the thyroid committed dose equivalent Ls, the dose quantity total effective dose equivalent (TEDE), i of "sum of EDE and CEDE" The EPA PAG guidance conversion factors. However, some states have decided to ALs need to be consistent with those of the states involved no.]	
	PAG, while the 5000 mrem thyroid CDE was established in A PAG for TEDE and thyroid CDE.]	
<u>EAL#1</u>		· · ·
The_ site specific -monitor list in EAL #1 release pathways.	shouldTable R-1 includes effluent monitors on all potential	
calculates from the dose values specifi real time, it is suggested that a release based on a site specific boundary (or b thyroid in one hour, whichever is more	bo determined using a dose assessment method that back od in the IC. Since doses are generally net menitored in duration of one heur be assumed, and that the EALs be eyond) dose of 1000 mrem whole body or 5000 mrem limiting (as was done for EALs #2 and #4). If individual site uration for the period in which the substantial portion of the should be used.]	
roading EALs. The same source term (as long as it maintains a realistic and n classifications. If proper escalations do calculated values are unrealistically hig	ame as those used for determining AU1 and AA1 menitor noble gases, particulates, and halogens) may also be used oar linear escalation between the EALs for the four not result from the use of the same source torm, if the th, or if correlation between the values and dose to consider using an accident source torm for AS1 and AG1	

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

Plant-Specific

The values shown correspond to a dose of 1000 mrem in one hour at the site boundary. Monitor indications are calculated (ref. 2) based on annual average X/Q dispersion factors from the ODCM (ref. 21) and a source term representative of accident conditions. For the main steam line monitors (R-31/32), the variability of results based upon the number of ARVs and/or Main Steam Safety Valves precludes the use of any single default value for these monitors. For these cases, adjustments are made for expected flow rates.

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.

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See de la -1.4.4.12 Ginna Basis Reference(s): :.... 1 - A 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM) 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor . . . *. 1.1 : Emergency Action Levels (EALs) 3. NEI 99-01 AG1 and the second . . . 1 1 1 ~ 100 , ~ 10 and the apple of the providence of which is the real of the theory

• EPAD-XX EMERGENCY ACTION LEVEL (1) (2) Prevision [Draft H] TECHNICAL BASES DOCUMENT Page 59 of 336 R – Abnormal Rad Release / Rad Effluent Category: 1 - Offsite Rad Conditions Subcategory: Initiating Condition: Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology EAL: **RG1.2 General Emergency** Dose assessment using actual meteorology indicates doses > 1,000 mRem TEDE or 5,000 mRem thyroid CDE at or beyond the site boundary Mode Applicability: n an an Thyper and a second New York Second secon New York Second secon The second second second 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -. . . المتحال والمحاديثين المحاد All a an an Arrange ann an Arrange ann an Arrange An Arrange ann an Arrange ann an Arrange ann an Arrange Arrange ann an Arrang a strange sign **Basis:** المراجع والمراجع ويعترض والجنأ ومأتج والمجاج والمتكور 1. A. 1. A.A. and the submersion and and a second submersion was second as Generic Standard and Service and Alexandric and the service of the serv *د بند [Rofer to Appendix A for a detailed basis of the radiological-offluent IC/EALs.] This IC-EAL addresses radioactivity releases that result in doses at or beyond the site boundary that exceed the EPA Protective Action Guides (PAGs). Public protective actions will be necessary. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public and likely involve fuel damage. While these failures are addressed by other ICs, this IC provides appropriate diversity and and the second addrosses 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 unmenitored or there may be large uncertainties associated with the source term and/or meteorology.] . . . The EPA PAGs are expressed in terms of the sum of the offective dose equivalent (EDE) and the committed effective dose equivalent (CEDE), or as the thyroid-committed dose equivalent 1 (CDE). For the purpose of these IC/EALs, the dose quantity total offective dose equivalent (TEDE), as defined in 10 CFR 20, is used in lieu of "...sum of EDE and CEDE...." The EPA PAG guidance provides for the use adult thyroid dose conversion factors. However, some states have decided to calculate child thyroid CDE. Utility IC/EALs need to be consistent with those of the states involved in the facilities emergency planning zone.] The TEDE dose is set at the EPA-PAG, while the 5000 mrem thyroid CDE was established in

— [The TEDE dose is set at the EPA PAG, while the 5000 mrem thyroid CDE was established i consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.]

<u>EAL #1</u>

----- The site specific monitor list in EAL #1 should include effluent monitors on all potential release pathways.

EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT

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Page 60 of 336 The monitor reading EALs should be determined using a dose assessment method that back

calculates from the dose values specified in the IC. Since doses are generally not monitored in real-time, it is suggested that a release duration of one hour be assumed, and that the EALs be based on a site specific boundary (or beyond) dose of 1000 mrem whole body or 5000 mrem thyroid in one hour, whichever is more limiting (as was done for EALs #2 and #4). If individual site analyses indicate a longer or shorter duration for the period in which the substantial pertion of the activity is released, the longer duration should be used.] ing a state of the end of the second state of the

[The meteorology used should be the same as those used for determining AU1 and AA1 monitor reading EALs. The same source term (noble gases, particulates, and halogens) may also be used as long as it maintains a realistic and near linear escalation between the EALs for the four classifications. If proper escalations do not result from the use of the same source term, if the calculated values are unrealistically high, or if correlation between the values and dose assessment values does not exist, then consider using an accident source term for AS1 and AG1 🤃 calculations.]

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

Plant-Specific

The 1000 mRem TEDE dose is set at 100% of the EPA PAG, while the 5000 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Dose assessment may be performed by either manual or computer based methods (ref. 1,

2, 3).

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D	efinitions:		2.35	ş e sayarı				
	Site Boundary			Martin - 1	$\psi_{i_1}(y_i) \neq 0$	N L H L H R	÷	· · · .
	The site boundary is ap	proximately a 0.3-mile radiu	s around the	reactor.	······································	te a lo <u>r</u> (N. M.) 1912 - Series Ale Rocha		ta internet
G	inna Basis Reference(s)):		· • •				
	EPIP-2-18 Control Roor							
		ose Projections - Personal (thod			• • • •	ener S S
	NEI 99-01 AG1	ose Projections - Manual M						
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		E	PAD-XX		
	EMERGENCY ACTION LE	VEL Revision	[Draft H]		
	TECHNICAL BASES DOCU	MENT Page 6	2 of 336		
Category:	R – Abnormal Rad Release / Rad	Effluent			· .
Subcategory:	1 – Offsite Rad Conditions			1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	
Initiating Condition:	Offsite dose resulting from an actu gaseous radioactivity greater than mRem thyroid CDE for the actual release using actual meteorology	n 1,000 mRem TEDE or 5 or projected duration of t	,000	en en la constante de la const Seconda constante de la constant	1. e. e
EAL:		, ¹ •		e a traditiona <u>es</u> era en	
RG1.3 General	Emergency	an an a			
•	licate closed window dose rates > at or beyond the site boundary	1,000 mRem/hr expected	to	••	
OR					
Analyses of field surve at or beyond the site b	y samples indicate thyroid CDE > 5 oundary	5,000 mRem for 1 hr of in	halation		
Mode Applicability:	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			

All

Basis:

Generic

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

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

EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 63 of 336

--<u>EAL #1</u>

— [The monitor reading EALs should be determined using a dose assessment method that back calculates from the dose values specified in the IC. Since doses are generally not monitored in real time, it is suggested that a release duration of one hour be assumed, and that the EALs be based on a site specific boundary (or beyond) dose of 1000 mrem whole body or 5000 mrem thyroid in one hour, whichever is more limiting (as was done for EALs #2 and #4). If individual site analyses indicate a longer or shorter duration for the period in which the substantial portion of the activity is released, the longer duration should be used.]

[The meteorology used should be the same as those used for determining AU1 and AA1 monitor reading EALs. The same source term (noble gases, particulates, and halogens) may also be used as long as it maintains a realistic and near linear escalation between the EALs for the four classifications. If proper escalations do not result from the use of the same source term, if the calculated values are unrealistically high, or if correlation between the values and dose assessment values does not exist, then consider using an accident source term for AS1 and AG1 calculations.]

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

Plant-Specific

Real time field surveys and sample analysis are performed by offsite field monitoring

teams per EPIP-2-12 "Offsite Surveys" (ref. 1) and assessed for radiological dose

consequences per EPIP-2-5 " Emergency Dose Projections - Personal Computer Method" (ref. 2).

Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

- 1. EPIP-2-12 Offsite Surveys
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method

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3. NEI 99-01 AG1

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		EPAD-XX	
	EMERGENCY ACTION LE	VEL Revision [Draft H]	
		MENT Page 65 of 336	
Category:	R – Abnormal Rad Release / Rad	Effluent	
Subcategory:	2 – Onsite Rad Conditions & Sper	nt Fuel Events	
Initiating Condition:	Unplanned rise in plant radiation l	evels	
EAL:			
RU2.1 Unusual	Event		
	drop in a reactor refueling pathway evel > SFP low water level alarm se	tpoint (Note 3)	
AND		adh a' air agus a sa	en an ann an Arthur an Ann an Arthur An Ann an Ann an Arthur an Ann an Ann an Ann
Area radiation monitor	reading rise on EITHER:	al an constant and a second second	e set state of the second
R-2 Containment	$(1, \dots, n_{n-1}) \in \{1, \dots, n_n\}$	algen of the attention of the state of	
OR			
R-5 Spent Fuel Po	ol		
Note 3: If loss of water lev EALs CU3.1, CU3	el in the refueling pathway occurs while in Mode 2 or CU3.3	e 5, 6 or D, consider classification under	-

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Mode Applicability:			· ·
All			•
Basis:	·		
Generic			(1,0,0,0,0,0,0)
irradiated fuel or events that rates within plant buildings. T	ased radiation levels as a result of wat have resulted, or may result, in unplan hese radiation increases represent a l ential degradation in the level of safety	ned increases in radiation dose oss of control over radioactive	grono no sente Angelando e Di Manto que
<u>EAL#1</u>		an a	n en state state en state en en state state state state
radiation monitors, and perso allow remote observation. De	may include instrumentation such as w onnel (e.g., refueling crew) reports. If a opending on available level instruments lications of water makeup rate or decre	vailable, video cameras may ation, the declaration threshold	na 1995 - Standard Standard († 1997) 1997 - Standard Standard († 1997) 1997 - Standard Standard († 1997)
Spont Fuel Pit/Fuel Transfer	Seal failure incidents at two different Canal at a BWR, explicit coverage of t iven their potential for increased deser	hoso typos of ovents via	
radiation monitor could detec	te specific combination of cavities, tube t an increase in dose rate due to a dro ether or not the fuel is covered.	es, canals and pools. While a p in the water level, it might not	n general and a state of the second secon

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

Application of this EAL requires understanding of the actual radiological conditions present in the vicinity of the monitor. Information Notice No. 90 08. "KR 85 Hazards from Decayed Fuel" should be considered in establishing radiation monitor EALs.] • • •

For refueling events where the water level drops below the RPVReactor Vessel flange classification would be via EAL CU3.1, CU3.2 or CU3.32. This event escalates to an Alert per EAL AA2-RA2.1 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Table for events in operating modes 1-4.

EAL #2

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

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

Plant-Specific

The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling ۰, ۰. pathway.

The SFP is equipped with a level switch (LC-661) that actuates a low level alarm at 20 in. from the top of the SFP (ref. 1). The minimum level per Technical Specifications is 23 feet above the fuel seated in the SFP (ref. 2).

The definition of "... cannot be restored and maintained above..." allows the operator to visually observe the low water level condition, if possible, and to attempt water level restoration instructions as long as water level remains above the top of irradiated fuel.

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

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Technical Specifications requires that refueling cavity water level be maintained 23 ft	
above irradiated fuel seated in the reactor vessel when moving fuel (ref. 3)	
Area radiation monitors R-2 and R-5 are located in the proximity of where spent fuel may	
be located and have been selected to be indicative of a decrease in radiation shielding due	
to decreasing refueling pathway water level (ref. 4). While a radiation monitor could detect	
a rise in dose due to a drop in the water level, it might not be a reliable indication, in and of	
itself, of whether or not the fuel is uncovered. For example, the reading on an area	
radiation monitor located on the refueling bridge may rise due to planned evolutions such	
as head lift, or even a fuel assembly being raised in the manipulator mast. Elevated	
radiation monitor indications will need to be combined with another indicator (or personnel	

report) of water loss.

This event escalates to an Alert if irradiated fuel outside the reactor vessel is uncovered.

Definitions:

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Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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Gi	na Basis Reference(s):
1.	AR-K-29 SFP HI TEMP 115 °F HI-LO LEVEL 20" 12"
2.	Technical Specifications Section 3.7.11 Spent Fuel Pool (SFP) Water Level
3. 4.	Technical Specifications Section 3.9.6 Refueling Cavity Water Level P-9 Radiation Monitoring System
5.	NEI 99-01 AU2
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EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 69 of 336	
Category:R – Radioactivity Release / Area RadiationSubcategory:2 – Onsite Rad Conditions & Spent Fuel EventsInitiating Condition:Unplanned rise in plant radiation levelsEAL:	
RU2.2 Unusual Event Massimum and the state of the st	
Mode Applicability: Booth Statute at the spectral state of the s	n ni sa Signi ya s
Basis:	
Generic Al Alexandra de la constance d	•
 This IC-EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in unplanned increases in radiation dose rates within plant buildings. These radiation increases represent a loss of control over radioactive material and represent a potential degradation in the level of safety of the plant. 	e ate all'he Prins au
<u>EAL #1</u>	•••
[Site specific indications may include instrumentation such as water level and local area radiation monitors, and personnel (e.g., refueling crew) reports. If available, video cameras may allow remote observation. Depending on available level instrumentation, the declaration threshold may need to be based on indications of water makeup rate or decrease in water storage tank level.] [In light of Reactor Cavity Seal failure incidents at two different PWRs and less of water in the Spent Fuel Pit/Fuel Transfer Canal at a BWR, explicit coverage of these types of events via	
threshold #1 is appropriate given their potential for increased doses to plant staff.] — The refueling pathway is a site specific combination of cavities, tubes, canals and pools. While a radiation monitor could detect an increase in dose rate due to a drop in the water level, it might not be a reliable indication of whether or not the fuel is covered.	
—.[For example, a refueling bridge ARM reading may increase due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Also, a monitor could in fact be properly responding to a known event involving transfer or relocation of a source, stored in or near the fuel peel or responding to a planned evolution such as removal of the reactor head. Generally, increased radiation monitor indications will need to combined with another indicator (or personnel report) of water loss.]	
the vicinity of the monitor. Information Notice No. 90-08, "KR-85 Hazards from Decayed Fuel"	

should be considered in establishing radiation monitor EALs.]

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For refueling events where the water level drops below the RPV flange classification would be via CU2. This event escalates to an Alert per 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 Table for events in operating modes 1-4.	· .		an tan Ang tan Ang tan
<u>EAL #2</u>			
radioactive material resulting in a potential degradation in the level of salety of the plant.			
This EAL excludes radiation level increases that result from planned activities such as use of radiographic sources and movement of radioactive waste materials. A specific list of ARMs is not required as it would restrict the applicability of the threshold. The intent is to identify loss of control of radioactive material in any monitored area.			
Plant-Specific			1
Assessment of this EAL may be made with survey readings using portable instruments as			
well as installed radiation monitors.			and San San San San San San San San San San
Definitions:		,	
Normal Levels			

As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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Ginna Basis Reference(s):	and a start of the trade of the start of the
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Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory: 2 – Onsite Rad Conditions & Spent Fuel Events	
Initiating Condition:	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the Reactor Vessel

EAL:

RA2.1 Alert

Alarm on **ANY** of the following radiation monitors due to damage to irradiated fuel or loss of water level:

- R-12 Containment Vent Noble Gas
- R-14 Plant Vent Noble Gas
- R-2 Containment
- R-5 Spent Fuel Pool

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

<u>EAL #1</u>

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

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

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

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

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

— [Application of this EAL-requires understanding of the actual radiological conditions present in the vicinity of the monitor. Information Notice No. 90-08, "KR-85 Hazards from Decayed Fuel" should be considered in establishing radiation monitor EALs.]

Escalation of this emergency classification level, if appropriate, would be based on <u>RS1.1, RS1.2,</u> <u>RS1.3, RG1.1, RG1.2 or RG1.3</u>AS1 or AG1.

Plant-Specific

This EAL is defined by the specific areas where irradiated fuel is located such as the refueling cavity, reactor vessel, or spent fuel pool.

The bases for the area radiation alarms include a spent fuel handling accident and are, therefore, appropriate for this EAL. Elevated readings on ventilation monitors may also be indication of a radioactivity release from the fuel, confirming that damage has occurred (ref. 1). However, elevated background at the monitor due to water level lowering may mask elevated ventilation exhaust airborne activity and needs to be considered. However, while radiation monitors may detect a rise 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 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. Interpretation of these EAL thresholds requires some understanding of the actual radiological conditions present in the vicinity of the monitors.

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Ginna Basis Reference(s):

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P-9 Radiation Monitoring System
 NEI 99-01 AA2

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Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:	2 – Onsite Rad Conditions & Spent Fuel Events	
Initiating Condition:	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the Reactor Vessel	
EAL:		
RA2.2 Alert	ę .	
A water level drop in a uncovered	reactor refueling pathway that will result in irradiated fuel becoming	
Mode Applicability:		
All	a statute and the second s	
Basis:	an a	an station T
Generic		
safety of the plant.	represents an actual or substantial potential degradation in the level of ato from AU2 in that fuel activity has been released, or is anticipated due to lies to spont fuel requiring water coverage and is not intended to address sed for dry storage 1	na shi ku qara i
		a territoria de la composición de la c
<u>EAL #1</u>	sod for dry storago.] The estimates a start of the start The start of the start	
		un fonte in neurophysion Prisultur - seurophysion Succession - sector seurophysion
	ions may include instrumentation such as water level and local area corsennel (e.g., refueling crew) reports. If available, video cameras may n. Depending on available level instrumentation; the declaration threshold in indications of water makeup rate or decrease in water storage tank avity Seal failure incidents at two different PWRs and less of water in the	un 1996 - Servic Angelon Robusto - Suro (199 Nacional Castro (199 Robusto - Sutto (1995) Agrico - Sutto (1995) Sutto - Sutto (1995)
	ons may include instrumentation such as water level and local area personnel (e.g., refueling crew) reports. If available, video cameras may n. Depending on available level instrumentation; the declaration threshold on indications of water makeup rate or decrease in water storage tank avity Seal failure incidents at two different PWRs and loss of water in the	an 1996 - Anna Angelo, an Robailt - Alain Bos Alain - Alain Angelo Robailt - Alain Angelo Alain - Angelo Robailt - Alain Angelo Robailt - Alain Angelo Alain - Alain Angelo
	ons may include instrumentation such as water level and local area personnel (e.g., refueling crew) reports. If available, video cameras may n. Depending on available level instrumentation; the declaration threshold on indications of water makeup rate or decrease in water storage tank avity Seal failure incidents at two different PWRs and loss of water in the sefer Canal at a BWR, explicit coverage of these types of events via ate given their potential for increased deces to plant staff.]	un 1996 - Anna Anglia, an Anna 1997 - Anna 199 Anna 1999 - Anna 199 Anna 1997 - Anna 199 Anna 199 Anna 199 Anna 199 Anna 199 Anna 199
[Site specific indicat. radiation monitors, and , allow remote observatio may nood to be based c lovel.] [In light of Reactor C Spent Fuel Pit/Fuel Trai threshold #1 is appropri EAL_#2 This EAL addresses Increased ventilatior	ons may include instrumentation such as water level and local area corsennel (e.g., refueling crew) reports. If available, video cameras may n. Depending on available level instrumentation; the declaration threshold on indications of water makeup rate or decrease in water storage tank avity Seal failure incidents at two different PWRs and loss of water in the stor Canal at a BWR; explicit coverage of these types of events via ate given their potential for increased decess to plant staff.]	un 1996 - Anne Angelog, an Research - Station Res Res and Station Res Res and Station Res Res and Station Res Res and Res and Res and Res and Res and Res and Res Res and Res and Res and Res

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EMERGENCY ACTION LEVEL	Revision [Draft H]	
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water level decrease may mask increased ventilation exhaust airbor considered.	ne activity and needs to be	
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While a radiation monitor could detect an increase in dose rate d		
it might not be a reliable indication of whether or not the fuel is cover	f ed.	
head-lift, or even a fuel assembly being raised in the manipulator me	sst. Also, a monitor could in	
fact be properly responding to a known event involving transfer or re or near the fuel pool or responding to a planned evolution such as re	Hocation of a source, stored in	
Generally, increased radiation monitor indications will need to combi		
personnel report) of water loss.]		1
— [Application of this EAL requires understanding of the actual radi the vicinity of the monitor. Information Notice No. 90-08. "KR-85 Haz		
should be considered in establishing radiation monitor EALs.]		na fa si shina a
Equalstian of this amorganou algorithection loval if appropriate would	ld be based on PAS1 1 PS1 2	1.1
Escalation of this emergency classification level, if appropriate, woul RS1.3, or RAG1.1, RG1.2 or RG1.3.	u be based on <u>MAS 1.1, MS 1.2</u> ,	. • •
		,
Plant-Specific		
The reactor refueling cavity, spent fuel pool and fuel transfer c	anal comprise the refueling	ż
pathway.	and a second	the states and
There is no indirect indication that water level in the spent fuel	pool or refueling cavity has	
dropped to the level of the fuel other than visual observation. S	Since there is no level	
indicating system in the fuel transfer canal, visual observation	of loss of water level would	
also be required. If available, video cameras may allow remote	observation. Depending on	
available level indication, the declared threshold may need to b		
makeup rate or lowering in Reactor Coolant Drain Tank (RCD)	i) ievei (reĭ. 1).	

The movement of irradiated fuel assemblies within containment requires a minimum water level of 23 ft above the reactor vessel flange and the top of spent fuel in the SFP. During refueling activities, this maintains sufficient water level in the refueling cavity, fuel transfer canal and SFP. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (ref. 2, 3).

Allowing level to decrease could result in spent fuel being uncovered, reducing spent fuel decay heat removal and creating an extremely hazardous radiation environment.

Ginna Basis Reference(s):

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	ER-SFP.1 Loss of Spent F					••••		
2. 3.	Technical Specifications S Technical Specifications S NEI 99-01 AA2	ection : ection :	3.9.6 Refueling C 3.7.11 Spent Fue	avity Water Level I Pool (SFP) Water	Level			
4.	NEI 99-01 AA2	•	an a	an Articonation Film Articles (1944)	t ja kirken en veren. An olikari en e	a atra.	s	
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Category:		an an agus an an agus an an an 1940 a
Subcategory:	3 – CR/CAS Rad	(2) Support States and the second states of the
Initiating Condition:	Rise in radiation levels within the facility that systems required to maintain plant safety fu	t impedes operation of nctions

EAL:

RA3.1	Alert
occupancy to	15 mRem/hr in EITHER of the following areas requiring continuous maintain plant safety functions: .oom (R-1)

Mode Applicability:

OR CAS

All

Basis:

<u>Generic</u>

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

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

— [At multiple-unit sites, the EALs could result in declaration of an Alert at one unit due to a radioactivity release or radiation shine resulting from a major accident at the other unit. This is appropriate if the increase impairs operations at the operating unit.]

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

Areas requiring continuous occupancy include the <u>C</u>eontrol <u>R</u>room and as appropriate to the site, any other control stations that are staffed continuously, such as the security alarm station<u>s CAS</u> and <u>SAS</u>. (Typically these areas are the Control Room and the Control Alarm Station (CAS).]

Plant-Specific

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The Control Room and Central Alarm Station (CAS) must be continuously occupied in	n all 👘 see an and the second
plant operating modes at Ginna.	HUSENE PROCESS HERE TO DO A TO
Area radiation monitor (ARM) R-1 detects radiation levels in the vicinity of the main C	ontrol
Room. This ARM alarms at 2 mR/hr giving personnel sufficient warning of changing le	evels
(ref. 1). There is no area radiation monitoring system at Ginna for the CAS. Abnormal	

•:

radiation levels may be initially detected by routine radiological surveys.

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Ginna Basis Reference(s):	A Martin Barris and States and	e e gefan gewaard en ge	the start sector of the
 P-9 Radiation Monitoring S NEI 99-01 AA3 	ystem	1997 - 1998 1997 - 1998 1997 - 1998	
2. NEI 99-01 AAS	$(M_{\rm eff})_{\rm eff} = 0.000$, where $M_{\rm eff} = 0.000$, M_{\rm	and an interaction of the	and the second second
	 M. Martin, N. S. Shan, J. S. Shan, and K. Zulitz, "A state of the stat	and a second second second	a she Karala a sa
	for the second	e de Certer de Constantes d	
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Category E – Independent Spent Fuel Storage Installation (ISFSI)

EAL Group: Not Applicable (the EAL in this category is applicable independent of plant operating mode)

An independent spent fuel storage installation (ISFSI) is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask/canister must escape its packaging and enter the biosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety.

A Notification of Unusual Event is declared on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask/canister confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

A hostile security event that leads to a potential loss in the level of safety of the ISFSI is a classifiable event under Security category EAL HA4.1.

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		· · · · · · · · · · · · · · · · · · ·	
Category: E ISFSI			Formatted: Sname Refore: 0 nt After: 0
Subcategory: Not Applicable			
Initiating Condition: Damage to a loaded cas	sk confinement boundary		
EAL:			
······································			
EU1.1 Unusual Event			
Damage to a loaded cask confinement boundar			and an
<u></u>			
Mode Applicability:	en de la composée		and the second
Not applicable	Contraction of the second s	$(A_{i}) = (A_{i}) \left(\left(\left(\left(\left(\left(\left(A_{i} \right) \right) \right) \right) \right) \left($	and a second the second se
Basis:		and the second	
Generic			· · · · ·
An NOUE in this IC-EAL is categorized on the basis magnitude that a loaded cask confinement boundary classification based on a loaded fuel storage cask codegradation of the fuel during storage or posing an or removal from storage.	y is damaged or violated. Th onfinement boundary loss le operational safety problem w	is includes ading to the vith respect to its	
[The results of the ISFSI Safety Analysis Report (S/ cask('s) Certificate of Compliance and the related N phenomena events and accident conditions that cou BOUNDARY. This EAL addresses a dropped cask, PROJECTILE damage, FIRE damage or natural phe tornade, etc.).]	RC Safety Evaluation Repor Id potentially offect the COA a tipped over cask, EXPLOS promena affecting a cask (e	R roforoncod in tho t idontify natural IFINEMENT SION,	para Santanan ing kanala
<u>Plant-Specific</u>			
The Ginna ISFSI utilizes the NUHOMS dry sper			en en tradición de la companya de técnica. An esta esta companya de la companya de la
This EAL addresses any condition which indicat	es a loss of a cask confin		in the term with t
•			

and thus a potential degradation in the level of safety of the ISFSI. The cask confinement

boundary is considered the Dry Shielded Canister (DSC).

Definitions:

Confinement Boundary

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

Independent Spent Fuel Storage Installation (ISFSI)

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

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	$(M_{1},M_{2}) = M_{1}M_{2}$, $(M_{1},M_{2}) = M_{2}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{2}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{1}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{1}M_{2}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{1}M_{2}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{1}M_{2}M_{2}M_{2}M_{2}$, $(M_{1},M_{2}) = M_{1}M_{2}M_{2}M_{2}M_{2}M_{2}M_{2}M_{2}M_{2$
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and general production of the spectrum of the

Category C - Cold Shutdown / Refueling System Malfunction

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

Category C EALs are directly associated with cold shutdown or refueling system safety functions. Given the variability of plant configurations (e.g., systems out-of-service for maintenance, containment open, reduced AC power redundancy, time since shutdown) during these periods, the consequences of any given initiating event can vary greatly. For example, a loss of decay heat removal capability that occurs at the end of an extended outage has less significance than a similar loss occurring during the first week after shutdown. Compounding these events is the likelihood that instrumentation necessary for assessment may also be inoperable. The cold shutdown and refueling system malfunction EALs are based on performance capability to the extent possible with consideration given to RCS integrity, containment closure, and fuel clad integrity for the applicable operating modes (5 - Cold Shutdown, 6 - Refuel, D – Defueled).

The events of this category pertain to the following subcategories:

1. Loss of AC Power

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

2. Loss of DC Power

Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of power to the 125 VDC buses.

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3. RCS Level	en ante de la companya de la company	• . •
Reactor Vessel or RCS water lev	el is directly related to the status of adequate core ntegrity. RCS levels associated with Category C EALs	· ! ,
are listed in Table C-5.		
—	n n sharan nan san an a	••••
4. RCS Temperature	$\mathbf{y} \in [1, \infty, 1]$	
Uncontrolled or inadvertent temp potential loss of safety functions.	erature propressure increases are indicative of a construct of the effective of the construct of the effective of the effecti	e th
		• •.
5. Communications	[10] A.M. A. A. A. M. A. M. LEWIS AND REPORT REPORT AND A Distance of the Mathematical Science of the Scienc	
Certain events that degrade plan	t operator ability to effectively communicate with	
essential personnel within or exte	ernal to the plant warrant emergency classification:	. '
6. Inadvertent Criticality		
Inadvertent criticalities pose pote	ntial personnel safety hazards as well as being	
indicative of losses of reactivity c		
	· · · · · · · · · · · · · · · · · ·	
	$(a,b) = a_{ab} \left(a_{b} \left(\frac{1}{2} + \frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} + 1$	
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Category:	C – Cold Shutdown / Refueling System Malfunction	
Subcategory:	1 – Loss of AC Power	5 (Sec. 3) (Sec.
Initiating Condition	on: AC power capability to 480V safeguards buses reduced to a power source for ≥15 min. such that ANY additional single fa would result in a complete loss of all 480V safeguards bus per	ilure
EAL:		$\mathcal{T}_{\mathrm{eff}} = \mathcal{T}_{\mathrm{eff}} + \mathcal{T}_{\mathrm{eff}$
CU1.1 Unus	sual Event	$\sum_{i=1}^{n} e^{i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} e^{-i \theta_{i}} \right] = e^{-i \theta_{i}} \left[e^{-i \theta_{i}} e^{-i$
• •	ity to 480V safeguards buses reduced to a single power source,	an a
Table C-1, for ≥ 15	5 min. (Note 4)	 double of general contraction
AND		$\{p_i, p_j \in \mathbb{N} \mid j \in [j_i \in \mathbb{N}]\}$
Any additional sing safeguards bus po	gle power source failure will result in a complete loss of all 480V	
	bwer	<u>na se la seconda de la seconda seconda de la seconda de la seconda s</u>
Note 4: The ED shou determined th	uld not wait until the applicable time has elapsed, but should declare the event as soon a hat the condition has exceeded, or will likely exceed, the applicable time.	sitis
Γ	Table C-1 AC Power Sources	· 《》《》《》《》
F		
	 EDG 1A (Safeguard train A, Buses 14 & 18) EDG 1B (Safeguard train B, Buses 16 & 17) 	an ta' an an an an gandar an an an an an

Ande	Ann	lica	bility:	

5 - Cold Shutdown, 6 - Refuel, D - Defueled

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Offsite

Basis:

Generic

The condition indicated by this <u>IC_EAL</u> is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a <u>station_blackoutcomplete loss of 480V safeguards bus AC power</u>. This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency bus. The subsequent loss of this single power source would escalate the event to an Alert in accordance with <u>EAL</u>CA<u>1.1</u>3.

Station Auxiliary Transformer 12A

Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed

(if currently established)

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Finteen minutes was selected as a tr	rreshold to exclude transient or momentary losses of power.		•:	÷* .	1
as cross ties or swing diesels, provid	uld allow credit for operation of installed design features, such ded that abnormal or emergency operating procedures addres			i e e e e e	-
thoir use. However, these-stations n safety functions in developing the si	nust also consider the impact of this condition on other shared to specific EAL.]			³ 9	
[Plants that have a proceduralized c	apability to cross tie AC power from an off site power supply c	# 11111		$c \to -\lambda_{0}$	Î
a companion unit may take credit for IC.]	r the redundant power source in the associated EAL for this		•	ni teret	۰.
	u e volonatio su peper volo 1175 du seto do 200		ali in	· . ·	•
Plant-Specific	And the second second second second second second	· · · · · · · · ·			۰
-	provide the necessary redundancy on the 480V	·			•
safeguards system. Train A cons	ists of 480V safeguards buses 14 and 18, while train B				•
consists of safeguards buses 16	and 17. Buses 14 and 16 provide power to engineered				
safety features that are essential	in response to the analyzed events and design basis				
accidents (e.g., charging pumps,	RHR pumps, containment fans, etc.). Buses 17 and 18				

provide power to the four service water pumps and are specifically included in Table C-1 because service water pump operation is necessary for decay heat removal while in cold conditions.

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and an Unusual Event must be declared.

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There are two onsite emergence	y AC power sources available in the cold modes: "The second second second second second second second second se
EDG 1A	
• EDG 1B	
If multiple sources fail to be cap 15 minutes, an Unusual Event i	selected as a threshold to exclude transient power losses. Dable of supplying one or more safety-related buses within is declared under this EAL. The subsequent loss of the escalates the event to an Alert under EAL CA1.1.
Ginna Basis Reference(s):	an an Anna an Anna an Anna an
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	TECHNICAL BASES DOCUMENT
Category:	C – Cold Shutdown / Refueling System Malfunction
Subcategory:	1 – Loss of AC Power
Initiating Condition	
EAL:	Busch for Elite minimum and the second se
CA1.1 Alert	$\overline{\psi_{2,2}}$, $\psi_{2,2}$, ψ
Loss of all offsite ar	d all onsite AC power, Table C-1, to 480V safeguards buses
for \geq 15 min. (Note 4	
Note 4: The ED should determined that	not wait until the applicable time has elapsed, but should declare the event as soon as it is the condition has exceeded, or will likely exceed, the applicable time.
	Table C-1 AC Power Sources
	EDG 1A (Safeguard train A, Buses 14 & 18)
Oncite	• EDG 1B (Safeguard-train B, Buses 16 & 17)
	Station Auxiliary Transformer 12A
Offsite	
Č	
Ĺ	(if currently established)
Mode Applicability	
5 - Cold Shutdown,	6 - Refuel, D - Defueled
Basis:	$\sum_{i=1}^{n} (A_i + A_i) = \sum_{i=1}^{n} (A_i) = \sum_{i=1}^{n} (A$
<u>Generic</u>	end de la calencia de la constructión en la conserva de exercición da de la transferia de la conserva de la conserva
Loss of all AC power ECCS, Containment I	compromises all plant safety systems requiring electric power including RHR, Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.
because of the signifi	ssified as an Alert when in cold shutdown, refueling, or defueled mode cantly reduced decay heat and lower temperature and pressure, increasing
the time to restore on Emergency EAL.	e of the emergency busses, relative to that specified for the Site Area
Escalating to Site Are Radiological Effluent	a Emergency, if appropriate, is by <u>EALs in Category R</u> Abnormal Rad Levels /
Fifteen minutes was s	elected as a threshold to exclude transient or momentary power losses.

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<u>Plant-Specific</u>	an a	y to Mary a strategy and a	
Two Class 1E independent tra	ins provide the necessary redundancy on	the 480V	
safeguards system. Train A co	nsists of 480V safeguards buses 14 and	18, while train B	
consists of safeguards buses	16 and 17. Buses 14 and 16 provide powe	er to engineered	
safety features that are essent	ial in response to the analyzed events an	d design basis	Later a second
accidents (e.g., charging pum	os, RHR pumps, containment fans, etc.). E	Buses 17 and 18	t e
provide power to the four servi	ce water pumps and are specifically inclu	ded in Table C-1	
because service water pump o	operation is necessary for decay heat rem	oval while in cold	
conditions.	·		:
There are three offsite power s	sources available to these buses in the co	ld modes (ref. 1):	
 Station Auxiliary Transf via CKT 7T) 	ormer 12A fed from one 34.5 kV transmis	sion line (STA 204	
 Station Auxiliary Transf CKT 767) via the 34.5 k 	ormer 12B fed from the 115 kV switchyard V Transformer #6.		
Unit Auxiliary Transform	ner 11 backfed from the 115 kV switchyard	d via the 19 kV	
Main Transformer with	the Main Generator bus disconnects (links) removed.	• . •
Based on operational experier	nce, if the Unit Auxiliary Transformer back	feed from the Main	
	ned, it cannot be considered available/ca	•	•
	ne time it will take to align it. In any case, i		· · · · ·
-	es, it is not considered available and Alert		17.
	cy AC power sources available in the cold		, , , , , , ,
-		,1 , , , , , , , , , , , , , , , , , ,	
EDG 1A		and the second	1 A.
EDG 1B		n en su an su	
	s selected as a threshold to exclude transi		

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Ginna Basis Reference(s): 1. UFSAR Section 8 and Fig					
2. NEI 99-01 CA3		14 F - 14	1999 (C) # 138	r <u>,</u> ' ''.	an an an guilt an
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Category: Subcategory: Initiating Condition:	C – Cold Shutdown / Refueling System Malfunction 2 – Loss of DC Power Loss of required DC power for ≥ 15 min.	
EAL:		

< 108 VDC on **required** 125 VDC buses for \geq 15 min. (Note 4)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

Generic

The purpose of this IC <u>EAL</u>and its associated EALs 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.]

---- [(Site specific) bus voltage should be based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value should incorporate a margin of at least 15 minutes of operation before the onset of inability to operate these leads. This voltage is usually near the minimum voltage selected when battery sizing is performed. Typically the value for the entire battery set is approximately 105 VDC. For a 60 cell string of batteries the cell voltage is typically 1.75 Volts per cell. For a 58 string battery set the minimum voltage is typically 1.81 Volts per cell.]

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Plant-Specific

The 125 VDC vital system is divided into two independent and isolated channels. Each channel consists of one battery, two battery chargers, one DC bus and one inverter. Each inverter has an associated vital AC distribution panel board. Power to the DC bus, DC unit

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control panels, and inverters is supplied by the station batteries and/or the battery chargers. Each battery charger is fully rated and can recharge a discharged battery while the state of the same time supplying the steady state power requirements of the system.	••
A separate TSC Battery system is designed with an intertie to each of the two main (A and B) distribution panels for use during maintenance and abnormal conditions.	•
The safety-related station batteries have been sized to carry their expected shutdown loads following a plant trip and loss of offsite power or following a station blackout without battery terminal voltage falling below 108.6 volts for a period of 4 hours (ref. 1).	
The fifteen-minute interval was selected as a threshold to exclude transient or momentary power losses.	
The loss of the TSC Battery does not constitute an entry condition for this EAL. This EAL is the cold condition equivalent of the hot condition loss of DC power EAL SS2.1.	•
Ginna Basis Reference(s): 1. UFSAR Section 8.3.2 Direct Current Power, Systems 2. O-6.13 Daily Surveillance Log 1624 (2020) Constant Control of the section of the sectio	•
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						• • • •
Category:	C - Cold Shutdown	/ Refueling Syst	tem Malfunction		tere por te	
Subcategory:	3 – RCS Level	$\tau \sim 10^{-1}$	terring proved	·		
Initiating Condition: EAL:	RCS leakage					
			<u>ingent verse og ste</u>	the second second	a the task of a	$M_{\rm eff} = 2000$
CU3.1 Unusual	Event	· · ·	n de la créati	·		· · · ·
RCS leakage results in established by procedu	the inability to main	tain or restore Ri te 4)	CS level within th	e target band	· · · · ·	
	· · · · · · · · · · · · · · · · · · ·				Jara - 1 - 1	
	wait until the applicable tin condition has exceeded, c			as soon as it is		ter al de
Mode Applicability:						<i>:</i> .
5 - Cold Shutdown			Sector 1	201 Mar 1	, т.	, and the sta
Basis:						
Generic		· .			State Sec.	
This IC-EAL is considered inability to maintain or res				plant. The	en area	e di esta de la composición de la comp

Relief valve normal operation should be excluded from this ICEAL. However, a relief valve that operates and fails to close per design should be considered applicable to this ICEAL if the relief valve cannot be isolated.

Prolonged loss of RCS inventory may result in escalation to the Alert emergency classification level via either <u>EAL</u>CA2_1 or <u>EAL</u>CA4<u>CA3_1</u>.

- [The difference between CU1 and CU2 deals with the RCS conditions that exist between cold shutdown and refueling modes. In the refueling mode the RCS is not-intact and RPV level and inventory are monitored by different means. In cold shutdown the RCS will normally be intact and standard RCS inventory and level monitoring means are available.]

Plant-Specific

This EAL is applicable if RCS level cannot be restored and maintained within the

prescribed target band specified by procedure.

Ginna Basis Reference(s):

- 2. AP-RCS.1, Reactor Coolant Leak
- 3. NEI 99-01 CU1

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Category:	C – Cold Shutdown / Refueling System Malfunction		
Subcategory:	3 – RCS Level	and the second	
Initiating Condition:	RCS Leakage	ان از این از این این به این این به در این	
EAL:			

CU3.2 Unusual Event

Unplanned RCS level drop below **EITHER** of the following for ≥ 15 min. (Note 4): Reactor Vessel flange (84 in. on loop level indicators) (when the level band is established above the flange) OR

RCS level target band established by procedure (when the level band is established below the flange)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Mode Applicability:

6 - Refuel

Basis:

<u>Generic</u>

This IC EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RCS water level below the <u>RPV Reactor Vessel</u> flange are carefully planned and procedurally controlled. An unplanned event that results in water level decreasing below the <u>RPV Reactor Vessel</u> flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the <u>RPV Reactor Vessel</u> flange), warrants declaration of a NOUE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either <u>EAL_CA2.1</u> or <u>EAL_CA4CA3.1</u>.

— [The difference between CU1-and CU2 deals with the RCS conditions that exist between cold shutdown and refueling modes. In cold shutdown the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the refueling mode the RCS is not intact and RPV level and inventory are monitored by different means].

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-EAL #1 27 . This EAL involves a decrease in RCS level below the top of the RPV-Reactor Vessel flange that This EAL involves a decrease in roo level below the top of the rat <u>reduced to the reduced to th</u> flooded reactor cavity level, which is addressed by EAL RU2.1AU2 EAL1, until such time as the level decreases to the level of the vessel flange. • and the second standard and share the providence of the second standard standards. $[1, 1] \in [1, \infty]$ n de la constante de la consta La constante de . . . Second Contraction of the second . . . · · · , er, 1 . $(\cdot, \dagger)_{i,i}$, . • • an an an that a · . . . · .^ the sea and a state of the الكريمين المراجعين المعهول المحاليين الكريمين المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين المح المعهد المحاليين المحاليين المحالي المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين المحال المحاليين المحاليين المحاليين الكريمية المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين ال المحاليين المحاليين المحاليين الكريمية المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين المحاليين ال ÷. • . . .

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For BWRs] if RPV level continues to decrease and reaches the Low Low ECCS Actuation was a subsequence of the second s Setpoint then escalation to CA1 would be appropriate. [For PWRs] If RPV level continues to decrease and reaches the Bottom ID of the RCS Loop then escalation to CA1-would be appropriate. EAL #2 Strategy and the grant of the This-EAL addresses conditions in the refueling mode when normal means of core temperature Carata State 1 - 1 - 1 - 1 - 4 indication and RCS level indication may not be available. Redundant means of RPV level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RPV inventory loss was 100 - Alexandria 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 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 containment to ensure they are indicative of RCS leakage.

Escalation to the Alert emergency classification level would be via either CA1-or CA4.

Plant-Specific

The Reactor Vessel flange level (uncorrected) is at 84 in. (252' 6" ele.) on Loop A & B Level Indicators (LIT-432A and B) (ref. 1, 2).

This EAL involves a lowering in RCS level below the top of the Reactor Vessel flange, or the inability to maintain water level above the intended level when level is being intentionally maintained below the flange, that continues for fifteen minutes due to an unplanned event. This EAL is not applicable to drops in flooded refueling pool level (covered by lowering spent fuel pool water level in EAL RU2.1) until such time as the level lowers to the level of the vessel flange. If level continues to lower and reaches the bottom of the RCS Hot Leg reference level (0 in. indicated), escalation to the Alert level under EAL CA3.1 would be appropriate. If the level lowering is accompanied by RCS heatup. escalation to the Alert level under EAL CA4.1 may also be appropriate.

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be available, Redundant means of Reactor Vessel level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will

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not be interrupted. Reactor Vessel water level is normally monitored in Refuel mode using the following instruments (ref. 3,5,6):

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass
- Cavity Water Level

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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Category:

C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Level

Initiating Condition: RCS Leakage

EAL:

CU3.3 Unusual Event

RCS level **cannot** be monitored with a loss of RCS inventory as indicated by an unexplained level rise in **ANY** Table C-2 sump / tank attributable to RCS leakage

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Mode Applicability:

6 - Refuel

Basis:

Generic

This IC-EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RCS water level below the <u>RPV_Reactor Vessel</u> flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level decreasing below the <u>Reactor VesselRPV</u> flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the <u>Reactor VesselRPV</u> flange), warrants declaration of a NOUE due to the reduced RCS inventory that is available to keep the core covered.

— The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either <u>EAL_CA3.1</u> or <u>EAL_CA4.1</u>.

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— {The difference between CU1 and CU2 deals with shutdown and refueling modes. In cold shutdown th RCS inventory and level monitoring means are ava intact and RPV level and inventory are monitored by c	e RCS will normally be intact and st ilable. In the refueling mode the RCS	<mark>ándárd</mark> (* 1979) - <mark>is not</mark> ře Maria (* 1979) - is notře Maria (* 1979)
<u>— EAL #1</u>		
This EAL involves a decrease in RCS level below 15 minutes due to an UNPLANNED event. This E/ reactor cavity level, which is addressed by AU2 EAL1 level of the vessel flange.	VE-is not applicable to decreases in f	looded
-[For-BWRs] if RPV level continues to decrease		
[For PWRs] If RPV level continues to decrease and a escalation to CA1 would be appropriate.	eaches the Bottom ID of the RCS Loc	p then
— <u>EAL #2</u>		an a' fhainn an Air airte an Air an Air ann an Air ann an Air An Airtí Ann ann an Airtí Ann airte an Airtí Ann an Airtí An Airtí Ann an Airtí Ann an Airtí Ann an Airtí Ann an Airtí
This EAL addresses conditions in the Refuel mode wh indication and RCS level indication may not be availal indication will normally be installed (including the abili ability to monitor level will not be interrupted. However loss of RCS inventory event, the operators would nee was occurring by observing sump and tank level chan evaluated against other potential sources of leakage s containment to ensure they are indicative of RCS leak	ble. Redundant means of <u>RPV_RCS</u> levely to monitor level visually) to assure the r, if all level indication were to be lost due d to determine that <u>RPV_RCS</u> inventory ges. Sump and tank level increases musuch as cooling water sources inside the such as cooling water sources inside the sources inside the source sources inside the sources in t	el at the uring a loss ist be
Escalation to the Alert emergency classification le	vel would be via either CA1 or CA4.	
<u>Plant-Specific</u>		tan an tan tan tan tan tan tan tan tan t
In this EAL, all level indication would be unavailat must be detected by Containment Sumps, Auxilia	ry Building Sump or RCDT level ch	anges
(ref. 1, 2). Sump and tank level increases must be sources of leakage such as cooling water sources are indicative of RCS leakage.		performance and the second

Ginna Basis Reference(s):

- 1. UFSAR 5.1.3.6 Design Criteria
- 2. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
- 3. NEI 99-01 CU2

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Category:	C – Cold Shutdown / Refueling System Malfunction
Subcategory:	3 – RCS Level

Initiating Condition: Loss of RCS inventory

EAL:

CA3.1 Alert

Loss of inventory as indicated by RCS water level < 0 in.

OR

RCS level cannot be monitored for ≥ 15 min. with a loss of RCS inventory as indicated by an unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage (Note 4)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Table C-2 R	S Leakage	Indications
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	· · · ·	-	• •	· •				
•	Containment Sump A				1.			
	Containment Sump B	in a single se	•				, t	en e
•	Auxiliary Building Sump	Tank .			-	L .	•	
		11 A. 1. A. 1. A. 1. A. 1.			1.	• . • •		

- 11 - I Reactor Coolant Drain Tank (RCDT) . S. 1

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel				i a part de prés
Basis:				
Generic	$(\mathcal{A}_{i}) = \mathcal{A}_{i} \in \mathcal{B}_{i} = \{1, \dots, n_{i}\} \in \mathcal{A}_{i} \in \mathcal{A}_{i}$		·	
These <u>This</u> EALs serves as <u>a precursor</u> magnitude of this loss of water indicates not be capable of preventing further RP condition will result in a minimum emerge	that makeup systems have not bee	en effective and mag	y i i	
<u>EAL #1</u>			10 - 14 a 2	An Artista di Az
The BMR Low Low ECCS Actuation	n Satpoint/Loval 2 was chosen been	uso it is a standard	i Store	and the second second

-[The BWR Low-Low ECCS Actuation-Setpoint/Level 2 was chosen because it is a standard sotpoint at which some available injection systems automatically start. The PWR Bottom ID of the Alter States and States at RCS Loop Setpoint was chosen because at this level remote RCS level indication may be lost and loss of suction to decay heat removal systems has occurred. The Bottom ID of the RCS Loop 111、111、32日(4) Sotpoint should be the level equal to the bottom of the RPV loop penetration (not the low point of the loop).]

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failure of the RCS barrier.	point would be indicative of a
	le centre la compania de la presenta de la desta de la desta de la defensa de la del
	法法 人名法斯尔 计分子操作 化合理学 化合理学 网络美国人名法
[In the cold shutdown mode, normal RCS level and RPV lev	vel-instrumentation systems will
usually be available. In the refueling mode, normal means of RF	PV lovel indication may not be
available. Redundant means of RPV level indication will usually	
monitor level visually) to assure that the ability to monitor level v	
all level indication were to be lost during a loss of RCS inventor	v-event, the operators would need
to determine that RPV inventory loss was occurring by observing	y ovent, the operators would need a second
Sump and tank level increases must be evaluated against other as cooling water sources inside the containment to ensure they	potential sources of leakage such

[The 15 minute duration for the loss of level indication was chosen because it is half of the CS1 Site Area Emergency EAL duration. Significant fuel damage is not expected to occur until the core has been uncovered for greater than 1-hour per the analysis referenced in the CG1 basis. Therefore this EAL mosts the definition for an Alert.] If RPV_RCS level continues to lower then escalation to Site Area Emergency will be via EAL CS3.2 or EAL CS3.3.

6. C. Salari, A. S. S. S. Sander, K. Reiner, Sander Salari, A. Sanger, B. A. Sey, C. S. Salari, S. S. Salari, A. S. Salari, A. S. Salari, A. Salari, Salari, A. Salari, A. Salari, Salari, Salari, Salari, A. Salari, Salari

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Plant-Specific

When RCS water level lowers to 0 in. (uncorrected) on loop level indicators, the bottom of the RCS hot leg level instrument tap is uncovered (ref. 1, 2). This level can be monitored by:

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass

This EAL serves as a precursor to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates makeup systems have not been effective and may not be capable of preventing further RCS or Reactor Vessel level lowering and potential core uncovery. The bottom of the hot leg is the level equal to the bottom of the Reactor Vessel loop penetration, not the low point of the loop. This level was chosen because remote RCS level indication may be lost and loss of suction to decay heat removal systems has occurred. The inability to restore and maintain level after reaching this setpoint implies a failure of the RCS barrier.

In Cold Shutdown, the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the Refuel mode. Entry into Cold Shutdown mode may be attained within hours of operating at power or hours after refueling is completed. Entry into the Refuel mode may not occur for many hours after the reactor has been shutdown. Thus, the heatup and the threat to damaging the fuel clad may be lower for events that occur in the Refuel mode with irradiated fuel in the Reactor Vessel. Note that the heatup threat could be lower for Cold Shutdown conditions if the entry into Cold Shutdown was following a refueling.

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel level indication will normally be installed

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(Cavity level monitoring with the ability to monitor level visually) to assure that the ability to	$\sqrt{2}$
monitor level will not be interrupted (ref. 7,8).	Starting a specifi
In the second condition of this EAL, all level indication would be unavailable and, the	
Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building	· . *]
Sump or RCDT level changes (ref. 1, 2, 3, 5). Sump and tank level increases must be	
evaluated against other potential sources of leakage such as cooling water sources inside	en e
are containment to endure andy are indicative of recordanage.	and the second
The 15-minute interval for the loss of level indication was chosen because it is half of the	and the second
Site Area Emergency EAL duration. The interval allows this EAL to be an effective	1
precursor to the Site Area Emergency EAL CS3.1. Therefore this EAL meets the definition	
for an Alert emergency.	en en el seguetor de la dela del seguetor de la del del seguetor de la del seguetor de la del del seguetor de Recenter de la del
Ginna Basis Reference(s):	
1. RF-601 Fuel Handling Accident Instructions	÷
2. O-2.3 Draining the Reactor Coolant System to < 84" but > 64"	,
3. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System	1
4. UFSAR 5.1.3.6 Monitoring Reactor Coolant Leakage	
 UFSAR 5.2.5 Detection of Leakage Through, Reactor Coolant Pressure Boundary NEI 99-01 CA1 	· .
7. O-15.1 Administrative Requirement Checklist for Entry to Mode 6 and Refueling	
Conditions	A CARACTER STORE
8. O-6.13 Daily Surveillance Log	e e su persona e
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ন কিন্তু হৈছে বিভাগ কুলি কৈ জিলি হৈছে বিভাগ বিভাগ বিভাগ কে বিভিন্ন হৈছে বিভাগ বিভাগ বিভাগ কৈ জিলি সভাৱ হৈছে। বিভাগ কে প্ৰথম কি বিভাগ কৈ জিলি হৈছে বিভাগ বিভাগ বিভাগ বিভাগ বিভাগ কৈ বিভাগ কৈ বিভাগ কৈ বিভাগ বিভাগ বিভাগ বিভাগ কি বিভাগ কি বিভাগ বিভা বিভাগ বিভাগ

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	EMERGENCY ACTION LEVEL	EPAD-XX Revision [Draft H]	
		Page 106 of 336	
Category:	C – Cold Shutdown / Refueling System Malfunctio	n statistics de statist	en en en en en el en el
Subcategory:	3 – RCS Level		d the Black of Asian at
Initiating Condition:	Loss of RCS inventory affecting core decay heat re	emoval capability	
EAL:			
CS3.1 Site Area	a Emergency		
	nonitored with a loss of RCS inventory as indicated	by ANY of the	
following for \geq 30 min.		a sector sector de la di	, the property of
 Containment rad 	iation R-29 or R-30 > 1.0E+02 R/hr		- 14
	ange Nuclear Instrumentation indication		· · · · · · · · · · · ·
Unexplained leve	el rise in ANY Table C-2 sump / tank attributable to	RCS leakage	
	wait until the applicable time has elapsed, but should declare the ev	ent as soon as it is	
determined that the	e condition has exceeded, or will likely exceed, the applicable time.		
	Table C-2 RCS Leakage Indications		na san ang san san
•	Containment Sump A	and the second sec	and a state of the
	Containment Sump B		
	Auxiliary Building Sump Tank		a kana sa sa sa sa sa
	Reactor Coolant Drain Tank (RCDT)	n an an tha an an tha an an an an an tha an	14 X 3
L		n 1995 - Die States Alexander Baltin	
Mode Applicability:			
5 - Cold Shutdown, 6 -	Refuel		
Basis:	2		
Generic			
Under the conditions spe	cified by this ICEAL, continued decrease in RCS/RPV le	vel is indicative of	

Under the conditions specified by this ICEAL, continued decrease in RCS/RPV level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RPVRCS. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via EAL CG23.1, RG1.1, RG1.2 or R1 or AG1.3.

<u>EAL #1</u>

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instrument is not available su be used to determine if the IC	
[Since BWRs have RCS pend indicative of pressure bounds	rations below the EAL value, continued lovel decrease may be y leakage.]
<u>— EAL #3</u>	· · · · · · · · · · · · · · · · · · ·
usually be available. In the re available. Redundant means monitor level visually) to assu all level indication were to be to determine that RPV invent Sump and tank level increase	a), normal RCS level and RPV level instrumentation systems will reling mode, normal means of RPV level indication may not be fRPV level indication may not be fRPV level indication will usually be installed (including the ability to be that the ability to be that the ability to monitor level will not be interrupted. However, if post during a less of RCS inventory event, the operators would need by level and some second and tank level changes. The valuated against other potential sources of leakage such a source they are indicative of RCS leakage.]
The 30-minute duration allow control equipment.	sufficient time for actions to be performed to recover inventory <u>ctor Vessel</u> lowers, the dose rate above the core will increase. The e should result in site specific monitor indication and possible alarm.
This EAL should conservative uncovory (i.e., lovol at TOAF)	y ostimato a sito specific dose rate sotpoint indicative of core For BWRs that do not have installed radiation menitors capable of nate site specific level indications of core uncovery should be used.]
	It the installed nuclear instrumentation will operate erratically when this should be used as a tool for making such determinations.]
Plant-Specific	and a second s Second second
In Refuel or Cold Shutdow	mode, normal RCS level indication may be unavailable but
alternate means of level in	cation are normally installed (including visual observation) to
assure that the ability to me	nitor level will not be interrupted. If all means of level
	, however, the Reactor Vessel inventory loss may be detected
by the following indirect me	
 As water level in the 	Reactor Vessel lowers, the dose rate above the core will rise. The state of the second s
Containment radiation	n is indicated on R-29 and R-30. The dose rate due to this core
shine should result i	on-scale Containment radiation monitor indication and

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possible alarm. Assuming total draindown of the upper cavity, line-of-sight dose rates from a fully exposed upper internal package would be approximately 300 R/hr.

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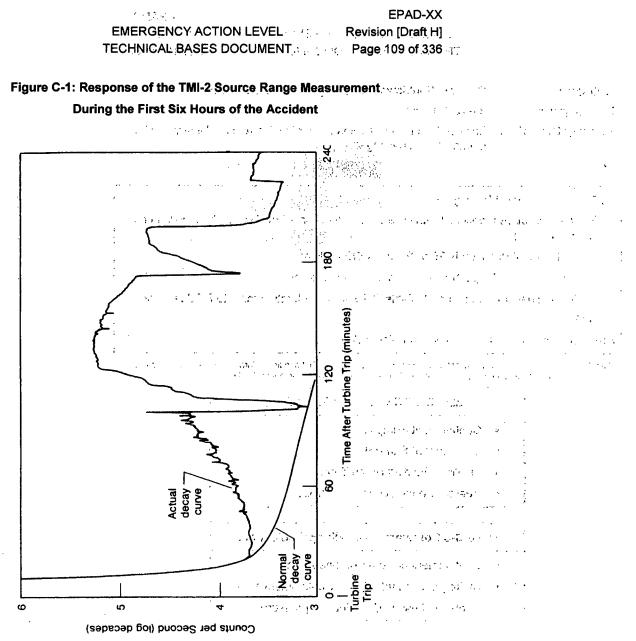
The containment radiation monitors high alarm is set at 1.0E+02 R/hr (ref 1). The 1.0E+02 R/hr setpoint has been selected to be operationally significant and above that expected under normal plant conditions while in the Refuel mode.

- Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that source range monitors such as Source Range Nuclear Instrumentation N-31 and N-32 can be used as a tool for making such determinations (ref 2). Figure C-1 shows the response of the source range monitor during the first few hours of the TMI-2 accident. The instrument reported an increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel downcomer and the reduced shielding that the two-phase mixture provides to the source range monitor.
- If water level indication is unavailable, Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes (ref. 3, 4, 5, 6, 7). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment 19. A. A. to ensure they are indicative of RCS leakage.

Ginna Basis Reference(s):

and the second and the second 1. P-9 Radiation Monitoring System and a second second second second 2. P-6 Precautions, Limitations and Setpoints Nuclear Instrumentation System 3. RF-601 Fuel Handling Accident Instructions 4. O-2.3 Draining the Reactor Coolant System to < 84" but > 64" 医马克 把一起的选择的 计可以通知 人 5. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System 6. UFSAR 5.1.3.6 Monitoring Reactor Coolant Leakage 7. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary 8. NEI 99-01 CS1 A CONTRACT OF A STATE PARTY AND A CONTRACT OF A STATE AND A STATE

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Category:	C - Cold Shutdown / Refuelir	ng System Malfunction	$\mathbf{x}_{i}^{\mathbf{k}} \in [\mathbf{x}_{i}^{\mathbf{k}}, \mathbf{x}_{i}^{\mathbf{k}}] \in [\mathbf{x}_{i}^{\mathbf{k}}, \mathbf{x}_{i}^{\mathbf{k}}] \in [\mathbf{x}_{i}^{\mathbf{k}}, \mathbf{x}_{i}^{\mathbf{k}}] \in [\mathbf{x}_{i}^{\mathbf{k}}, \mathbf{x}_{i}^{\mathbf{k}}]$
Subcategory:	3 – RCS Level	at the second segment	
Initiating Condition:	Loss of Reactor Vessel inven Containment challenged	tory affecting fuel clad integr	ity with

EAL:

CG3.1 **General Emergency**

RCS level cannot be monitored with core uncovery indicated by ANY of the following for \geq 30 min. (Note 4):

12 1 1

- Containment radiation R-29 or R-30 > 1.0E+02 R/hr
- Erratic Source Range Nuclear Instrumentation indication
- Unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage . AND

Any Containment Challenge Indication, Table C-3

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Table C-3 Containment Challenge Indications

- Containment closure not established .
- Hydrogen concentration in Containment \geq 4% •
- Unplanned rise in Containment pressure •

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

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Basis:

Generic

This IC-EAL represents the inability to restore and maintain RPV-RCS level to above the top of active fuel with containment challenged. Fuel damage is probable if RPV-RCS level cannot be restored, as available decay heat will cause boiling, further reducing the RPV-RCS level. With the Containment breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or imminent loss of function of all three barriers.

Those EALs are based on concerns raised by Generic Letter 88-17, Loss of Decay Heat Removal, SECY 91-283, Evaluation of Shutdown and Low Powor Risk Issues, NUREG-1449. Shutdown and Low Power Operation at Commercial Nuclear Power Plants in the United States. and, NUMARC 91-06, Guidelines for Industry Actions to Assess Shutdown Management.]

10 a. 1 A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include:

[PWRs] mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy; decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining and the second state of the second state

[BWRs] initial vessel level, shutdown heat removal system design

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen. deligation of the end of each

If Containment Closure is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to General Emergency would not occur. The method was a structure would be address as the transformer of the

[Site shutdown contingency plans typically provide for re-establishing CONTAINMENT CLOSURE following a loss of heat removal or RCS inventory functions.] sectors related and the accordance

12.1

[In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core why set 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 Goneral Emergency declared if it is determined that an explosive mixture exists.]

For BWRs, the use of secondary containment radiation monitors should provide indication of a statute at the increased release that may be indicative of a challenge to secondary containment. The site specific radiation monitor values should be passed on the 201 million values are easily recognizable and have an emergency basis.] The construction of the second state of the second state of the second state of the second state of the second radiation monitor values should be based on the EOP "maximum safe values" because these EAL #2 · 李·特·特尔克律师,在于他们的关系,在我们就是这个人,也是我们的人,要不

Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage. and a state of the second second second second states and the second second second second second second second

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As water level in the <u>RPV_RCS</u> lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

_{This EAL should consorvatively estimate a site specific dose rate setpoint indicative of core uncovery (ie., level at TOAF). For BWRs that do not have installed radiation monitors capable of indicating core uncovery, alternate site specific level indications of core uncovery should be used.]

[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.]

Plant-Specific

In Refuel or Cold Shutdown mode, normal RCS level indication may be unavailable but alternate means of level indication are normally installed (including visual observation) to assure that the ability to monitor level will not be interrupted. If all means of level monitoring are not available, however, the Reactor Vessel inventory loss may be detected by the following indirect methods:

- As water level in the Reactor Vessel lowers, the dose rate above the core will rise. Containment radiation is indicated on R-29 and R-30. The dose rate due to this core shine should result in on-scale Containment radiation monitor indication and possible alarm. Assuming total draindown of the upper cavity, line-of-sight dose rates from a fully exposed upper internal package would be approximately 300 R/hr. The containment radiation monitors high alarm is set at 1.0E+02 R/hr (ref 1). The 1.0E+02 R/hr setpoint has been selected to be operationally significant and above that expected under normal plant conditions while in the Refuel mode.
- Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that source range monitors such as Source Range Nuclear Instrumentation N-31 and N-32 can be used as a tool for making such determinations (ref 2). Figure C-1 shows the response of the source

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range monitor during the first few hours of the TMI-2 accident. The instrument is a standard of the accident and increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel downcomer and the reduced shielding that the two-phase mixture provides to the source range monitor.

 If water level indication is unavailable. Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes (ref. 3, 4, 5, 6, 7). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Three indications are associated with Containment challenges:

- NAME (NAME) AND STREET • Containment Closure is the action or condition that ensures Containment and its فالراقين الصطور والمتحد وواريان associated systems, structures or components, as listed in O-2.3.1A "Containment Closure Capability Within Two Hours During RCS Reduced Inventory Operation", an Bitter of 2014 and 2014 provide a functional barrier to fission product release (ref 8). Containment closure is initiated by the Shift Manager if plant conditions change that could raise the risk of a 12.17. 2011 fission product release as a result of a loss of decay heat removal: Containment and some and the second second closure requires that, upon a loss of decay heat removal, any open penetration must be closed or capable of being closed prior to RCS bulk boiling. and the second second In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due •
- to a core uncovery could result in an explosive mixture of dissolved gases in Containment. However, Containment monitoring (CH-EPIP-CVH2) and/or sampling should be performed to verify this assumption. A combustible mixture can be formed when hydrogen gas concentration in the Containment atmosphere is greater than 4.1% (rounded to 4%) by volume (ref. 9).

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ent pressure increases are not expected during Cold
node. The threshold is indicative of conditions challenging
and the second
2. Prove the second term of the constraint of the second s second second s second second s second second s second second se
· "你们还是你的你们,你们还不知道你?""你们还是你们的你们还是你们还是你们的你?""你们不是你们的你?"
urally defined actions taken to secure containment and its vstems, and components as a functional barrier to fission visting plant conditions. As applied to Ginna, Containment condition that ensures Containment and its associated pomponents (SSC), as listed in O-2.3.1A, provide a functional release.
n en en en en el persona de la companya en entre en en entre en la companya de la companya en el persona de la En entre en entre en entre en entre en entre e
an event, the reasons for which may be known or unknown, n intended evolution or expected plant response to a transient.
system ons and Setpoints Nuclear Instrumentation System ccident Instructions tor Coolant System to < 84" but > 64" eration at Reduced Inventory of the Reactor Coolant System ng Reactor Coolant Leakage of Leakage Through Reactor Coolant Pressure Boundary losure Capability Within Two Hours During RCS Reduced ent Control Room Guideline Initial Response

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Figure C-1: Response of the TMI-2 Source Range Measurement there and the second second second **During the First Six Hours of the Accident** · · · · · · and the second of the second of the second . 24C · · · · · · ÷,1 ····· . 77 ÷., $\{u_i\}_{i \in \mathcal{I}}$ and provide a second state of the state of the second state of the . . a constraint of the second aka ta ka in the State 15. 8 ·•. · .. . <u>v</u> þ (minutes) . • 1946 - N. 1966 - 1966 1.1.414 ٠. 1 million de Maria de Maria de · 120 Time Atter Turbine Trip (n 1.25 . . . Site of anador narregone, ÷. Supervise of state when the pre- $[i_1, i_2]$ 16.1 3.500 . -¹ 8 Actual decay curve •; A structure of the ::: 化氯乙基乙基基 医白红 医乙酰胺 . . . see enters en trappe a la constantina de la terra de la constantina. නා වනයේ විශ්යාවනයේ පරානයේ වියන්තාවයි. මෙම විශ්ය වෙඩි වර්තවරුම්වරින් විශ්යේ විශ්ය විශ්යානයේ අවර්ධනයේ වර්තවල මහත් විශ්ය කරන්නේ වෙරට කරුවන විශ්යානයේ විශ්ය විද්යානයේ අ මහත 1999.0 Normal decay -curve (1)Section and and Turbine Trip · · · · · · · · · · Q ŝ 4 A state of the s and shirts a transferred and and the second ÷

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Category:	C – Cold Shutdown / Refueling System Malfunction		
Subcategory:	4 – RCS Temperature	and the second state of the second state of the	
Initiating Condition:	Unplanned loss of decay hea	t removal capability	

EAL:

CU4.1 Unusual Event

Unplanned event results in RCS temperature > 200°F

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

Generic

This IC EAL is be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

Entry into cold shutdown conditions may be attained within hours of operating at power. Entry into the refueling mode procedurally may not occur for typically 100 hours (site specific) or longer after the reactor has been shutdown. Thus the heatup threat and therefore the threat to damaging the fuel clad may be lower for events that occur in the refueling mode with irradiated fuel in the RPV (note that the heatup threat could be lower for cold shutdown conditions if the entry into cold shutdown was following a refueling). In addition, the operators should be able to monitor RCS temperature and RPV level so that escalation to the alert level via CA4 or CA1 will occur if required.]

During refueling the level in the <u>RPV_RCS</u> will normally be maintained above the <u>RPV-Reactor</u> <u>Vessel</u> flange. Refueling evolutions that decrease water level below the <u>RPV-Reactor Vessel</u> flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS/RPV temperatures depending on the time since shutdown.

[Unlike the cold shutdown mode,] nNormal means of core temperature indication and RCS level indication may not be available in the Refuel mode. Redundant means of RPV_RCS 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 both temperature and level indication. Escalation to Alert would be via EAL_CA3.1 based on an inventory loss or EAL_CA4.14 based on exceeding its temperature duration or pressure criteria.

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Plant-Specific	1	and we state a state	•	
Several instruments are capable	of providing indication of RCS tem	perature with respect to	o .	se i tras
the Technical Specification cold	shutdown temperature limit (200°F)	(ref. 1). These include	restant in He	a grá trên.
(ref. 2):				. 11
The average of T0409A (T _{HOT}) and T0410B (T _{COLD}) for forced	d circulation with A	e in set i	C Rate A
RCP pump running	Constant and the second	lan the second second	$(x, y, y, y, y, z) \in \mathbb{R}^{n}$	27 a antoire
	DLD) AND either T0410A OR incore		en e	
for forced circulation with	•			
	noval Pump Discharge Header		n en Brezel 1995 Brezel-Saudi	
 Incore Temperatures 				. A.S.
Definitions:	 D1 - V dk (h + 11,990) - Statulity (a) 	and the family states of the		
Unplanned			and the second second	
A parameter change or an event that is not the result of an interest of an intere	vent, the reasons for which may be ended evolution or expected plant r	known or unknown, esponse,to a transient.	ang ar siyang ang bar 1965 ang barang ang 1965 ang barang ang barang ang	1 - 1 - 1 - 1
Ginna Basis Reference(s):				
 Technical Specifications Table O-2.2 Plant Shutdown from H NEI 99-01 CU4 			• .	
0. NEI 00-01 004		, ·	·	
		un nye en tres a Briannes († 1990) 1995 - La nacho Brian, sin an tras 1996 - Brian Britton, nye ar san an 1989 - Anne en trasta († 1990) 1989 - Anne en trasta († 1990)	and an	· · · · · · · · · · · · · · · · · · ·

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	Category:	C – Cold Shutdown	Refueling System Malfu	nction	1. 1. 1 . 1. 1.
	Subcategory:	4 – RCS Temperatur			din manan tahun sa sa sa
	Initiating Condition:	•			
	EAL:	• •		•	
				· · · · ·	
	CU4.2 Unusual				
ł		·····	indication for ≥ 15 min. (N		
			has elapsed, but should declare will likely exceed, the applicable to	me	, , ,
	Mode Applicability:				We want the second s
	5 - Cold Shutdown, 6 -	Refuel	, t. e. (c.	and the contract	atta marekita ere
	Basis:				t an the second state
	<u>Generic</u>				
	This IC -EAL is be a prec	ursor of more serious co	onditions and, as a result, is	considered to be a	
'	potential degradation of	the level of safety of the	plant. In cold shutdown the	ability to remove	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.
			v. Operation of the systems oss of electrical power or RC		
	RCS usually remains inta keep the core covered.		mode a large inventory of v	water is available to	n an the end of the same
			attained within hours of ope sur for typically 100 hours (s	ite specific) or longer	and the second state of th
			eatup-threat and therefore t in the refueling mode with ir	no-unoai io uamaying	C. Caller And Revenue (1993) 111 (1993) Annual Caller Annual Caller (1993) 111 (1993)
	RPV (note that the heatu	ip threat could be lower	for cold shutdown condition	s if the entry into cold	
			the operators should be ab the alort level via CA4 or C		
	required.]				
	During refueling the leve	I in the RPV <u>RCS</u> will no	ormally be maintained above	e the RPV <u>Reactor</u>	
I			e water level below the RPA ntrolled. Loss of forced deca		
1	reduced inventory may re		ases in RCS/RPV temperat		
	time since shutdown.				
ĺ			ns of core temperature indic de. Redundant means of RI		ı
'	are therefore procedural	ly installed to assure that	t the ability to monitor level	will not be interrupted.	
			vere to be lost in either the claration of a NO UE if both		
,	indication cannot be rest	tored within 15 minutes f	rom the loss of both means	of indication.	

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Escalation to Alert would be via EAL CA3.1 based on an inventory loss or EAL CA4.14 based on a second secon

Plant-Specific

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel 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. Reactor Vessel water level is normally monitored in Refuel mode using the following instruments (ref. 1,5,6):

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass
- Cavity Water Level

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F) (ref. 2). These include (ref. 3):

- The average of T0409A (T_{HOT}) and T0410B (T_{COLD}) for forced circulation with A RCP pump running
- The average of T0410B (T_{COLD}) AND either T0410A OR incore thermocouples for T_{HOT} for forced circulation with B RCP pump running
- T0630 Residual Heat Removal Pump Discharge Header
- Incore Temperatures

Ginna Basis Reference(s):

- 1. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 2. Technical Specifications Table 1.1-1
- 3. O-2.2 Plant Shutdown from Hot Shutdown to Cold Conditions
- 4. NEI 99-01 CU4

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- 5. O-15.1 Administrative Requirement Checklist for Entry to Mode 6 and Refueling Conditions
- 6. O-6.13 Daily Surveillance Log

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Category:	C – Cold Shutdown / Refueling System Malfunction	
Subcategory:	4 RCS Temperature	de la
Initiating Condition:	Inability to maintain plant in cold shutdown	
EAL:	en 14 met en de la companya de la c La	

CA4.1 Alert

An unplanned event results in EITHER: A state of the stat 1.11 3

assault in the sign for

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OR

RCS pressure increase > 10 psi due to an unplanned loss of decay heat removal capability (this condition is not applicable in solid plant conditions) 25.3 1

Table C-4 RCS			aku antari si si subata da uta na subata antari subata subata subata. Statu subata da Strata da Strata da Strata subata subata subata subata subata subata subata subata subata subat Strata da
RCS Status	Containment , Closure Status		na na Record as an assurant as an an an Record as assared as as an an as a
Intact AND not reduced inventory	N/A		
Not intact OR	Established	20 min.*	(14) A set of participant participants of the set of
reduced inventory	Not established	0 min.	an an ann an ann an European an Anna an

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

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

Generic

and the state of the For EAL 1, tThe RCS Reheat Duration Thresholds table addresses complete loss of functions required for core cooling for greater than 60 minutes during refueling and cold shutdown modes when RCS integrity is established. [RCS integrity should be considered to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams). The status of CONTAINMENT CLOSURE in this condition is immaterial given that the RCS is providing a high pressure barrier to fission product release to the onvironment.] The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

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The RCS Reheat Duration Thresholds table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refueling and cold shutdown modes when

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2. Containment Closure is established but RCS integrity is not established or RCS inventory is reduced [(e.g., mid loop operation in PWRs)]. [As discussed above, RCS integrity should be assumed to be in place when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams).]. The allowed 20 minute time New Sector Press 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 prossure Containment barrier to fission product release is established. a na agus e cheisteachd à c Finally, complete loss of functions required for core cooling during refueling and cold shutdown modes when neither Containment Closure nor RCS integrity are established is addressed. [RCS integrity is in place when the RCS 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 because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment. . . The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time a de la completa de En esta de la completa frame 1. 1. 1. 2. In EAL 2, tThe 10 psig pressure increase addresses situations where, due to high decay heat loads, the time provided to restore temperature control, should be less than 60 minutes. The RCS العالي المحاجر منه. والع المحاج الأليان محاج pressure setpoint was chosen should be 10 psi obecause it is the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psig. and the second Escalation to Site Area Emergency would be via EAL CS3.1 should boiling result in significant RPV · · · · · · · · · Reactor Vessel level loss leading to core uncovery. - -**.** . in a set cash t · · · · For PWRs, this IC and its associated EALs are based on concerns raised by Generic Letter 88-17. "Loss of Decay Heat Removal." A number of phenomena such as pressurization, vortexing, . steam generator U tube draining, RCS level differences when operating at a mid leop condition, decay heat removal system design, and level instrumentation problems can lead to conditions where decay heat removal is lost and core uncovery can occur. NRC analyses show that there are sequences that can cause core uncovery in 15 to 20 minutes and severe core damage within an s prove a state of the second state of hour after decay heat removal is lest.] A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary unplanned excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available. and the second second The Emergency Director must remain alert to events or conditions that lead to the conclusion that and the second frank exceeding the EAL is imminent. If, in the judgment of the Emergency Director, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded.

Plant-Specific

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Several instruments are capable of providing indication of RCS temperature with respect:

 The average of T0409A (T_{HOT}) and T0410B (T_{COLD}) for forced circulation with A RCP pump running 	
• The average of T0410B (T _{COLD}) AND either T0410A OR incore thermocouples fo	 A state of a state o
T _{HOT} for forced circulation with B RCP pump running	
 T0630 Residual Heat Removal Pump Discharge Header 	an a
Containment Closure is the action or condition that ensures Containment and its	$r \sim 10^{-12}$
associated systems, structures or components, as listed in O-2.3.1A "Containment Clos	n engelen og er en som som som som en er en e E ure en er en e
Capability Within Two Hours During RCS Reduced Inventory Operation" (ref. 3), provide	
functional barrier to fission product release. Containment closure is initiated by the Shift	
Manager if plant conditions change that could raise the risk of a fission product release	as
a result of a loss of decay heat removal. Containment closure requires, upon a loss of	a the second
decay heat removal, any open penetration must be closed or capable of being closed pr to RCS boiling.	rior
Reduced Inventory (administrative) is defined as RCS level less than 64 in. on the RCS Loop indicators (ref. 4).	a an
The pressure rise of greater than 10 psig implies an RCS temperature in excess of the	and the state of the
Technical Specification cold shutdown limit (200°F) for which this EAL would otherwise	· ·
permit up to sixty minutes to restore RCS cooling before declaration of an Alert (RCS	· · · · · · ·
intact). This EAL therefore covers situations in which it is determined that, due to high	
decay heat loads, the time provided to reestablish temperature control should be less th	an
sixty minutes (as indicated by significant RCS re-pressurization).	

Pressure indicator PI-420 Rx Clnt Loop Lo Rng Press is capable of measuring pressure changes of 10 psig (ref. 5). This represents the visual resolution of the device, with the smallest scale increment of 10 psig (Basis: Walkdown). Escalation to a Site Area

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Emergency would be under l					
level loss leading to core und	overy.	•		ali a ta sa .	
Definitions:					
Containment Closure	· · · · ·	. •	s Artista (S. K.)	· · · · ·	
The site-specific procedu associated structures, sys product release under ex Closure is the action or co systems, structures or co barrier to fission product of	stems, and components isting plant conditions. A ondition that ensures Co mponents (SSC), as liste	as a function s applied to G ntainment an ed in O-2.3.1/	al barrier to fiss Sinna, Containn d its associated	ion nent I ctional	· · · · · · · · · · · · · · · · · · ·
RCS Intact			····		· · · · · · · · · · · · · · · · · · ·
The RCS should be cons condition for the cold shu dams).	tdown mode of operation	n (e.g., no free	eze seals or no	its normal zzle	
Unplanned					
A parameter change or a that is not the result of an	n event, the reasons for i intended evolution or ex	coected plant	response to a	ransient.	an an Arran an Arran Arran an Arran an Arr
Ginna Basis Reference(s):	1 a a a a a	4	i de la constante de la consta	e 1243 1	
1. Technical Specifications	Table 1.1-1				
 O-2.2 Plant Shutdown fro O-2.3.1A Containment Cl Inventory Operation O-2.3.1 Draining and Ope <u>CPI-PRESS 420 Calibrat</u> 	losure Capability Within eration at Reduced Inver	Two Hours Do	uring RCS Red	uced System	and a second second Second second s
Instrumentation		yotenn ress			الأربعين وهي والالا والالا
6.<u>5.</u>NEI 99-01 CA4		1. A. 1. A.	terre partire. T	2000 reactions of	n Fernand Carlos and
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Category:	C – Cold Shutdown / Refueling System Malfunction
Subcategory:	5 – Communications reactions and a statement of the second statement of the statement of the second statem
Initiating Condition:	Loss of all onsite or offsite communications capabilities

EAL:

CU5.1 Unusual Event

Loss of **all** Table C-5 onsite (internal) communication methods affecting the ability to perform routine operations **OR**

Loss of all Table C-5 offsite (external) communication methods affecting the ability to perform offsite notifications

Table C-5 Communications Systems			na se a provinsi de la Aliga de Stati Aliga de la Companya d
System	Onsite (internal)	Offsite	terra to select and and the selection of t
Commercial phone system	x	X	алын алы <u>алын ал</u> ы алы тарылар (1979) ж. Тарылар алы (1979) ж. (1979) ж. (1979) ж. (1979) ж. (1979)
Direct Dial POTS Lines (Blue Phones)	x	x	
Plant Page Party system	x		
Radios/Walkie Talkies	x		
FTS 2001 telephone system (ENS, HPN)		x	
Control Room Hard Wired Satellite Phone		x	
Control Room Emergency Cell Phone		x	

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel, D - Defueled

Basis:

Generic

The purpose of this <u>IC_EALand its associated EALs</u> is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

		EPAD-XX	
TECHNICAL BASES DO		Page 120 01 330	
The availability of one method of ordinary off-site communistate, and local authorities of plant issues. This EAL is intra-	ended to be used only	when	
extraordinary means (e.g., relaying of information from ra- to off-site locations, etc.) are being utilized to make comm		Nouals being sent	
	t encompass the loss o	f all means of	
——Site specific list for off site communications loss must communications with off site authorities. This should inclu telecopy transmissions, and dedicated phone systems.]			na dyna a sin a barail 2011 - Angelan Angelan a sin a sin 2011 - Angelan Angelan Angelan a sin a
Plant-Specific	une de la sec	an an the second second	· · · · · · · · · · · · · · · · · · ·
Onsite/offsite communications systems are listed in T	Гаble C-2 (ref. 1, 2).	 	tana ang tang tang tang tang tang tang t
This EAL is the cold condition equivalent of the hot c	ondition EAL SU6.1.		
Ginna Basis Reference(s):		• · · ·	· ·
1. A-56 Communication Systems at Ginna Station	ta stranije stranije	·	
2. ER-COMM.1 Loss of Communications			
3. NEI 99-01 CU6	N/	а <u>н</u> (т. 4)	te i italian
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 Category:
 C - Cold Shutdown / Refueling System Malfunction

 Subcategory:
 6 - Inadvertent Criticality

 Initiating Condition:
 Inadvertent criticality

 EAL:
 EAL:

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CU6.1 Unusual Event

An unplanned sustained positive startup rate observed on nuclear instrumentation

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

Generic

This IC-EAL addresses criticality events that occur in Cold Shutdown or Refuel modes [(NUREG 1449, Shutdown and Low Power Operation at Commercial Nuclear Power Plants in the United States)]_such as fuel mis-loading events and inadvertent dilution events. This IC-EAL indicates a potential degradation of the level of safety of the plant, warranting a NOUE classification.

Escalation would be by Emergency Director jJudgment.

Plant-Specific

The term "sustained" is used to allow exclusion of expected short-term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short-term positive startup rates are the result of the rise in neutron population due to subcritical multiplication. Short-term positive startup rates can also be due to welding activities.

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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Ginna Basis Reference(s):

1. NEI 99-01 CU8

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Category H – Hazards ar	nd Other Conditions Affecting Plant Safety	
EAL Group:	ANY (EALs in this category are applicable to	A CHAR STRATE CONSTRACT OF BERNARD ST
	any plant condition, hot or cold.)	and the second system of the second second
Hazards are non-plant sys	stem-related events that can directly or indirectly	affect plant and a second state and the
operation, reactor plant sa	afety or personnel safety.	n na seu la stra de placera a ser placera per placera de placera p
	والمراجع والمراجع المراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع	 A start of the second se second second s second second se
The events of this categor	y pertain to the following subcategories:	en al altra de la complete de l
1. Natural or Destructiv	ve Phenomena	n en stratien bestriken de service
Natural events include	hurricanes, earthquakes or tornadoes that have	potential to the advance of the second se
cause plant structure o	or equipment damage of sufficient magnitude to t	threaten
personnel or plant safe	ety. Non-naturally occurring events that can caus	se damage to
plant facilities include a	aircraft crashes, missile impacts, etc.	

2. Fire or Explosion

Fires can pose significant hazards to personnel and reactor safety. Appropriate for classification are fires within the site Protected Area or which may affect operability of equipment needed for safe shutdown

3. Hazardous Gas

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

4. Security

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

5. Control Room Evacuation

Events that are indicative of loss of Control Room habitability. If the Control Room must be evacuated, additional support for monitoring and controlling plant functions is necessary through the emergency response facilities.

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6. Judgment

The EALs defined in other categories specify the predetermined symptoms or events that are indicative of emergency or potential emergency conditions and thus warrant classification. While these EALs have been developed to address the full spectrum of possible emergency conditions which may warrant classification and subsequent implementation of the Emergency Plan, a provision for classification of emergencies based on operator/management experience and judgment is still necessary. The EALs of this category provide the Emergency Director the latitude to classify emergency conditions consistent with the established classification criteria based upon Emergency Director judgment.

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Category:H – Hazards and Other Conditions Affecting Plant SafetySubcategory:1 – Natural or Destructive PhenomenaInitiating Condition:Natural or destructive phenomena affecting the Protected AreaEAL:

HU1.1 Unusual Event

Seismic event identified by ANY two of the following:

- Red LED event indicator on Kinemetrics ETNA Digital Recorder indicates seismic event detected
- Earthquake felt onsite
- National Earthquake Information Center (Note 6)

Note 6: The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude.

Mode Applicability:

All

Basis:

Generic

These EALs are is EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

<u>EAL-#1</u>

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

[For most plants with soismic instrumentation, the soismic switches are set at an acceleration of about 0.01g. This EAL-should be developed on site specific basis. The method of detection can be based on instrumentation, validated by a reliable source, or operator assessment.]

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

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<u>EAL #2</u>	· · · · ·			:	
This EAL is based on a tornado striking (t	ouching down) or high winds	within the PROTECTE	Đ	• ,	••••••••
AREA.		Cables of the CAS	en en ester	$U \not = M_{\rm eff} (M_{\rm eff})^2$	i di privi
[The high wind value should be based on range of the instrumentation available for		asis as long as it is with	hin the		
Escalation of this emergency classification	n level if appropriate would	he based on VISIBLE	5.1		
DAMAGE, or by other in plant conditions,					
<u>EAL #3</u>	an e an the same start of the set		st greater in the		•
This-EAL addresses the effect of internal equipment misalignment, or outage activit	5 ,	uch as component failu	res, teata	"• · · ·	
		a the part of the second	en a Meritan Ang		
[The site specific areas include those area				• • • • •	
plant, which are not designed to be partia insight into areas to be considered when t		plant's IPEEE may provi			
Escalation of this emergency classification via HA1, or by other plant conditions.	n level, if appropriate, would	be based VISIBLE DAI	MAGE		11 J. 11
<u>EAL#4</u>					
This EAL addresses main turbine rotating	component failures of suffic	ient magnitude to caus	e		• •
observable damage to the turbine casing					(^r w ?
damage observed after generator purge of impact normal operation of the plant.	loes not meet the intent of th	nis EAL because it did r	lot		7 :
input normal operation of the plant.			(1,2,2,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,		er star
Of major concern is the potential for leaka (hydrogen cooling) to the plant environs. /	Actual FIRES and flammable		;		
appropriately classified via HU2 and HU3	ter an		entre entre F		the end
This-EAL is consistent with the definition of desired and recognizing the risk to non sa		the anticipatory nature)	•	· • - ^ - • •
					· ^,
Escalation of this emergency classification done by PROJECTILES generated by the conjunction with a steam generator tube r	failure or by the radiologica	I releases for a BWR; o			
classified by the radiological ICs or Fissio		1944 - 1968 197			

<u>EAL #5</u>

This EAL addresses other site specific phenomena (such as hurricane, flood, or seiche) that can also be presursors of more serious events.

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[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.).]	yn Poly Gall e 1	
l Plant-Specific	ata di k	$\sim 1000 \times 10^{-1} {\rm gm}^{-1} = 1$
A strong motion accelerograph is installed in the subbasement of the intermediate building at elevation 237 ft (ref. 1).		
Ginna seismic instrumentation actuates upon sensing any ground motion greater than 0.01g. Registration of a tremor > 0.01g is indicated by a red light on the event indicator at the bottom of the accelerograph case (ref. 2, 3, 4).		unitaria de la composición de la compos de la composición de la de la composición de
The National Earthquake Information Center (NEIC) can confirm seismic activity in the vicinity of Ginna. The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of R. E.		n son to the son A Balan Authorite
Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude (ref. 5).	n wyw 1997 - Star	
1 UESAR Section 3.7.4 Seismic Instrumentation		,

1.	UFSAR Section 3.7.4 Seismic Instrumentation
2.	ER-SC.4 Earthquake Emergency Plan
3.	CPI-ACCELEROGRAPH-51 Functional Check of Kinemetrics Strong Motion Accelerograph
4.	VTD-K3356-4104 Kinematics, ETNA Strong Motion Accelerograph Schematics
5.	USAR Section 2.1.1 Site Location and Description
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6. NEI 99-01 HU1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety	
Subcategory:	1 – Natural or Destructive Phenomena	
Initiating Condition:	Natural or destructive phenomena affecting the Protected Area	
EAL:		

HU1.2 Unusual Event		$(1,1) \in \{1,2\} \text{ for } i \in \{1,2\}$
Tornado striking within Protected OR	d Area boundary a second graduit construction of a second parameters adaption a function of the second	
Sustained high winds > 75 mph	and a second second Second second	
Mode Applicability:	tana provinsi da Antika anti an	and the second state
All	 Construction (CONSTRUCTION) Construction (CONSTRUCTION) 	an Tari sa na sa
Basis:	 A state of a figure of the context of a state of a st	
Generic	na an an tao an	

These This EALs are is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

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1.1.1

EAL #1

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Damage may be caused to some portions of th	e site, but should not affe	ect ability of safety	
functions to operate.		. All the state of the second states of the	

October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the pueleas plant cite and recording to the the tite and recording to 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. This EAL should be developed on site specific basis. The method of detection can be based on instrumentation, validated by a reliable source, or operator assessment.]

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

EAL #2

This EAL is based on a tornado striking (touching down) or high winds within the Protected Area.

[The high wind value should be based on site specific FSAR design basis as long as it is within the range of the instrumentation available for wind speed.]

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	TECHNICAL BASES DOG	CUMENT P	age 135 of 336				
Escalation of this emergency or by other in plant conditions			-		· .		·
<u>EAL #3</u>				•		· · · ·	
This EAL addresses the effect equipment misalignment, or o			onent failures,			и 1 ре	
[The site specific areas inclue plant, which are not designed insight into areas to be consid	to be partially or fully submor	god. The plant's IPEEE	may provide	- .		1993) 1993 - 1993	
Escalation of this emergency via HA1, or by other plant cor	classification level, if appropri	-		• •	<u>``</u>	Induc	
<u>EAL #4</u>				· .		· · · · .	
This EAL addresses main turl observable damage to the tur damage observed after gener impact normal operation of th	bine casing or to the seals of ator purge does not meet the	es of sufficient magnitue the turbine generator. G	enerator seal use it did not	n Santa Santa Santa Santa Santa Santa Santa			
Of major concern is the poten (hydrogen cooling) to the plar appropriately classified via HI	t environs. Actual FIRES and		and gases				

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 this emergency classification level, if appropriate, would be to HA1 based on damage done by PROJECTILES 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. <u>EAL #5</u>

This EAL addresses other site specific phenomena (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

[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., procautionary shutdowns, diesel testing, staff call outs, etc.).]

Plant-Specific

All Class 1 structures are designed for a wind velocity of 75 mph assuming FSAR "severe environmental loading" conditions (ref. 1).

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nd speed can be measured up to 100 mph on the 250' and 150' wind speed recorder 'A' f. 2). Sustained winds are the five-minute average wind speed.
e Protected Area Boundary is depicted in Drawing 33013-2722 (ref. 3)
finitions:
Protected Area
The site specific area which normally encompasses all controlled areas within the security Protected Area fence.
nna Basis Reference(s):
UFSAR Section 3.3.2.1.4 Wind and Tornado Loadings - Input Load Criteria CPI-MET-250 Calibration of Ginna Station Meteorological Wind Speed and Wind Direction Translator Cards Drawing 33013-2722 Residential AC Power Distribution Circuit - Site Layout ER-SC.1 Adverse Weather Plan NEI 99-01 HU1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting the Protected Area
EAL:	

HU1.3 Unusual Event

Internal flooding that has the potential to affect **ANY** safety-related structure, system, or component required by Technical Specifications for the current operating mode in **ANY** Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Control Building sets as an intervention of a set of the set

research and the states of the

- Intermediate Building
- Emergency Diesel Building(s)
- SAFW Building
- Screenhouse
- Cable Tunnel Support Strateger State (Sector Strateger Strateger State)
 Kernel Strateger State (Sector Strateger Strateger State)
- Battery Rooms

Mode Applicability:

All

Basis:

Generic

These This EALs are is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

<u>EAL #1</u>

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake".is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

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{For most plants with soismic about 0.01g. This EAL should basod on instrumentation, val	be developed on site sp	ocific basis. The me	thod of detectior		:	· • .
The National Earthquake Cen	ter can confirm if an ear	thquake has occurre	d in the area of t	he plant.	х <u>г</u>	.: * **
EAL#2	··· · ·					
This EAL is based on a tornad	to striking (touching dow	n) or high winds with	in the PROTEC	TED		•
AREA.		 A set of the set of		i the solution	a goralea	• * • * • • • •
{The high wind value should b range of the instrumentation a			as long as it is w	within the	، ميري في أخير. •	
Escalation of this emergency DAMAGE, or by other in plant		propriate, would be b	ased on VISIBL	E		
<u>EAL#3</u>			·. · ·			
This EAL addresses the effect		sed by events such a	as component fa	ilures,	· · ·	: :
equipment misalignment, or o	utage activity mishaps.		•.		1. 11	
{The site specific areas includ plant, which are not designed insight into areas to be consid	to be partially or fully su	bmerged. The plant's				
Escalation of this emergency EAL_HA1 <u>.3</u> , or by other plant of		propriate, would be b	ased visible dan	n age via		

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<u>EAL#4</u>	and a construction operator when all provide many life in-	· 你到了这个新闻,我们们有这个人的最近的。
	e rotating component failures of sufficient magnitude to cause the casing or to the seals of the turbine generator. Generator seal	B. A. Arabaka, "Devices in the effective second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system in the second system is a second system in the second system in the second system in the second system in the second system in the second system in the second system is a second system in the second system in the second system is a second system in the second system in the second system is a second system in the second system in the second system is a second system in the second system in the second system is a second system in the second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system is a second system in the second system in the second system is a second system in the second system is a second system in the secon
	or purge does not meet the intent of this EAL because it did not	and the state of the second
impact normal operation of the pl	lant. Pins vuriensis oppositionen providioren oppositionen alter	· 如果,你们要找到这个人的问题。
	l for leakage of combustible fluids (lubricating oils) and gases (and the straight data with the
	environs. Actual FIRES and flammable gas build up are	- 11 - 17 · 1
appropriately classified via HU2 a	and-HU3.	· · · · · · · · · · · · · · · · · · ·
This EAL is consistent with the do desired and recognizing the risk t	lefinition of a NOUE while maintaining the anticipatory nature to non-safety related equipment.	

Escalation of this emergency classification level, if appropriate, would be to HA1 based on damage done by PROJECTILES 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.

<u>EAL #5</u>

This EAL addresses other site specific phenomena (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

[Sites subject to sovere weather as defined in the NUMARC station blackout initiatives should include an EAL based on activation of the severe weather mitigation procedures (e.g., procautionary shutdowns, diesel testing, staff call outs, etc.).]

Plant-Specific

This threshold addresses the effect of flooding caused by internal events such as component failures, Circulating, Component Cooling or Service Water line ruptures, equipment misalignment, fire suppression system actuation, and outage activity mishaps.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of its removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

This threshold addresses events that may have resulted in a Safe Shutdown Area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems. Safe Shutdown Areas are areas that house equipment the operation of which may be needed to ensure the reactor safely reaches and is EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 140 of 336

maintained in cold shutdown. Safe Shutdown Areas include structures that contain the equipment of concern (ref. 1, 2).

Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume | Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HU1

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	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 141 of 336	
Category:	H – Hazards and Other Conditions Affecting Plant Safety	
Subcategory:	1 – Natural or Destructive Phenomena	
Initiating Condition: EAL:	Natural or destructive phenomena affecting the Protected Area	
HU1.4 Unusua	al Event	
Turbine failure resulti	ng in casing penetration or damage to turbine or generator seals	
Mode Applicability:		
All	ante en estado y deserva en en el conserva en estatute de la seconda de la conserva de la conserva y a serva e Referencia de la conserva de la conserva en estado en la conserva de la conserva en estado estado estado estado	
Basis:	からたち かんぽうがん かわり しょうよう かかられたのでの ムチャック・モス えいかく うちょうよう	. NJU - 4
Generic	and and an	-0
functions to operate. As defined in the EPRI October 1989, a "felt ea vibratory ground motior a consensus of control instrumentation, the sei	by perators.	i forma na transforma na transforma na transforma na
	should be developed on site specific basis. The method of detection can be	
basod on instrumentation	on, validated by a reliable source, or operator assessment.]	
basod on instrumentation The National Earthquai		
basod on instrumontation The National Earthquak EAL#2	on, validated by a reliable source, or operator assessment.] ce Center can confirm if an earthquake has occurred in the area of the plant.	1
based on instrumentation The National Earthquak <u>EAL #2</u> This EAL is based on a AREA. [The high wind value st	on, validated by a reliable source, or operator assessment.] ce Center can confirm if an earthquake has occurred in the area of the plant.	÷
basod on instrumentation The National Earthquak <u>EAL #2</u> This EAL is based on a AREA. [The high wind value shange of the instrument Escalation of this emerging	on, validated by a reliable source, or operator assessment.] «e Center can confirm if an earthquake has occurred in the area of the plant. -tornade striking (touching down) or high winds within the PROTECTED nould be based on site specific FSAR design basis as long as it is within the	•

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	LEVEL Revision [Draft H]		
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	y events such as component failures,		
is a straight of the	stoms required for safe shutdown of the god. The plant's IPEEE may provide		
	<u>\.</u>		
	ate, would be based VISIBLE DAMAGE		
· · · · · ·	· · · · · · · · · · · · · · · · · · ·		,
化合金 化化合金	es of sufficient magnitude to cause	1、1853年1月25日	
	he turbine generator. Generator seal	, -	
	intent of this EAL because it did not		
5	fluids (lubricating oils) and gases	·	
	flammable gas build up are		
yn Mary y Cold Cymry M			
	maintaining the anticipatory nature ment.		
	ate, would be to <u>EAL_HA1.4</u> based on r by the radiological releases for a , for a PWR . These latter events would sion Product Barrier <u>Category F</u>		
	s hurricane, flood, or seiche) that can		
	S station blackout initiativos should nitigation proceduros (o.g.,).]		
			i
	al kinetic energy in its rotor. In the		
	al kinetic energy in its rotor. In the y may be transformed into both		
	y may be transformed into both		

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	ojectiles may impact variou luipment.	us plant structures, including those housing safety related	y tu biyo a San tu sant
	ailure of turbine or generato condenser vacuum (ref. 1)	or seals maÿ be indicated by a loss of seal oil pressure or loss the entry of the second to be a second to be a	•1 •• • • • • • • • • • • • • • • • • •
Gi	inna Basis Reference(s):	Failure and Missile Emergency Plan - Automatic gradient and attraction and the second statement of the	-
	NEI 99-01 HU1	1 1. 585	int 12 o toda o go di
		a interaction between the second of the second s Second second s	್ಷಾಗಿ ಕ್ಷೇತ್ರಿ ಕ್
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Category:	H – Hazards and Other Conditions Affecting Plant Safety	
Subcategory:	1 – Natural or Destructive Phenomena	$e = \frac{1}{2} e^{-\frac{1}{2} \frac{1}{2} \frac{1}$
Initiating Condition:	Natural or destructive phenomena affecting the Protected Area	n kalana ya kala ana sa ƙwarta
EAL:		Contractor and the second

HU1.5 Unusual Event

Deer Creek flooding over entrance road bridge hand rail

Lake level > 252 ft

OR

Screen House Suction Bay water level < 17 ft or < 15.5 ft by manual level measurement

Mode Applicability:

All

Basis:

Generic

These This EALs are is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

<u>EAL #1</u>

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated Octobor 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. This EAL should be developed on site specific basis. The method of detection can be based on instrumentation, validated by a reliable source, or operator assessment.]

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

EAL #2

This EAL is based on a tornado striking (touching down) or high winds within the PROTECTED AREA.

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[The high wind value should be range of the instrumentation av	based on site specific FSAR design basis vallable for wind speed.]	<mark>s as long as it is within the</mark> , any then been been as a real	ŗ
-	, .	(1,1,2,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,3,	· .
	lassification level, if appropriate, would be l conditions, via HA1.	<mark>based on VISIBLE</mark> Mine Chine seesad a ^{the C} uiter ⁽ the start st	. ·
EAL-#3	mende la selfateria.		• * .
This EAL addresses the effect equipment misalignment, or ou	of internal flooding caused by events such tage activity mishaps.	as component failures,	
plant, which are not designed t	those areas that contain systems required o be partially or fully submorgod. The plant ared when developing this EAL.]	alignet of the constant of the constant of the second second second second second second second second second s	· .
Escalation of this emergency c via HA1, or by other plant cond	lassification level, if appropriate, would be l litions.	based VISIBLE DAMAGE	
<u>EAL-#4</u>	even in any dramatic the	an table sign an ormal algebra and a	· .
observable damage to the turb	ne rotating component failures of sufficient ine casing or to the seals of the turbine ger tor purge does not meet the intent of this E plant.	nerator. Generator seal	. •
(hydrogen cooling) to the plant	al for leakage of compustible fluids (lubrica environs. Actual FIRES and flammable ga 2 and HU3.	ating oils) and gases is build up are	
	definition of a NOUE while maintaining the kine of a non-safety related equipment.	e anticipatory nature	
done by PROJECTILES generation with a steam generation	lassification level, if appropriate, would be t ated by the failure or by the radiological rel ator tube rupture, for a PWR. These latter s or Fission Product Barrier ICs.	leases for a BWR, or in	· .
<u>EAL #5</u>			٠
This EAL addresses other site also be precursors of more ser	specific phenomena (such as hurricane, fle ious events.	ood, or seiche) that can	

[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.).]

Plant-Specific

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This threshold addresses high and low lake water level conditions that could be a precursor of more serious events.

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Ginna plant grade is generally at 270 ft mean sea level (msl) except the area between the lake and Turbine Building which is at grade 253 ft msl. Lake water level > 253.28 ft msl corresponds to plant design levels (ref. 1). A lake level of 252 ft has been selected for this threshold to be anticipatory of exceeding design flood levels and is the level at which flood control actions are procedurally taken (ref. 2).

Flooding in Deer Creek above the plant entrance handrails will ultimately result in water accumulation in the Turbine Building and Screenhouse (ref. 2). This may preclude emergency response personnel access and egress.

High lake level may be determined using markers attached to a metal pole mounted on the discharge canal bridge upstream of the submarine net. The high level markers are at lake levels of 252 ft and 253 ft (ref. 2).

The Screenhouse Lo-Lo level alarm actuates at 19' indicated (ref. 3). When Screenhouse Suction Bay water level drops to 17.0 ft indicated (this corresponds to a level of 15.5' measured manually) increased Control Room monitoring is initiated. This level has been selected for this threshold to be anticipatory of a potential loss of service water system pump suction at 16.0 ft (ref. 4).

••. ...

Ginna Basis Reference(s):

- 1. UFSAR Section 3.4.1 Flood Protection
- 2. ER-SC.2 High Water (Flood) Plan
- 3. AR-I-9 Screen House Lo-Lo Level 19'
- 4. ER-SC.3 Low Screenhouse Water Level
- 5. NEI 99-01 HU1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety		•	
Subcategory:	Natural or Destructive Phenomena			
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas	`		1

EAL:

HA1.1	Alert	- kurse og er som skale af er er som skale som skale som er som er er som skale som er er som skale som er sog Skale som er er som skale og er er som skale som er som skale som er s	ng Ang San
EITHER			
1	irmation of an earth rgency Plan	quake of an intensity > 0.08 g per ER-SC.4 Earthquake	· · ·
Cont	R rol Room indication em, or component	of degraded performance of ANY safety-related structure,	۲۰۰۰ کار دور ۲۰۰۰ زیر ۲۰ ۱۹۰۰ - ۲۰۰
AND			
Earthqua	ake confirmed by El	THER:	
E	arthquake felt in one	site	
	OR	· · · · · · · · · · · · · · · · · · ·	
N	ational Earthquake	Information Center (Note 6)	
	confirm recent seismic act	d by calling (303) 273-8500. Select option #1 and inform the analyst you wish to ivity in the vicinity of Ginna Nuclear Power Plant. Provide the analyst with the s: 43° 16.7' north latitude, 77° 18.7' west longitude.	:

Mode Applicability:

All

Basis:

<u>Generic</u>

These EALs escalate from HU1.1 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction ICsEALs.

EALs #2 - #5

	EMERGENCY ACTION LE	EVEL Re	evision [Draft H]		
	TECHNICAL BASES DOCU	MENT P	Page 148 of 336		
	te specific structures or areas th				
	ired for safe shutdown of the pla or equipment and plant areas re			u	· · · · ·
shutdown.]				_ **	•
<u>EAL #1</u>					
	de can result in a vital area beir e assumed to have occurred to			• • • • • •	; .
This threshold should be base	d on site specific FSAR design	basis. Soo EPRI sp	onsored		· .·
"Guidelines for Nuclear Plant F seismic event categories.]	Rosponso to an Earthquake", da	nted October 1989, fe	ə r information on	Alexandra Terration	
The National Earthquake <u>Inform</u> of the plant.	<u>mation</u> Center can confirm if an	earthquake has occ	urred in the area	n an	
	· .				
<u>EAL #2</u>					
This EAL is based on a tornad	o-striking (touching down) or hig	h-winds that have or	aused VISIBLE	· · · · ·	
	ning functions or systems require			and the set of a	
[The high wind value should be range of the instrumentation av	o based on site specific FSAR d	losign basis as long	as it is within the	an an an Araige	· · · ·
-		، د ۱۹۰۰ و سو	••••		• •••
<u>EAL #3</u>	(f) A set of the se	a second s	result 1 MML in the second	an a	
	of internal flooding caused by e			e t _a	• .
	utage activity mishaps. It is base rial safety hazards (e.g., electric				
	afety equipment. The inability to				
	al or substantial potential degrae	dation of the level of	safety of the		
plant.					
	escribes a condition where wate of removal, resulting in a rise o				
Classification of this EAL shou	ld not be delayed while corrective				
the water source.	4. F. 1. Methods (1992)	•	"Bartal and	ing the second	
plant, which are not designed l) those areas that contain syste to be partially or fully submerge prod when developing this EAL.	d. The plant's IPEEE	shutdown of tho may provide		
Ũ				andar da eta da esta d Esta da esta da	
<u>EAL #4</u>		, , ,			
by main turbine rotating compo	to safety related equipment imponent failures. Therefore, this Exercises for actual or substantial p	AL is consistent with	the definition of	nt ja og Soort	1999 - Andrea Andrea Andrea

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[The site specific list of areas should include all areas containing safety structure; system; or component, their controls, and their power supplies.]	n at evident to service in
EAL #5	
This EAL addresses vehicle crashes within the PROTECTED AREA that results in VISIBLE DAMAGE to VITAL AREAS or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.	na se compositor deservicións No transferencia deservicións
EAL#6	•
This EAL addresses other site specific phenomena that result in VISIBLE DAMAGE to VITAL	n an an an Arrent Carlor an an Arrent Arrent an Arr
AREAS or results in indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant (such as burricane, flood, or saiche).	an a
[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.).]	
Plant-Specific	u de l'Arren Brukel en la Gael d'Arren (Gael Gael en d
This EAL is based on the UFSAR design basis operating earthquake of 0.08 g acceleration	
(ref. 1). Seismic events of this magnitude can cause damage to plant safety functions.	n an
Ginna seismic instrumentation actuates upon sensing any seismic activity (ref. 2, 3, 4).	tanatan ang santan s Santan santan s
The method of detection of an earthquake greater than OBE intensity relies on either:	
analysis of the Ginna strong motion accelerograph located in the Intermediate	
Building by plant I&C and plant Engineering (ref. 3)	
OR	
 by actual indications of degraded safe shutdown system performance 	

confirmed by either shift operators on duty in the Control Room determining that ground motion was felt, or corroborated by the NEIC.

The National Earthquake Information Center (NEIC) can confirm seismic activity in the vicinity of Ginna. The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of R. E.

	· ·	ED	AD-XX	
·	EMERGENCY ACTION LE	EVEL		
	TECHNICAL BASES DOCU	•		
Ginna Nuclear Power	Plant. Provide the analyst with the	following Ginna coordinates	s: 43°	
16.7' north latitude,	77° 18.7' west longitude (ref. 5).			
Definitions:				
Safety-Related S	ructures, Systems and Compone	ents (as defined in 10CFR5	0.2)	
	systems and components that are in ng design basis events to assure:	relied upon to remain function	onal	
(1) The integrit	y of the reactor coolant pressure bo	oundary;		
(2) The capabi condition;	ity to shut down the reactor and <i>ma</i>	<i>aintain</i> it in a safe shutdown		
	ity to prevent or mitigate the conse ential offsite exposures.	quences of accidents which	could	
Ginna Basis Referen				
2. ER-SC 4 Earthqua	7.1.3 Design Response Spectra ike Emergency Plan			• . •
3. CPI-ACCELEROG Accelerograph	RAPH-51 Functional Check of Kin	emetrics Strong Motion	y and a setting to a set	
	ETNA Strong Motion Accelerograp	h Schematics	Net Handberg	
5. USAR Section 2.1 6. NEI 99-01 HA1	.1 Site Location and Description	and a state of the state	and the second	
	a the second		. .	• .
		un ser se		

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Category:	H – Hazards and Other Conditions Affecting Plant Safety	en de engliste data data data data data data data da
Subcategory:	1 – Natural or Destructive Phenomena	
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas	
EAL:		

<u>...</u>

HA1.2 Alert

Tornado striking or sustained high winds > 75 mph resulting in **EITHER**:

Visible damage to **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Emergency Diesel Building(s)
- Energency Dieser Building
- SAFW Building
- Screenhouse
- Cable Tunnel
- Battery Rooms

Mode Applicability:

All

Basis:

Generic

These-This EALs escalates from HU1.2 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

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	EMERGENCY ACTIO	N LEVEL Revision	n [Draft H]	
	TECHNICAL BASES DO		52 of 336	
			02 01:000	
Escalation of this emergency of Malfunction ICsEALs.	classification level, if approp	priate, would be based on Syste	em .	
		4.12 P	the second second	
<u>EALs #2 #5</u>	27 1 -	la se se contra e se de 194	aan too waxaa	NARA NY BE
component and functions requ	iired-for-safe-shutdown of ti	eas that contain safety system, (he plant. Site specific Safe Shul pas required to establish or mail	down ntain safo	
			a ser i dinas d	
<u>EAL #1</u>	x = L + p + 2 + 2 + 2	12.12.12.12.12.12.12.12.12.12.12.12.12.1	$\{\phi_{i}^{*}\}_{i=1}^{n} = \{\phi_{i}^{*}\}_{i=1}^{n} \in \{\phi_{i}^{*}\}_{i=1}^{n} \in \{\phi_{i}^{*}\}_{i=1}^{n} $	
		REA being subjected to forces I occurred to plant safety system		
		osign basis. Soc EPRI sponsore o", dated October 1989, for info		
The National Earthquake Cent	ter can confirm if an earthq	uake has occurred in the area c		
<u>EAL #2</u>			Robert Contractor Anna Contractor	. p
		or high winds that have caused uired for safe shutdown of the p		
[The high wind value should b range of the instrumentation a		AR design basis as long as it is	within the	
EAL #3	4. 4		• • • •	· · · · · · · · · · · · · · · · · · ·
equipment misalignment, or ou systems, or has created indus access to operate or monitor s	utage activity mishaps. It is trial safety hazards (e.g., e safety equipment. The inabi	by events such as component based on the degraded perforn lectrical shock) that preclude no lity to access, operate of perform	nance of ocessary or safety	anta Barratta ana ang
equipment represents an actu plant.	al or substantial potential d	egradation of the level of safety	-or the	19. 19.
installed equipment is capable Classification of this EAL shou	of removal, resulting in a r Ild-not be delayed while co	water is entering the room fact ise of water level within the roo rrective actions are being taken	m. to isolate	845 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
the water source.	an a			
plant, which are not designed	e those areas that contain t to be partially or fully subm	systems required for safe shutd orged. The plant's IPEEE may ₁ EAL.]	own of the provide	ar an

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<u>EAL #4</u>	- SMM - CYCLE - March	en an thaile an the Abara an th	so the monent second
This-EAL-addresses the threat to sa by main turbine rotating component an ALERT in that the potential exists	failures. Therefore, this EAL is	consistent with the definition of	an an an an Anna an an Anna 1969. Tha an Anna an
safety of the plant.	-	-	Lessand - Electric de la servici
The site specific list of areas should component, their controls, and their		foty structuro, systom, or	horized as the state
	177796 (1001 057090), 12 ¹ 896 3	e wanta pay in territoria.	Constraint Constraints (2010), 1945-1945
<u>EAL #5</u>		ga kata sa ka sa	an an an ann an an an S
This EAL addresses vehicle crashes DAMAGE to VITAL AREAS or indication containing functions and systems re	tion of damage to safety struct	ures, systems, or components	English A
EAL #6			a tana ta sa ta'é
This EAL addresses other site speci AREAS or results in indication of da functions and systems required for s that can also be precursors of more	fic phènomèna that résult in VI mage to safèty strüctures, syste afe shutdown of the plant (sucl	SIBLE DAMAGE to VITAL	an Angelan († 1990) 19 - Angelan († 1990)
[Sitos subject to severe weather as a include an EAL based on activation precautionary shutdowns, diesel tes	of the severe weather mitigation	n procoduros (o.g.,	na terres de la construcción de la serie d
Plant-Specific	·	a shi shekerar sa . Shekerar sa shekerar sa sh	a dita del productione del productione del productione del productione del productione del productione del prod La constante del productione del productione del productione del productione del productione del productione del
All Class 1 structures are designed			
environmental loading" conditions			· · ·
of 75 mph or impact by tornado. V functions.		can cause damage to safety	
Wind speed can be measured up (ref. 2). Sustained winds are the t	•	•	and an
The Protected Area Boundary is	depicted in Drawing 33013-2	722 (ref. 3).	en general de la complete de la comp Complete de la complete de la complet
This threshold addresses events subjected to forces beyond desig occurred to plant safety systems.	n limits and thus damage ma	y be assumed to have	and a start of a start of the s
the operation of which may be ne	eded to ensure the reactor s	afely reaches and is	ang sa kang siga di tana sa k
maintained in cold shutdown. Saf		•	State Contraction

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equipment of concern. The Alert classification is appropriate if relevant plant parameters indicate that the performance of safety systems in the affected Safe Shutdown Areas has been degraded. No attempt should be made to fully inventory the actual magnitude of the damage or quantify the degradation of safety system performance prior to declaration of an Alert under this threshold.

. . .

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing Class 1 equipment and systems needed for safe shutdown (ref. 4, 5).

Definitions:

Visible Damage

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

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

and tonowing desi	gri basis events to as	3010.		
(1) The integrity of the	e reactor coolant pres	sure boundary;		
(2) The capability to s				
condition;			$m_{\rm eff} = 1.5 \pm 10^{-10}$	· "

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(3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

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Ginna Basis Reference(s):

1.	I. UFSAR Section 3.3.2.1.4 Wind and Tornado Loadings - Input Load Criteria	5 T.	
2.	2. CPI-MET-250 Calibration of Ginna Station Meteorological Wind Speed and Wind		· .
	Direction Translator Cards		,
3.	3. Drawing 33013-2722 Residential AC Power Distribution Circuit - Site Layout	• .	
4	UFSAR Table 3 2-1 Classification of Structures. Systems and Components		
5.	5. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone		• • •
	Analysis		

6. ER-SC.1 Adverse Weather Plan -7. NEI 99-01 HA1 · · ·

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Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.3

Alert

Internal flooding in ANY Table H-1 area resulting in EITHER:

An electrical shock hazard that precludes access to operate or monitor **ANY** safetyrelated structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Control Building
- Intermediate Building
- Emergency Diesel Building(s)
- SAFW Building
- Screenhouse
- Cable Tunnel
- Battery Rooms

Mode Applicability:

All

Basis:

Generic

These EALs escalate from HU1 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 room indications of degraded system response or performance. The occurrence of VISIBLE DAMAGE and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here

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	HNICAL BASES DOCUMENT Page 157 of 336		
s not that a particular system or stru nagnitude to cause this degradation	eture was damaged, but rather, that the event was of sufficient $\frac{1}{2}$		•
Escalation of this emergency classific Malfunction <u>EAL</u> I C s.	cation level, if appropriate, would be based on System		
EALs #2 #5			;
	cific structuros or areas that contain safety system, or or safe shutdown of the plant. Site specific Safe Shutdown		
	ipment and plant areas required to establish or maintain safe		•
<u>AL #1</u>			;
5	n result in a VITAL AREA being subjected to forces beyond be assumed to have occurred to plant safety systems.		•
	sito spocific FSAR dosign basis. See EPRI sponsored nso to an Earthquako", dated October 1989, for information on		3
The National Earthquake Center can	confirm if an earthquake has occurred in the area of the plant.		i
EAL #2			!
	ing (touching down) or high winds that have caused VISIBLE nctions or systems required for safe shutdown of the plant.		;
The high wind value should be base range of the instrumentation availabl	ed on site specific FSAR dosign basis as long as it is within the le for wind speed.]	1	
EAL-#3	A set of the	an an Alistan an Alista	
	المريكية المروح والمروا ومروح والمعاد والمعاد والمعاور والمراجع	Million of the second second second	
This EAL addresses the effect of inte	ernal flooding caused by events such as component failures,	the design the second second	
systems, or has created industrial sa	activity mishaps. It is based on the degraded performance of ifety hazards (e.g., electrical shock) that preclude necessary equipment. The inability to access, operate or monitor safety		
equipment represents an actual or su plant.	ubstantial potential degradation of the level of safety of the		
	$= \left\{ \left \left(\frac{1}{2} + 1$	n in provinsial in sur Manufactoria	
nstalled equipment is capable of rem	es a condition where water is entering the room faster than noval, resulting in a rise of water level within the room.	and the grade of the states	
he water source.	be delayed while corrective actions are being taken to isolate	n jan bor state in data an an	
The site specific graps include these	o areas that contain systems required for safe shutdown of the	iv ×¢3ker tuto teev	
	partially or fully submorgod. The plant's IPEEE may provide	n an Arian an Arian an Arian	
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<u>EAL #4</u>	
This EAL addresses the threat to safety related equipment imposed by main turbine rotating component failures. Therefore, this EAL is a an ALERT in that the potential exists for actual or substantial potent safety of the plant.	consistent with the definition of
•	
[The site specific list of areas should include all areas containing sa component, their controls, and their power supplies.]	afoty-structuro, systom, or
EAL#5	
This EAL addresses vehicle crashes within the PROTECTED ARE/ DAMAGE to VITAL AREAS or indication of damage to safety struct containing functions and systems required for safe shutdown of the	tures, systems, or components
EAL#6	
This EAL addresses other site specific phenomena that result in VIS AREAS or results in indication of damage to safety structures, syste functions and systems required for safe shutdown of the plant (such that can also be precursors of more serious events.	ems, or components containing
[Sitos subject to severe weather as defined in the NUMARC station include an EAL based on activation of the severe weather mitigation precautionary shutdowns, diesel testing, staff call outs, etc.).]	n blackout initiatives should n procoduros (o.g.,
<u>Plant-Specific</u>	
This threshold addresses the effect of flooding caused by inte	ernal events such as
component failures such as Circulating, Component Cooling of	or Service Water line
ruptures, equipment misalignment, fire suppression system ac	ctuation, steam leaks or
outage activity mishaps.	en en participante de la companya d La companya de la comp
Safe Shutdown Areas are areas that house equipment the op	peration of which may be
needed to ensure the reactor safely reaches and is maintaine	
9	

Shutdown Areas include structures that contain the equipment of concern (ref. 1, 2). Uncontrolled internal flooding that has degraded safety shutdown equipment or created a safety hazard precluding access necessary for the safe operation or monitoring of safety equipment warrants declaration of an Alert.

Definitions:

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Safety-Related Structures, Systems and Components (as define	ned in 10 CFR 50.2)	
Those structures, systems and components that are relied upon to r during and following design basis events to assure:	remain functional	ņ.,
(1) The integrity of the reactor coolant pressure boundary;	parantiple and an and an approximation of the	'::
(2) The capability to shut down the reactor and <i>maintain</i> it in a sa condition;	safe shutdown	
(3) The capability to prevent or mitigate the consequences of acc result in potential offsite exposures.	ccidents which could	. "
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Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components and the provided and the second structures of the second structures of the second structures and the
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone and Area and Are Analysis
- 3. NEI 99-01 HA1 Constant and the second s and the second Second State State State States of the ee geka di aantiki yaan se ee J. ; Sec. Sec. Sec. torg and a unter Mission depose anti-anti-anti-a · • • • • • • e. . e i i i e i e e e i e e e
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Category:	H – Hazards and Other Conditions Affecting	Plant Safet	y ^{i i}	· · · ·	an a	
	1 – Natural or Destructive Phenomena					
Initiating Condition:	Natural or destructive phenomena affecting	Vital Areas				
EAL:						

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HA1.4 Alert

Turbine failure-generated projectiles resulting in EITHER:

Visible damage to or penetration of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Control Building
- Intermediate Building
- Emergency Diesel Building(s)
- SAFW Building
- Screenhouse
- Cable Tunnel
- Battery Rooms

Mode Applicability:

All

Basis:

Generic

Thisese EALs escalates from HU1.4 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a

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particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation. in real courses into the second 11. 1 A. 14 Escalation of this emergency classification level, if appropriate, would be based on System Malfunction ICsEALs. Adda dava a Marakki bir adda tir ili in distati daga ka ƙasar Ili di s EALs #2 #5 Those EALs should specify site specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for oquipmont and plant areas required to establish or maintain safe shutdown.] EAL #1 Seismic events of this magnitude can result in a VITAL AREA being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. [This threshold should be based on site specific FSAR design basis. See EPRI sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on soismic event categories.] The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant. EAL #2 This EAL is based on a tornado striking (touching down) or high winds that have caused VISIBLE DAMAGE to structures containing functions or systems required for safe shutdown of the plant. [The high wind value should be based on site specific FSAR design basis as long as it is within the range of the instrumentation available for wind speed.] seen in the second second state of the second s EAL #3 This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety, hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety

equipment represents an actual or substantial potential degradation of the level of safety of the plant. Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source. [Tho site specific areas include these areas that contain systems required for safe shutdown of the plant, which are not designed to be partially or fully submerged. The plant's IPEEE may provide

insight into areas to be considered when developing this EAL.]

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This EAL addresses the threat to safety related equipment imposed by projectiles generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an Alert in that the potential exists for actual or substantial potential degradation of the level of safety of the plant.

[The site specific list of areas should include all areas containing safety structure; system, or component, their controls, and their power supplies.]

<u>EAL #5</u>

<u>EAL #4</u>

This EAL addresses vehicle crashes within the PROTECTED AREA that results in VISIBLE DAMAGE to VITAL AREAS or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

<u>EAL #6</u>

This EAL addresses other site specific phenomena that result in VISIBLE DAMAGE to VITAL AREAS or results in indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

[Sitos 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., procautionary shutdowns, diesel testing, staff call outs, etc.).]

Plant-Specific

The turbine generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine generator parts is insufficient, external projectiles will be released. These ejected projectiles may impact various plant structures, including those housing safety related equipment.

Failure of turbine or generator seals may be indicated by a loss of seal oil pressure or loss of condenser vacuum (ref. 1).

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing Class 1 equipment and systems needed for safe shutdown (ref. 2, 3).

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The National Earthquake Center can confirm if an earthquake has occurred in the area of	f the plant.	
EAL #2		
This EAL is based on a tornado striking (touching down) or high winds that have caused DAMAGE to structures containing functions or systems required for safe shutdown of the		a naga té sakran 🕄
[The high wind value should be based on site specific FSAR design basis as long as it is range of the instrumentation available for wind speed.].		ntakon tiji Butonoko on Steriuso i u Ukato kunu na mitaturak kita na titano ku
EAL#3	1 m 7	n - en la partenta
This EAL addresses the effect of internal flooding caused by events such as component f equipment misalignment, or outage activity mishaps. It is based on the degraded perform systems, or has created industrial safety hazards (e.g., electrical shock) that preclude neo access to operate or monitor safety equipment. The inability to access, operate or monito equipment represents an actual or substantial potential degradation of the level of safety plant.	ance of cessary r safety	n de la sur la compositación de la compositación la de la compositación de la compositación de la compositación la de la compositación de la comp
Flooding as used in this EAL describes a condition where water is entering the room faster installed equipment is capable of removal, resulting in a rise of water level within the room Classification of this EAL should not be delayed while corrective actions are being taken to the water source.	9.	an Angeles (1997) Angeles (1997) Angeles (1997) Angeles (1997)
[The site specific areas include those areas that contain systems required for safe shutde plant, which are not designed to be partially or fully submerged. The plant's IPEEE may p insight into areas to be considered when developing this EAL.]	4	an la butu kanada ata di ntana kanata ata ata ata ata
EAL#4		
This EAL addresses the threat to safety related equipment imposed by PROJECTILEs ge by main turbine rotating component failures. Therefore, this EAL is consistent with the de an ALERT in that the potential exists for actual or substantial potential degradation of the safety of the plant.	finition of	and a finite second cards of the second s The second s
[The site specific list of areas should include all areas containing safety structure, system, component, their controls, and their power supplies.]		
EAL #5		an a
This EAL addresses vehicle crashes within the PROTECTED AREA that results in VISIRI	E	

This EAL addresses vehicle crashes within the PROTECTED AREA that results in VISIBLE DAMAGE to VITAL AREAS or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

<u>EAL #6</u>

This EAL addresses other site specific phenomena that result in visible damage to vital areas or results in indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant (such as hurricane, flood, or seiche) that can also be precursors of more serious events.

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[Sitos subject to sovere weather as defined in the NUMARC station blackout initiatives should include an EAL based on activation of the severe weather mitigation procedures (e.g., procautionary shutdowns, diesel testing, staff call-outs, etc.).]

Plant-Specific

This threshold covers high and low water level conditions that may have resulted in a plant safe shutdown area being subjected to levels beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

Ginna plant grade is generally at 270 ft mean sea level (msl) except the area between the lake and Turbine Building which is at grade 253 ft msl. Lake water level > 253.28 ft msl corresponds to plant design levels (ref. 1). A lake level of 253 ft has been selected for this threshold to be indicative of exceeding design flood levels (ref. 2).

High lake level may be determined using markers attached to a metal pole mounted on the discharge canal bridge upstream of the submarine net. The high level markers are at lake levels of 252 ft and 253 ft (ref. 2).

The Screenhouse Lo-Lo level alarm actuates at 19' indicated (ref. 3). If indicated service water pump bay level drops below 16 ft (this corresponds to a lake level of 14.5' measured manually) the service water pumps are declared inoperable. This level has been selected for this threshold to be indicative of a loss of service water system pump suction (ref. 4).

Ginna Basis Reference(s):

- 1. UFSAR Section 3.4.1 Flood Protection
- 2. ER-SC.2 High Water (Flood) Plan
- 3. AR-I-9 Screen House Lo-Lo Level 19'
- 4. ER-SC.3 Low Screenhouse Water Level
- 5. NEI 99-01 HA1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety	· -	:	52 G G
Subcategory:	1 – Natural or Destructive Phenomena			
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas			
EAL:				

HA1.6 Alert

Vehicle crash resulting in EITHER:

Visible damage to **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Control Building
- Intermediate Building
- Emergency Diesel Building(s)
- SAFW Building
- Screenhouse
- Cable Tunnel
- Battery Rooms

Mode Applicability:

All

Basis:

Generic

These EALs escalate from HU1 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 room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

	1. 1. 1. 1.		EPAD-XX	
	EMERGENCY ACTION TECHNICAL BASES DOC		vision [Draft H] age 168 of 336	
Escalation of this emergency of Malfunction ICs<u>EALs</u>.	classification level, if appropria	ațe, would be based on \$	System	· · · · · · · · · · · · · · · · · · ·
<u>EALs #2 #5</u>	$M^{*} = \frac{1}{2} \frac{1}$		n in the second s	
[These EALs should specify si component and functions requ Analysis should be consulted f shutdown.]	ired for safe shutdown of the	plant. Sito specific Safo	Shutdown	
<u>EAL #1</u>		5. 2 ·	*****	an teorem a service and the service The construction as a transformation
Seismic events of this magnitudesign limits, and thus damage				
[This throshold should bo base "Guidelines for Nuclear Plant F seismic event categories.]				
The National Earthquake Cent	er can confirm if an earthqual	e has occurred in the a	rea of the plant.	:
<u>EAL #2</u>		. • :	ine en træk v	****
This EAL-is-based on a tornad DAMAGE to structures-contair				
[The high wind value should be range of the instrumentation a		dosign basis as long a	s it is within tho	λ.
<u>EAL #3</u>				• .
This EAL addresses the effect equipment misalignment, or ou systems, or has created indust access to operate or monitor s equipment represents an actual plant.	utage activity mishaps. It is ba irial safety hazards (e.g., elec afety equipment. The inability	sed on the degraded pe trical shock) that preclud to access, operate or m	erformance of de necessary nonitor safety	
Flooding as used in this EAL d installed equipment is capable Classification of this EAL shou the water source.	of removal, resulting in a rise	of water level within the	s room.	e territori Estatori
{The site specific areas include plant, which are not designed insight into areas to be conside	to be partially or fully submorg cred when developing this EA	god. The plant's IPEEE (L.)	may provido	
				χ_{1} , χ_{2} , M_{1} , M_{2} , M_{2} , M_{2} , M_{2}

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EPAD-XX EMERGENCY ACTION LEVEL COMPARISON [Draft H] TECHNICAL BASES DOCUMENT COMPARE 163 of 336/000

Definitions:	$\phi^{2}_{AB}(x^{2})$ and $\phi^{2}_{AB}(x^{2})$ is a spectrum form of 0 and 0 and 0 and 0	a and a second secon
Projectile	and the second	a standard
An object directed toward a Nuc continued operability, reliability,	lear Power Plant that could cause concern for its in the second or personnel safety.	and the second secon
Visible Damage	مسويت الحاري المراجع المراجع المراجع	*· · · ·
testing, or analysis. Damage is a operability or reliability of affecte damage includes: deformation of	ure that is readily observable without measurements, sufficient to cause concern regarding the continued ed safety structure, system, or component. Example lue to heat or impact, denting, penetration, rupture, se blemishes (e.g., paint chipping, scratches) should not	an Sin - An - An Sin - An - An Sin - An - An Sin - An - An - An - An Sin - An - An - An - An Sin - An - An - An - An
Safety-Related Structures, Sy	stems and Components (as defined in 10 CFR 50.2)	an alament the joy to solution and
Those structures, systems and during and following design bas	components that are relied upon to remain functional is events to assure:	1. + M2E
(1) The integrity of the react	or coolant pressure boundary;	
(2) The capability to shut do condition;	wn the reactor and <i>maintain</i> it in a safe shutdown	
(3) The capability to prevent result in potential offsite e	or mitigate the consequences of accidents which could exposures.	

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Ginna Basis Reference(s):

- 1. ER.SC-8 Turbine Blade Failure and Missile Emergency Plan
- 2. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 3. Ginna Station Fire Protection Program Volume | Part III Section 7.0 Fire Area/Fire Zone Analysis
- 4. NEI 99-01 HA1

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	EPAD-XX	
	EMERGENCY ACTION LEVEL Revision [Draft H]	
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Category:	H – Hazards and Other Conditions Affecting Plant Safety	2 (g. 2)5
Subcategory:	1 – Natural or Destructive Phenomena	
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas	e e de la companya d
EAL:		
HA1.5 Alert		
	انه الإيرانية المراجع المراجع المراجع المراجع	
Lake level > 253 ft OR		ing to a second se
Screen House Suction	n Bay water level < 16 ft or < 14.5 ft by manual level measurement	and an and a second second
Mode Applicability:	「ALL MYDER」というので、ALMANACE、MARKADE、MARKADE、LATA	
All		
Basis:		
<u>Generic</u>		· · ·
DAMAGE to plant structu caused damage to the st	om HU1 in that the occurrence of the event has resulted in VISIBLE tures or areas containing equipment necessary for a safe shutdown, or has safety systems in those structures evidenced by control room indications of nse or performance. The occurrence of VISIBLE DAMAGE and/or	
degraded system respon should not be interpreted attempt is made in this E is not that a particular sy	nse is intended to discriminate against lesser events. The initial report d as mandating a lengthy damage assessment prior to classification. No EAL to assess the actual magnitude of the damage. The significance here ystem or structure was damaged, but rather, that the event was of sufficient	landar Alandar - Arada
magnitude to cause this	- degradation.	an she
Escalation of this emerge	ency classification level, if appropriate, would be based on System	1. S
Malfunction ICs.	 Association of the state of the	
<u>EALs #2 #5</u>		1. ·
component and function	ecify site specific structures or areas that contain safety system, or as required for safe shutdown of the plant. Site specific Safe Shutdown sulted for equipment and plant areas required to establish or maintain safe	
<u>EAL #1</u>		
	nagnitude can result in a VITAL AREA being subjected to forces beyond lamage may be assumed to have occurred to plant safety systems.	
This threshold should be	e based on site specific FSAR design basis. See EPRI-sponsored	

["This tineshold should be based on site specific FSAR-design basis. See EFR-spensored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, for information on seismic event categories.] EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 169 of 336

EAL-#4 And a sector for the sector of the sector of the sector of the sector for the sector of the 1.50 This EAL-addresses the threat to safety related equipment imposed by PROJECTILEs generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an ALERT in that the potential exists for actual or substantial potential degradation of the level of safety of the plant. and the second second second second second second [The site specific list of areas should include all areas containing safety structure, system, or component, their controls, and their power supplies. a per entrane a ner a car con en a 1. 1. 11 . EAL #5 . .. This EAL addresses vehicle crashes within the Protected Area that results in visible damage to We share the vital areas or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant. Sector of the EAL #6 This EAL addresses other site specific phenomena that result in VISIBLE DAMAGE to VITAL AREAS or results in indication of damage to safety structures, systems, or components containing · • • functions and systems required for safe shutdown of the plant (such as hurricane, flood, or seiche) that can also be precursors of more serious events. $\{1,1,\dots,n,n\}, \{N,P,n\}$ 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.).]

Plant-Specific

This EAL 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. Vehicle types include automobiles, aircraft, trucks, cranes, forklifts, waterborne craft, etc.

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing Class 1 equipment and systems needed for safe shutdown (ref. 1, 2),

Definitions:

Visible Damage

Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture,

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T	ECHNICAL BASES DOCUMENT Page 170 of 336	
cracking, paint blistering. be included.	Surface blemishes (e.g., paint chipping, scratches) should not	
Safety-Related Structure	s, Systems and Components (as defined in 10 CFR 50.2)	
Those structures, systems during and following desig	and components that are relied upon to remain functional n basis events to assure:	:
(1) The integrity of the	reactor coolant pressure boundary;	
(2) The capability to sh condition;	ut down the reactor and <i>maintain</i> it in a safe shutdown	
(3) The capability to pr result in potential o	event or mitigate the consequences of accidents which could fsite exposures.	••••
		. C
Ginna Basis Reference(s):		
	fication of Structures, Systems and Components on Program Volume I Part III Section 7.0 Fire Area/Fire Zone	
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	ada a seña el el entre en el entre en entre a servición de la companya de la companya de la companya de la comp Este entre	e 98 e
	a a seconda a seconda a seconda da seconda da Seconda por esta seconda da second	
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	EMERGENCY ACTION LEVEL Revision [Draft H]		
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Category:	H Hazards and Other Conditions Affecting Plant Safety		
Subcategory:	2 – Fire or Explosion		
Initiating Condition:	Fire within the Protected Area not extinguished within 15 min. of detection or explosion within the Protected Area		

EAL:

HU2.1 **Unusual Event**

Fire not extinguished within 15 min. of Control Room notification or verification of a Control Room fire alarm in ANY Table H-1 area or Turbine Building (Note 4)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

- **Reactor Containment Building** •
- **Auxiliary Building** •
- **Control Building** .
- Intermediate Building .
- Emergency Diesel Building(s) Stur 11 $\mathbf{u}_{1} = \mathbf{u}_{2} \mathbf{u}_{1}^{\dagger}$. . · - : . a sa tanàna sa ka

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- SAFW Building .
- Screenhouse •
- **Cable Tunnel**
- **Battery Rooms**

Mode Applicability:

All

Basis:

Generic

This EAL addresses the magnitude and extent of fires or EXPLOSIONS that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / EXPLOSION, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

EAL-#1

The purpose of this threshold is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems.

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As used here, notification is visual observation and report by plant personnel or sensor alarm	
indication.	
or indication of a valid fire detection system alarm.	in the group of the solit
Determination of a valid fire detection system alarm includes actions that can be taken within the Control Room or at nearby Fire Panels to determine that the alarm is not spurious. These actions	
include the use of direct or indirect indications such as redundant alarms or instrumentation	
Treadings associated with the area to ensure the alarm is not spurious and is an indication of a fire.	
An alarm verified in this manner is assumed to be an indication of a fire unless personnel dispatched to the scene disprove the alarm within the 15-minute period. The report, however, shall	and the second
not be required to verify the alarm. If the alarm cannot be verified by redundant Control Room or	teres in a second s
nearby Fire Panel indications, notification from the field that a fire exists would be required to start	
the 15-minute classification and fire extinguishment clocks. The 15 minute time period begins with a	
credible notification that a fire is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the	
	5- -
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 site specific list should be limited and applies to buildings and areas in actual contact with or the state and applies to buildings and areas in actual contact with or the state areas and areas and areas areas are state areas are state areas are state areas are state areas areas are state areas	•
immodiatoly adjacent to VITAL AREAS or othor significant buildings or areas. The intent of this IC	
is not to include buildings (i.e., warehouses) or areas that are not in actual contact with or	
immediately adjacent to VITAL AREAS. This excludes FIRES within administration buildings, waste-basket FIRES, and other small FIRES of no safety consequence. Immediately adjacent	
implies that the area immediately adjacent contains or may contain equipment or cabling that could	
impact equipment located in VITAL AREAS or the fire could damage equipment inside VITAL	
AREAS or that procludos accoss to VITAL AREAS.]	•
EAL #2	·
This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA.	
No attempt is made to assess the actual magnitude of the damage. The occurrence of the	
EXPLOSION is sufficient for declaration.	
The Emergency director-also needs to consider any security aspects of the EXPLOSION, if	
applicable.	
Ecolotion of this operation level if appropriate would be based on UA2	
Escalation of this emergency classification level, if appropriate, would be based on HA2.	

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Plant-Specific

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Table H-1 Safe Shutdo	wn Areas include all Class 1 Structures and	structures containing	
Class 1 equipment and	systems needed for safe shutdown (ref. 1,	2). The Turbine Building	a dagage da
is included because it i	s immediately adjacent to one or more Table	e H-1 areas and a fire the second second second	a catha
within the Turbine Build	ling may potentially impact safe shutdown e	quipment should the fire	
not be controlled.			
Definitions:	i territori de la construcción de la	n an	
Fire) <u>.</u>	n na series de la s La series de la serie	
belts or overheated	terized by heat and light. Sources of smoke electrical equipment do not constitute fires. required if large quantities of smoke and he	Observation of flame is	enter productione de la companya de Reference de la companya de la company Reference de la companya de la compa

Ginna Basis Reference(s):

1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components and the second structures are second

2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis

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3. NEI 99-01 HU2

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Category:	H – Hazards and Other Conditions Affecting Plant Safety	` . <
Subcategory:	2 - Fire or Explosion of the state of the second	1 . The 14
Initiating Condition:	Fire within the Protected Area not extinguished within 15 min. of	• • *
	detection or explosion within the Protected Area	۰ <i>۴</i> ۰

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EAL:

HU2.2

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Explosion within the Protected Area

Unusual Event

Mode Applicability:

All

Basis:

Generic

This EAL addresses the magnitude and extent of FIRES or explosions that may be potentially significant precursors of damage to safety systems. It addresses the FIRE / explosion, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

EAL-#1

The 15 minute time period begins with a credible notification that a FIRE is occurring, or indication of a fire detection system alarm/actuation. Verification of a fire detection system alarm/actuation includes actions that can be taken within the control room or other nearby site specific location to ensure that it is not spurious. An alarm is assumed to be an indication of a FIRE unless it is disproved within the 15 minute period by personnel dispatched to the scene. In other words, a personnel report from the scene may be used to disprove a sensor alarm if received within 15 minutes of the alarm, but shall not be required to verify the alarm.

The intent of this 15 minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket).

[The site specific list should be limited and applies to buildings and areas in actual contact with or immediately adjacent to VITAL AREAS or other significant buildings or areas. The intent of this IC is not to include buildings (i.e., warehouses) or areas that are not in actual contact with or immediately adjacent to VITAL AREAS. This excludes FIRES within administration buildings, wasto-basket FIRES, and other small FIRES of no safety-consequence. Immediately-adjacent implies that the area immediately adjacent contains or may contain equipment or eabling that could impact equipment located in VITAL AREAS or the fire could damage equipment inside VITAL AREAS or that procludes access to VITAL AREAS.]

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<u>EAL #2</u>	na bahasi kupiténé interesi ang Oles	SHEAR CLARDS CO.	المراجع المراجع
This EAL addresses only those explosions of equipment within the Protected Area.	sufficient force to damage permanent s		• •
No attempt is made to assess the actual mag explosion is sufficient for declaration.			
The Emergency Director also needs to conside applicable.	ler any security aspects of the explosior	n ; if 110 110 110 110 110 110 110 110 110 11	n na na serie de la companya de la c
Escalation of this emergency classification levels	vel, if appropriate, would be based on <u>Ev</u>	AL HA2.1.	
Plant-Specific	an a shekarar waxar a sayar ta 🗍		en utstellen i Fordatif
While some explosions may also result in necessary to declare an emergency in the	fires that exceed EAL HU2.1, no fire	e is Note that was the second of the second of OCCUPS as a second of the s	n an
result or with an explosion, declare the Ur			
the progress of the fire for potential escala	ation due to fire damage	· · · · · · · · · · · · · · · · · · ·	-
Definitions:		 The event of the set B. S. A. S. S. S. S. S. S. S. S. S. 	N.
Explosion). A
A rapid, violent, unconfined combustio pressurized/energized equipment that damage permanent structures, system	imparts energy of sufficient force to	potentially to the second s	
Protected Area			7 7 2
The site specific area which normally e security Protected Area fence.	encompasses all controlled areas wit	thin the	
•	ter a segura a segura	an an tha an an tha Bharlann an	•
Ginna Basis Reference(s):			
1. Drawing 33013-2722 Residential AC F 2. NEI 99-01 HU2	Power Distribution Circuit - Site Layou	ut	۰. ۲
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		AL BASES DOCUMENT		e 176 of 336	
			-		
Category:	H – Hazards ar	d Other Conditions Affe	cting Plant Safe	ty	
Subcategory:	2 – Fire or Expl	osion	فالبريان الأرور والأ	an a ra na c	e e sur sur a sur e presente e sur estas e sur est Estas e sur estas e sur est
Initiating Condition:		n affecting the operabili			
	required to esta	blish or maintain safe s	hutdown	n tari seri.	
EAL:					
HA2.1 Alert		tan tang dari dari dari dari dari dari dari dari	••••• <u>•</u>		na sana ang kang kang kang kang kang kang ka
Fire or explosion resu	Iting in EITHER:	· ····			
Visible damage to	ANY safety-relate	ed structure, system, or			
Table H-1 area					
OR		e totte Charles			
		d performance of ANY s	afety-related str	ucture,	en Marine en en same
system, or compo					
	Table H-1		1	: , , , , , , , , , , , , , , , , , , ,	• • • • • • • • • • • • • • • • • • • •
			5		the second water the the second
	eactor Containme	ent Building			
1	uxiliary Building				
	ontrol Building				$\mathcal{D} = \mathcal{L} [\mathcal{L}^{+}]$
	termediate Buildi	-		1. 1	
• E	mergency Diesel	Building(s)			
• S	AFW Building		A contractor of the	· · · · ·	
• S	creenhouse				
• C	able Tunnel	1. ** 1 *	·	<i>2</i>	
• B	attery Rooms				
U					
Mode Applicability:					

All	

Basis:

States present of states and states are set of the states of states are set of the states of the

Generic

Visible damage is used to identify the magnitude of the fire or explosion and to discriminate against minor fires and explosions.

The reference to structures containing safety systems or components is included to discriminate against fires or explosions in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the fire or explosion was large enough to cause damage to these systems.

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The use of visible damage should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency Director with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the explosion.

[This EAL should specify site specific structures or areas that contain safety system, or component and functions required for safe shutdown of the plant. Site specific Safe Shutdown Analysis should be consulted for equipment and plant areas required to establish or maintain safe shutdown.]

Escalation of this emergency classification level, if appropriate, will be based on <u>EALs in System</u> Malfunctions<u>Category S</u>, Fission Product Barrier DegradationCategory<u>F</u> or Abnormal Rad Levels / Radiological Effluent IGs<u>Category R</u>.

Plant-Specific

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing

Class 1 equipment and systems needed for safe shutdown (ref. 1, 2).

Definitions:

Explosion

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

Fire

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

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

Visible Damage

Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example

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damage includes: deformation due to heat or impact, denting, penetration, rupture, a strand the state of the cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

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Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume | Part III Section 7.0 Fire Area/Fire Zone Analysis

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3. NEI 99-01 HA2 and the second second

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	3 – Hazardoùs Gas in e e l'Alver e stat gas d'e referir s'e de ser stat de la ser e stat de la ser e ser e ser e
Initiating Condition:	Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

EAL:

HU3.1 Unusual Event

Release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations

Mode Applicability:

All

Basis:

Generic

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This IC-EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on EAL HA3.1.

Plant-Specific

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

Definitions:

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

Ginna Basis Reference(s):	· .	 - 14		
1. NEI 99-01 HU3	an a			
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	EMERGENCY ACTIO TECHNICAL BASES D		Revision [Dr			
Category:	H – Hazards and Other Con	ditions Affecting Pla	ant Safety	، میں بند اور میں	•.	
Subcategory:	3 – Hazardous Gas		· .	en de la companya	· .	
Initiating Condition:	Release of toxic, corrosive, a deemed detrimental to norm	al plant operations		· · · · ·		111 - A
EAL:	and Alexandrian Alexandrian	an an the state of		n seine in Esti in p		
HU3.2 Unusual	Event					: .*
Recommendation by lo based on offsite event	ocal, county or state officials t	o evacuate or shelt	er site personr	el	· · · · ·	· • • • •
Mode Applicability:					. F. i.	
All	· · · · ···				- · · ·	• •
Basis:	Subject and the second	i i se s	• • • • •			i Maria
<u>Generic</u>		- 1		- . 5.1		
This IC is not intended to uncontrolled process tha incidental releases, or re An asphyxiant is a gas o Most commonly, asphyx reduces the concentratic breathing difficulties, unc	be worn does not eliminate the require significant assessment t has the potential to affect plant leases that do not impact structu apable of reducing the level of o ants work by merely displacing a n of oxygen below the normal le consciousness or even death.	or quantification. It a operations. This we res needed for plant xygen in the body to air in an enclosed en vel of around 19%, v	ssumes an ould preclude sn t operation dangerous leve vironment. This vhich can lead to			
Plant-Specific					$\sim m_{D,Q}^{2} m_{S_{1}}^{2}$	and.
None						17 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
Ginna Basis Referen	ce(s):					
1. NEI 99-01 HU3	No. 22 Sec.	ан ^с алан та	na en la cara	1418 M. H. H.		
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	n an transformation and an anti- transformation and an anti- transformation and an anti-	i ja oli su ta ta ta ta ta ta Ali su ta	en kan sen karata da Sanada da sana sa	the stand and an	antina Mirani Matana a	n i la c A constante

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		EMERGE	ENCY ACTION LEVEL	Revisio	n [Draft H]		
		TECHNIC	AL BASES DOCUMENT	Page	82 of 336	;	
•							
Category:		H – Hazards ar	d Other Conditions Affect	ting Plant Safety			· · · ·
Subcategory	y:	3 – Hazardous	Gas		e serve a		
Initiating Co	ondition:	asphyxiant or fl	al Area is prohibited due ammable gases which je ment required to maintair eactor	opardize operatio	on of the second	•	
EAL:						41 J.M.	
HA3.1	Alert			<u> </u>		· · · · · · · ·	
Access to AM	Y Table I	H-1 area is prohi	bited due to toxic, corrosi	ve, asphyxiant o	.		
flammable ga component (l		h jeopardize ope	ration of ANY safety-rela	ted structure, sys	tem, or	н не.	н Настанование По
		· · · · · · · · · · · · · · · · · · ·					•
EAL H	IA3.1 should	not be declared as it v	Iready inoperable, or out of servic will have no adverse impact on th already allowed by Technical Spe	e ability of the plant to	safely		
		Table H-1	Safe Shutdown Areas				
	• Re	eactor Containme	ent Building				
	• Au	ixiliary Building	-				
	• Co	ontrol Building					
	• Int	ermediate Buildi	ng	1			
		nergency Diesel					
	• SA	FW Building					:
	• Sc	reenhouse					
	• Ca	able Tunnel					
	• Ba	attery Rooms			1		

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Mode	Applicability:
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All

Basis:

<u>Generic</u>

Gases in a Vital Area can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases.

	EPAD-XX	
EMERGENCY ACTION LEVEL	Revision [Draft H]	
TECHNICAL BASES DOCUMENT	Page 183 of 336	••

2. * * · · · · · · · · · · · ·

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This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If access is not required at the time the unsafe concentrations exist in the affected area or iff the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on System Malfunctions<u>EALs in Category S, Category F or Category R, Fission Product Barrier Degradation</u> or Abnormal Rad Levels / Radioactive Effluent ICs.

Plant-Specific

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing

Class 1 equipment and systems needed for safe shutdown (ref. 1, 2).

If hazardous gas concentration in a Table H-1 area restricts access but the equipment is

not required to be operable or will not be required to operate before access can be

reestablished (e.g., fans are ventilating the area), this EAL should not be declared.

Definitions:

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

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Ginna Basis Reference(s):

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- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HA3

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 $(x_1, x_2, \dots, x_{n-1}) \in \mathbb{R}^n$, $(x_1, \dots, x_{n-1}) \in \mathbb{R}^n$, $(x_1, \dots, x_{n-1}) \in \mathbb{R}^n$, $(x_1, \dots, x_{n-1}) \in \mathbb{R}^n$

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EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT. Revision Page 185 of 336, 11

Category:	H – Hazards and Other Conditions Affecting Plant Safety	
Subcategory:	4 – Security	
Initiating Condition:	Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant	an an tha an tha tha an tha
EAL:	the first sector of the sector	an second and a second s
HU4.1 Unusual	Event Event	en and a the art of the antipation of the second states of the second states of the second states of the second
A security condition the Supervision	at does not involve a hostile action as reported by Security Shift	
OR	provide a subscription of the transformed state of the species	en la companya da servica da servi
	security threat notification	the second s Second second
OR		
A validated notification	from NRC providing information of an aircraft threat	
Mode Applicability:	a standard an anna a sheachar a' sharan a' an	。 1995年1月1日(1997年1月)) 1997年日(1997年1月)(1997年1月)
All	and the second	
Basis: Generic	a a ser a ser A ser a s A ser a s	
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	e communication between Security Shift Supervision and the Control plementation of effective Security EALs.	ta ang ang ang ang ang ang ang ang ang an
reported under 10 CFR 7	not represent a potential degradation in the level of safety of the plant are 3.71 or in some cases under 10 CFR 50.72. Security events assessed as fable under EAL HA4.1. EAL HS4.1 and EAL HG4HG4.1.	etter jageneter Antonia etter statueter etter
A higher initial classificati	on could be made based upon the nature and timing of the security threat	
and potential consequent	ces. The licensee shall consider upgrading the emergency response assification level in accordance with the site's Ginna Safeguards	
Contingency Plan and Er	nergency Plan.	and the second
EAL #1First Condition	 A set of the set o	•
designated personnel on	e specific security shift supervision because these individuals are the security event is occurring or site qualified and trained to confirm that a security event is occurring or n security event classification confirmation is closely controlled due to the	an a
	aced on the plant <u>Security and</u> Safeguards Contingency Plan.	
	n site specific security plans<u>the Ginna Safeguards Contingency</u> Plan. Site ingency Plans are<u>The Ginna Safeguards Contingency Plan is</u> based on I 03-12.	an a
		an gan ingen signa.

	EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 186 of 336				
	$\mathcal{L}_{\mathrm{res}} = \mathcal{L}_{\mathrm{res}} = \mathcal{L}_{\mathrm{res}$	1. ÷			nga angalana d
ł	EAL-#2Second Condition				Second R
	This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.			· · .	
	The determination of "credible" is made through use of information found in the <u>Ginna Safeguards</u> <u>Contingency Plan site specific Safeguards Contingency Plan</u> .		•	····).	с. 1 с. 1 с.
	EAL #3Third Condition	• .		1.0	na ta nistrea Interne
1	The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.	ы.,	· ı .	·	۰۰ ۲
	This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.	¥1 -	•	e :	• <u>-</u>
	The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.				ن رو د رو
ł	Escalation to Alert emergency classification level would be via <u>EAL</u> HA4.1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.		•	•	sanal ing a Sintanan
	Plant-Specific			•	· · · · · ·
	If the Security Shift Supervisor determines that a threat notification is credible, the Security			1	
	Shift Supervisor will notify the Operations Shift Manager that a "Credible Threat" condition		•		
	exists for Ginna. Generally, Ginna Security procedures address standard practices for				
	determining credibility. The three main criteria for determining credibility are: technical				•
	feasibility, operational feasibility, and resolve. For Ginna, a validated notification delivered				
	by the FBI, NRC or similar agency is treated as credible.			and and a second se	ny stransferance S
	Definitions:				

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EPAD-XX

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Airliner/Large Aircraft

Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

Hostile Action

EPAD-XX EMERGENCY ACTION LEVEL (1997) Revision [Draft H] (1997) TECHNICAL BASES DOCUMENT (1997) Page 187 of 336 (1997)

equipment, take hostages, includes attack by air, land, other devices used to delive may be included. Hostile ac	الأرباط المناج والمتناجين والمتناج والمتعام والمتعام والمتعام والمتعاد والمتعاد	त्र भाषे २०१४ - तन्म्रेडियमः २०१४	ego ditana ta
	ld be used to address such activities (i.e., this may include luals in the owner controlled area).		
Security Condition		-	
threat/compromise to site s degradation to the level of s	ecurity, threat/risk to site personnel, or a potential safety of the plant. A security condition does not involve a	an ing pangangangkana ara s	2.21 2.21
hostile action.	and a state of a state state of a	3- และสะไปที่จางจุ 	· · · · · · · ·
Ginna Basis Reference(s):		en^{i} . (ана Э
 Ginna Safeguards Continge ER-SEC.1 Response to Ch 	ency Plan ange in Security Threat Level		
3. ER-SEC.2 Response to Intr	rusion by Adversary		at a t
4. ER-SEC.3 Response to Air 5. NEI 99-01 HU4	borne Threat Electrical officients states in the Pastern States and the electric states and the states of the states of the states and the states of the sta	e la terrebue ver e tre la centritra	n 1940 - John S 1940 - Prografi
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	ela en el Transforma de gasterna en en el antico de la compañía de la compañía de la compañía de la compañía d Terrar de Villa en el antico de la compañía de la c Propiedad de la compañía de la compañía De Villa de la compañía		· .
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EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 188 of 336

Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	4 – Security
Initiating Condition:	Hostile action within the Owner Controlled Area or airborne attack threat
EAL:	 But the gradient of the presentation of the gradient of the second se Second second sec

HA4.1 Alert

by Security Shift Supervision	the and all the second s	•
	and the second	

Mode Applicability:

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Basis:	÷ .;		
Generic		$\kappa_{\pm}g^{\pm}$. (1)	
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Note: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These-This EALs addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL #1First Condition

This EAL condition addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Owner Controlled Area. Those events are adequately addressed by other EALs.

Note that this EAL-condition is applicable for any hostile action occurring, or that has occurred, in the Owner Controlled Area. This includes ISFSI's that may be outside the PROTECTED AREA but still within the OWNER CONTROLLED AREA.

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Although nuclear plant security officers are well trained and propared to protect against HOSTILE ACTION, it is appropriate for OROs to be notified and encouraged to begin activation (if they de not normally) to be better prepared should it be necessary to consider further actions.]

[If not proviously notified by the NRC that the airborne HOSTILE ACTION was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.]

EAL #2Second Condition

This EAL condition addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL-condition is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (OROs) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL-condition is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Plant-Specific

Definitions:

Airliner/Large Aircraft

Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Ginna Basis Reference(s):

EPAD-XXEMERGENCY ACTION LEVELRevision [Draft H]TECHNICAL BASES DOCUMENTPage 190 of 336

1. Ginna Safeguards Contingency Plan

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2. NEI 99-01 HA4

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· , · , · , EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 191 of 336 Category: H – Hazards and Other Conditions Affecting Plant Safety 4 - Security Subcategory: Initiating Condition: Hostile action within the Protected Area · 这个问题,是 EAL: and a second states of A hostile action is occurring or has occurred within the Protected Area as reported by Security Shift Supervision and the second Mode Applicability: na sa terita da la El and the set of the second states in the second second second second 1. J. and a second strain and a second s Ail Basis: Generic and the state of the This condition represents an escalated threat to plant safety above that contained in the Alert in that a hostile force has progressed from the Owner Controlled Area to the Protected Area. This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements. The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization (ORO) readiness and preparation for the implementation of protective measures. This EAL addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Protected Area. Those events are adequately addressed by other EALs.

[Although nuclear plant security officers are well trained and propared to protect against HOSTILE ACTION, it is appropriate for OROs to be notified and encouraged to begin-preparations for public protective actions (if they do not normally) to be better prepared should it be necessary to consider further actions.]

[If not previously notified by NRC that the airborne HOSTILE ACTION was intentional, then it would be expected, although not certain, that notification by an appropriate Federal agency would follow. In this case, appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. However, the declaration should not be unduly delayed awaiting Federal notification.]

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Plant-Specific

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efinitions:					e y te e
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Hostile Action					
An act toward Ginna or its p equipment, take hostages, includes attack by air, land, other devices used to delive may be included. Hostile ac disobedience or felonious a terrorism-based EALs shou	and/or intimidate to or water using gui er destructive force tion should not be cts that are not pa Id be used to addr	ne licensee to ach ns, explosives, pro construed to inclu rt of a concerted a ess such activities	ieve an end. The pjectiles, vehicles satisfy the over ade acts of civil attack on Ginna	his es, or all intent a. Non-	
violent acts between individ Protected Area	uais in the owner	controlled area).			۰. ۱
The site specific area which security Protected Area fen		asses all controlle	d areas within	the	4 T
security i rotected Area len		1. 1 . 1. 1. 1. 1.		and a second second	Rectange in the Article
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Ginna Safeguards Continge NEI 99-01 HS4	ency Plan			an a	a set an
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	EMERGENCY ACTION LEVEL Revision [Draft H]
	TECHNICAL BASES DOCUMENT Page 193 of 336
Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	4 – Security
Initiating Condition:	Hostile action resulting in loss of physical control of the facility
EAL:	
HG4.1 General E	mergency
A hostile action has occ required to maintain safe	urred such that plant personnel are unable to operate equipment ety functions
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Basis:	and the second of the second
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<u> </u>	
control of Vital Areas (con maintain safety functions a another location. [<i>Typically, those safety fur</i> <i>shutdown) reactor water le</i>	and itions under which a hostile action has resulted in a loss of physical taining vital equipment or controls of vital equipment) required to and control of that equipment cannot be transferred to and operated from and control of that equipment cannot be transferred to and operated from anot control of that equipment cannot be transferred to and operated from a control of that equipment cannot be transferred to and operated from a control of that equipment cannot be transferred to and operated from a control of that equipment cannot be transferred to and operated from a control of that equipment cannot be transferred to and operated from a control of that equipment cannot be transferred to and operated from a control (ability to shut down the reactor and keep it evel (ability to cool the core), and decay heat removal (ability to maintain the equivalent functions for a PWR are reactivity control, RCS inventory,
the ability to maintain safe location of the transfer swi	val.] f the control room or romoto shutdown capability alone may not prevent ty functions per so. Design of the romoto shutdown capability and the tches should be taken into account. Primary omphasis should be placed instruments that supply protection for and information about safety
If control of the plant equip another location, then the	oment necessary to maintain safety functions can be transferred to threshold is not met.
<u>EAL #2</u>	
	e of spent fuel cooling systems as a result of HOSTILE ACTION if s likely, such as when a freshly off-loaded reactor core is in the spent fuel
[A freshly off-leaded react	or core is defined by site specific criteria.]
Plant-Specific	

EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Safety functions include:		. •	e^{-1}	an an said	• .		
Reactivity control							
RCS Inventory				a i con		• (°,	• •.
Secondary Heat Removal	l						
Definitions:							
Hostile Action	· · · · · ·			$e \to \pi^{-1} X$	e ut e	, ¹ ()	···· .
An act toward Ginna or its person equipment, take hostages, and/o includes attack by air, land, or wa other devices used to deliver des may be included. Hostile action s disobedience or felonious acts th terrorism-based EALs should be violent acts between individuals i	or intimidate the lid ater using guns, e structive force. Ot should not be con nat are not part of used to address	censee to achi explosives, pro her acts that s istrued to inclu a concerted a such activities	eve an end. T jectiles, vehic atisfy the over de acts of civi ttack on Ginna	estroy his les, or all intent I a. Non-			

Ginna Basis Reference(s): 1. NEI 99-01 HG1

	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 195 of 336	
Category:	H – Hazards and Other Conditions Affecting Plant Safety	19 M. A
Subcategory:	4 – Security	_
Initiating Condition:	Hostile action resulting in loss of physical control of the facility	
EAL:	and a second state of the	$(\mathbf{r}_{i},\mathbf{r}_{i}) = (\mathbf{r}_{i},\mathbf{r}_{i}) + (\mathbf{r}_{i},\mathbf{r}_{i}) $
HG4.2 General	Emergency:	n tanàna amin'ny taona 2008. No minina mandritra dia kaominina dia kaominina dia kaominina dia kaominina dia kaominina dia kaominina dia kaomi
A hostile action has ca	aused failure of Spent Fuel Cooling systems	
AND	 State of the second state of the	
Imminent fuel damage	is likely	n mar el marte des Constantinos
Mode Applicability:		
All	an an Marzard an an Araba an Araba an Araba an Araba an Araba. An an Araba an Araba.	
Basis:		
Generic		
EAL-#1		a a share a star in a sain a sain a
physical control of VITAI	conditions under which a HOSTILE ACTION has resulted in a loss of AREAS (containing vital equipment or controls of vital equipment) ty functions and control of that equipment cannot be transferred to and acation.	tend e estatut
shutdown) reactor water	unctions are reactivity control (ability to shut down the reactor and keep it lovol (ability to cool the core), and decay heat removal (ability to maintain The equivalent functions for a PWR are reactivity control, RCS inventory, loval.]	
the ability to maintain sa location of the transfer s	of the control room or remete shutdown capability alone may not provent foty functions per soDesign of the remete shutdown capability and the witches should be taken into account. Primary omphasis should be placed nd instruments that supply protection for and information about safety	
If control of the plant equance of the plant equal the second sec	uipment necessary to maintain safety functions can be transferred to e threshold is not met.	
<u>EAL #2</u>		
	ure of spent fuel cooling systems as a result of hostile action if imminent sh as when a freshly off loaded reactor core is in the spent fuel pool.	
A freshly off-loaded read	ctor coro is defined by site specific criteria.]	
Plant-Specific		

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Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Imminent

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

Ginna Basis Reference(s):

1. NEI 99-01 HG1

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Category:	H Hazards and Other Conditions A	ffecting Plant Safety	a static
Subcategory:	5 – Control Room Evacuation	a tetta anti a substatu	ne fa la la francés
Initiating Condition:	Control Room evacuation has been i	initiated of the set of with the second	
EAL:			· • • •
HA5.1 Alert	· · · · · · · · · · · · · · · · · · ·		unia – si Stational data data data data data data data da
Control Room evacuation	on has been initiated		NET THE REPORT OF MELTING
Mode Applicability:	·	នុងដ្ឋានស្រែកទេស្សស្រុក	aan Destere - Leeteren Destere
Basis:			ាមសំភាពស្នោះស្នោកសិក្សាធិនាយីអ
<u>Generic</u>			
	cuated, additional support, monitoring a and/or other emergency response facilit	0	terre Alson
Inability to establish plant Area Emergency.		Il escalate this event to a Site	
Plant-Specific		$(2^{10} + 1)^{10} (2^{10} + $	
AP-CR.1 Control Room	Inaccessibility provides specific instr	uctions for evacuating the	and a state of the s The state of the state
Control Room and estal	olishing plant control in alternate loca	itions (ref. 1).	n an
Ginna Basis Reference			4
1. AP-CR.1 Control Ro 2. NEI 99-01 HA5	om Inaccessibility		
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		IECHNICA	L' BASES DOCUME		ge 198 of 336		
	Category:	H – Hazards and	d Other Conditions A	ffecting Plant Saf	fety	•	
	Subcategory:	5 - Control Roo	m Evacuation	··	N. But The B.	972 - A	
	Initiating Condition:	Control Room e cannot be estat	vacuation has been i blished	nitiated and plant	t control and the	erent y insta	
	EAL:						
	HS5.1 Site Area	a Emergency]	
	Control Room evacuat	• •	ated		$(2\pi)^{2} = 1$	and the second states	
	AND		·				·····
	Control of the plant ca	nnot be establish	ed within 30 min.				
			······			1	
	Mode Applicability:						
	All Basis:			N	e ge endig g		e e e e e
	Generic			a and en a station			
1	The intent of this IC-EAL	is to capture those	events where control	of the plant cannot	ine de la col	ta. exects	Υ.
1	reestablished in a linnely	manner. In this cas	se, expeditious transle	i of control of salet	y systems has		and the second
	not occurred (although fi	•					
	The intent of the EAL is t important plant parameter					. الفاجرين رغا راجا	e en
	components and instrum Typically, these safety fu	ents that supply pr inctions are reactivi	otection for and inform ity control (ability to sh	ation about safety to utdown the reactor	functions. and maintain	y ^{de} son and an a	a transformation
1	it shutdown), reactor wat maintain a heat sink) for	er level (ability to c a BWR. The equiv	iool the core), and dec alent-functions for a P	ay heat removal (al NR are reactivity c	ontrol, RCS	en. en el	
	inventory, and secondary	y heat removal .			• • •		
•	The determination of who on Emergency Director (informed judgment withir from the remote shutdow	ED) judgment. The the site specific til	Emergency Director is	s expected to make	e a reasonable,		
	[The site specific time for must be reestablished w 15 minutes without addit	ithout core uncover					

Escalation of this emergency classification level, if appropriate, would be by <u>EALs in Category F or</u> <u>Category R</u>Fission Product Barrier Degradation or Abnormal Rad Levels/Radiological Effluent EALs.

Plant-Specific

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AP-CR.1 Control Room Inaccessibility provides specific instructions for evacuating the second	1. N. S.
Control Room and establishing plant control in alternate locations (ref. 1).	
An analysis was performed as part of the Fire Protection Program (ref. 2) to determine how	
quickly control must be re-established at Ginna without core uncovery or damage. There	e Mare
are 5 time-critical actions which must be accomplished to enable established performance	·····
goals to be met. In evaluating a reasonable timeline for completion of tasks required in the $-rac{2\pi}{2}$	
ER-FIRE procedures to restore charging, it was estimated that restoration should be completed in less than 30 minutes. This is consistent with information obtained during	
completed in less than 30 minutes. This is consistent with information obtained during	
operator walk-throughs of the ER-FIRE procedures which consistently indicated restoration	
in 17 to 24 minutes.	ga se tra e ta Arena e a como e a
Ginna Basis Reference(s):	Second and the second
1. AP-CR.1 Control Room Inaccessibility	Ц. Ц.
2. Fire Protection Program, Section 3.2.2.12 Time Criteria for Achieving Hot Shutdown	10 m.ek

3. NEI 99-01 HS2

 $A_{i}^{(1)} \stackrel{\mathrm{def}}{\longrightarrow} A_{i}^{(2)}$ ان الذي الأخلية المستقدمة الأمان المحاج ليوديك المحافظية للمتعلق يوميطان المحاطة الماريك المحاد المحاد المحاد الاحتاذ المعالم المحاد المحادي أن المحاد المحاصية المحاجة المعلم المعاد المحاد المحاد المحاد المحاد المحاد المح 17 - يادية إلى يوافي المحاد المحاد المحاد المحاد المحادي المحاد المحاد المحاد المحاد المحاد المحاد المحاد المحا

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	EMERGENCY AC	CTION LEVEL	Rev	vision [Draft H	1] [
	TECHNICAL BASE	S DOCUMENT	[`] Pa	ge 200 of 33	6	
Category:	H – Hazards and Other	Conditions Affe	cting Plant Sa	fety		1. 1. 1. 1. 1. 1.
Subcategory:	6 – Judgment				the attack	·····
Initiating Condition:	Other conditions existing Director warrant declara	g that in the judg ition of a UE	ment of the E	Emergency	2 M	
EAL:		· · · · · · · ·				
Other conditions exist events are in progress of safety of the plant O No releases of radioad	Event which in the judgment of to or have occurred which in R indicate a security thre tive material requiring off tion of safety systems occ	the Emergency ndicate a potent at to facility prot site response or	Director indic ial degradatic ection has be	ate that on of the leve en initiated.		
Mode Applicability:						tan start ₹.
Basis:			27 - 10 Î	-		•.
<u>Generic</u>					•	· · · .
declaration of an emerge	nticipated conditions not ad ncy because conditions exi NOUE emergency classifica	st which are belie				

Plant-Specific

None

Ginna Basis Reference(s):

1. NEI 99-01 HU5

			EPAD-> Revision [Draft Page 201 of 3	H] .	
Category:	H – Hazards and Other	Conditions Affecting	Plant Safety	4.4 X X	
Subcategory:	6 – Judgment		<pre>/ :</pre>	gaar sh	• _,
Initiating Condition:	Other conditions exist the Director warrant declaration				y leter for any set
EAL:					. *
HA6.1 Alert		<u> </u>			an an Atana ang ang
events are in progress degradation of the leve threatening risk to site (Any releases are expen	which in the judgment of or have occurred which of safety of the plant or personnel OR damage to cted to be limited to sma rels (1,000 mRem TEDE	involve an actual or r a security event tha o site equipment bec all fractions of the EP or 5,000 mRem thyr	potential substantial t involves probable lif ause of hostile actior A Protective Action	ie чарани и на	Angeles († 1997) 1997 - Standard († 1997) 1997 - Standard († 1997) 1997 - Standard († 1997) 1997 - Standard († 1997)
Mode Applicability:			•	•	ч. Ч
All		<i>.</i> .			,
Basis:				• •	
Generic					
This EAL addresses unar declaration of an emerge	nticipated conditions not ac ncy because conditions ex Alert emergency classificat	kist which are believed tion level.	by the Emergency	en tel a construction de	a Article Article Article Article Article
Plant-Specific	1997 - 1997 -				
Definitions:					
Hostile Action	a or its porsennal that in	aludae the use of the	lant force to destruct		an tairt
An act toward Ginna equipment, take hos includes attack by a other devices used may be included. Ho disobedience or felo terrorism-based EA	a or its personnel that ind stages, and/or intimidate air, land, or water using g to deliver destructive for ostile action should not b onious acts that are not p Ls should be used to ad n individuals in the owne	the licensee to achi guns, explosives, pro ce. Other acts that so be construed to inclu- part of a concerted a dress such activities or controlled area).	eve an end. This jectiles, vehicles, or atisfy the overall inter de acts of civil ttack on Ginna. Non- (i.e., this may include	n na singer an http://generations. include the forest state of the state of the state http://generation.	
An act toward Ginna equipment, take hos includes attack by a other devices used may be included. Ho disobedience or felo terrorism-based EAI violent acts between	stages, and/or intimidate air, land, or water using g to deliver destructive for ostile action should not b onious acts that are not p Ls should be used to ad n individuals in the owne	e the licensee to achi guns, explosives, pro ce. Other acts that so be construed to inclu- part of a concerted a dress such activities er controlled area).	eve an end. This jectiles, vehicles, or atisfy the overall inter de acts of civil ttack on Ginna. Non- (i.e., this may include	n na si se se al nte se na se se se se se se se se se se s	
An act toward Ginna equipment, take hos includes attack by a other devices used may be included. Ho disobedience or felo terrorism-based EA	stages, and/or intimidate air, land, or water using g to deliver destructive for ostile action should not b onious acts that are not p Ls should be used to ad n individuals in the owne	e the licensee to achi guns, explosives, pro ce. Other acts that so be construed to inclu- part of a concerted a dress such activities er controlled area).	eve an end. This jectiles, vehicles, or atisfy the overall inter de acts of civil ttack on Ginna. Non- (i.e., this may include	nta a sur a sur an a	en og Anton Addet Den og ander Solo Afgense Agning Anton Solo Addet Anton Addet Anton Addet Anton Addet Anton Addet Anton Addet Anton Addet Anton Addet

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		EPAD-XX evision [Draft H] Page 202 of 336	
Category:	H – Hazards and Other Conditions Affecting Plant	Safety	<i>.</i>
Subcategory:	6 – Judgment		
Initiating Condition:	Other conditions existing that in the judgment of the Director warrant declaration of a Site Area Emerge		tan ing kanalari ka
EAL:			
HS6.1 Site Area	a Emergency		
events are in progress plant functions needed intentional damage or lead to the likely failure the protection of the pu which exceed EPA Pro	which in the judgment of the Emergency Director ind or have occurred which involve actual or likely majo for protection of the public OR hostile action that re- malicious acts: (1) toward site personnel or equipme of, or: (2) that prevent effective access to, equipme ublic. Any releases are not expected to result in exp tective Action Guideline exposure levels (1,000 mRe DE) beyond the site boundary	r failures of sults in int that could int needed for osure levels	
Mode Applicability:			
Ali			
Basis:			•
Generic			
declaration of an emerge	nticipated conditions not addressed explicitly elsewhere to ncy because conditions exist which are believed by the E emergency classification level description for Site Area E	out that warrant Emergency	
Plant-Specific			tean 12
Definitions:			en literation
Hostile Action	tage (1. 1998). A start of the start	an an an an an Air a Air an Air an A	at in the second se
equipment, take ho includes attack by a other devices used may be included. H disobedience or fel terrorism-based EA	a or its personnel that includes the use of violent for stages, and/or intimidate the licensee to achieve an ir, land, or water using guns, explosives, projectiles, to deliver destructive force. Other acts that satisfy th ostile action should not be construed to include acts onious acts that are not part of a concerted attack or Ls should be used to address such activities (i.e., th n individuals in the owner controlled area).	ce to destroy end. This , vehicles, or ne overall intent of civil n Ginna. Non-	
Site Boundary		÷.	N.
The Site Boundary	is approximately a 0.3-mile radius around the reacto	r	· · · · ·

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Ginna Basis Reference(s):

1. NEI 99-01 HS3

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	EMERGENCY ACTION LEVEL	Revision [Draft H]
	TECHNICAL BASES DOCUMENT	Page 204 of 336
Category:	H Hazards and Other Conditions Affecting	g Plant Safety
Subcategory:	6 – Judgment	
Initiating Condition:	Other conditions exist that in the judgment of	of the Emergency

Director warrant declaration of a General Emergency

EAL:

HG6.1 General Emergency

Other 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 for loss of containment integrity **OR** hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) offsite for more than the immediate site area

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

Plant-Specific

Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Imminent

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

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Ginna Basis Reference(s):

1. NEI 99-01 HG2

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EPAD-XX

Category S ~ System Malfunction

EAL Group: Hot Conditions (RCS temperature > 200°F); EALs in this category are applicable only in one or more hot operating modes.

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Numerous system-related equipment failure events that warrant emergency classification have been identified in this category. They may pose actual or potential threats to plant safety.

The events of this category pertain to the following subcategories:

1. Loss of AC Power

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

2. Loss of DC Power

Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of power to the 125 VDC buses.

3. Criticality & RPS Failure

Inadvertent criticalities pose potential personnel safety hazards as well as being indicative of losses of reactivity control.

Events related to failure of the Reactor Protection System (RPS) to initiate and complete automatic reactor trips. In the plant licensing basis, postulated failures of the RPS to complete a reactor trip comprise a specific set of analyzed events referred to as Anticipated Transient Without Scram (ATWS) events. For EAL classification however, ATWS is intended to mean any automatic trip failure event that does not achieve reactor shutdown. If RPS actuation fails to assure reactor shutdown, positive control of

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reactivity is at risk and could cause a threat to fuel clad, RCS and Containment and the second statement of the second statem

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4. Inability to Reach or Maintain Shutdown Conditions

System malfunctions may lead to failure of the plant to be brought to the required plant operating condition required by Technical Specifications if a limiting condition for operation (LCO) is not met.

5. Instrumentation

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

6. Communications

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

7. Fuel Clad Degradation

During normal operation, reactor coolant fission product activity is very low. Small concentrations of fission products in the coolant are primarily from the fission of tramp uranium in the fuel clad or minor perforations in the clad itself. Any significant increase from these base-line levels (2% - 5% clad failures) is indicative of fuel failures and is covered under Category F, Fission Product Barrier Degradation. However, lesser amounts of clad damage may result in coolant activity exceeding Technical Specification limits. These fission products will be circulated with the reactor coolant and can be detected by coolant sampling and/or the Letdown radiation monitor.

8. RCS Leakage

The Reactor Vessel provides a volume for the coolant that covers the reactor core. The Reactor Vessel and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel clad integrity fail.

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Excessive RCS leakage greater than Technical Specification limits indicates potential pipe cracks that may propagate to an extent threatening fuel clad, RCS and Containment integrity.

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	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT
Category:	S – System Malfunction
Subcategory:	1 – Loss of AC Power
Initiating Condition	Loss of all offsite AC power to 480V safeguards buses for ≥ 15 min.
EAL:	Name of the generative point of work of the state of the
SU1.1 Unusu	al Event To the Asker Bolk to the Constant base of the Market of the second structure and the second second second
Loss of all offsite AC	power, Table S-1, to 480V safeguards buses for ≥ 15 min. (Note 4) and the set of the
·····	not wait until the applicable time has elapsed, but should declare the event as soon as it is the condition has exceeded, or will likely exceed, the applicable time.
	Table S-1 AC Power Sources
<u>e</u>	• EDG 1A (Bus 14)

Ons	٠	EDG 1B (Bus 16)	the she taken a state of the dependence of the state of the
•	•	Station Auxiliary Transformer 12A	na anna an Artainn airean airean an an an an an an
site		Station Auxiliary Transformer 12B	······································
Đ	•	Unit Auxiliary Transformer 11 backfeed (if currently established)	an managan ing pangangan kara sa
			化物理学 化合同分子 化合同物合物 法认识 医甲状

Mode Applicability:

No. 1977	and the second	and the second second second second	
o, 3 - Hot Shutdown, 4 -	Hot Standby	an the second of the second	· · · · ·
	NATION NEEDED AND AND AND AND AND AND AND AND AND AN		11
(1,1) = (1,1) + (1,1	$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{i$	N Alexandra de Solar	
ering the plant more vulne	rable to a complete loss of AC p	bower	
threshold to exclude trans	sient or momentary losses of off	site	والمؤمرين ممرحا
vided that abnormal or om must also consider the im site specific EAL.]	orgoncy operating procedures a pact of this condition on other s	addross harod Classes Typin	an an an an air an
	er reduces required redund aring the plant more vulne threshold to exclude trans ould allow crodit for opera vided that abnormal or om must also consider the im site specific EAL.]	er reduces required redundancy and potentially degrades ering the plant more vulnerable to a complete loss of AC p threshold to exclude transient or momentary losses of off ould allow credit for operation of installed design features vided that abnormal or omorgency operating procedures must also consider the impact of this condition on other s site specific EAL.]	ould allow credit for operation of installed design features, such a state to the second design features, such a state to the second design features address must also consider the impact of this condition on other shared

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[Plants that have a proceduralized	capability to cross tio AC	power from an off-site power supp	yly of	1774 F. 1888
a companion unit may take credit fe	or the redundant power s	ource in the associated EAL for th	÷	
/C.]			••••	2 ·
				۰.,

Plant-Specific

Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features ····· required for hot shutdown and hot standby modes will be operable.

1. <u>1</u>.

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 and share the second of via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be 🔅 👘 accomplished within 15 minutes, it is not considered available and an Unusual Event must Average to every constraint of the starter of the second constraint of be declared.

The fifteen-minute interval was selected as a threshold to exclude transient power losses.

Ginna Basis Reference(s):

- 1. UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System
- 2. NEI 99-01 SU1

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Category:	S – System Malfunction
Subcategory:	1 – Loss of AC Power
Initiating Condition:	AC power capability to 480V safeguards buses reduced to a single power source for ≥15 min. such that ANY additional single failure would result in a complete loss of all 480V safeguards bus power

EAL:

SA1.1	Alert
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AC power capability to 480V safeguards buses reduced to a single power source, Table S-1, for \ge 15 min. (Note 4)

AND

Any additional single power source failure will result in a complete loss of all 480V safeguards bus power

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

	Table S-1 AC Power Sources				
Onsite	EDG 1A (Bus 14)EDG 1B (Bus 16)				
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established) 				

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

[This IC and the associated EALs are intended to provide an escalation from IC SU1, "Loss of All Off site AC Power To Emergency Busses for Greater Than 15 Minutes."]

The condition indicated by this IC EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a <u>complete loss of 480V vital bus AC</u> <u>power station blackout</u>. This condition could occur due to a loss of off-site power with a concurrent

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related condition could be the loss of all o with only one train of emergency <u>480V vit</u> the loss of on-site emergency generators backfed from off-site power. The subsequ	r to supply power to its emergency busses. Anot ff-site power and loss of on-site emergency gen <u>al</u> busses being backfed from the unit main gen with only one train of emergency <u>480V</u> vital bus lent loss of this single power source would esca	erators erator, or ses being late the	tan tanga Langung Sangar
event to a Site Area Emergency in accord	lance with <u>EAL</u> SS1 <u>1</u> .		uth Charles and
Fifteen minutes was selected as a thresh	old to exclude transient or momentary losses of	power.	
as cross-ties or swing diesels, provided th	low credit for operation of installed design featur hat abnormal or emergency operating procedure	s address	an thur ang at
their use. However, these stations must a safety functions in developing the site spe	vise consider the impact of this condition on othe peific EAL.]	er shared	
[Planta that have a proceduralized earph	ility to cross-tie AC power from an off-site power	augulu of	75.25
	redundant power source in the associated EAL f	for this	n. g ≥1
	$(t_1, \ldots, t_n) \in \mathcal{M}(t_1, t_2) \to t_1 \in \mathcal{M}(t_1, t_2) \to t_1 \in \mathcal{M}(t_1, t_2)$	s se	tta sint turasia∄
Plant-Specific	$(A_{ij}) = (A_{ij}) \frac{\partial h}{\partial t} = \frac{\partial h}{\partial t} \frac{\partial h}$	e a constant	
Two Class 1E independent trains prov	vide the necessary redundancy on the,480V	and a second	ayar esta an
safeguards system. Train A consists of	of 480V safeguards buses 14 and 18, while t	rain B	· · ·
consists of safeguards buses 16 and	17. Buses 14 and 16 provide power to engin	eered	
safety features that are essential in re	sponse to the analyzed events and design b	anin	utri se Cristina e C
	s, containment fans, etc.). Buses 17 and 18		langan kar∛ri, s Solariya kar
	and are not listed in Table S-1 because the		
•	18 alone does not ensure engineered safety		
required for hot shutdown and hot star	• •		
required for not shuldown and not star	nuny modes will be operable.		

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed.

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Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and an Unusual Event must be declared.

There are two onsite emergency AC power sources available in the hot modes:

· · . ·

- EDG 1A
- EDG 1B

The fifteen-minute interval was selected as a threshold to exclude transient power losses. If multiple sources fail to be capable of supplying one or more safety-related buses within 15 minutes, an Unusual Event is declared under this EAL. The subsequent loss of the single remaining power source escalates the event to a Site Area Emergency under EAL and the super-structure of the supervision of the super-structure structure of the super-1. 21 . SS1.1. . . Same and the second second and the second Ginna Basis Reference(s): 1. UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System and the state of the second ÷. 1 2. NEI 99-01 SA5 and the second state of the se and the contract of the state o 化离子成的现在分词 机固定 医牙口 医肉样性 医尿道病 化化反应分子 المراجع والمراجع والمروا المراجع والمحاصل والمحاص والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع . 1 and the second product and the second second second 1. . . .

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		TECHNICAL BASES DOCUMENT	
	Catagony	S – System Malfunction	i
	Category:	1 – Loss of AC Power	
	Subcategory:		•
	Initiating Condition:	Loss of all offsite and all onsite AC power to 480V safeguards buses for ≥ 15 min.	•
	EAL:		• •
	SS1.1 Site Are	a Emergency	
		all onsite AC power, Table S-1, to 480V safeguards buses	
l	for ≥ 15 min. (Note 4)	the second s	1.1
	Note 4: The ED should no determined that th	It wait until the applicable time has elapsed, but should declare the event as soon as it is econdition has exceeded, or will likely exceed, the applicable time.	- eff 3
		Table S-1 AC Power Sources	
	Onsite		
		Station Auxiliary Transformer 12A	1.13
	site	Station Auxiliary Transformer 12B	
	Offsite	Unit Auxiliary Transformer 11	•
	-	backfeed (if currently established) in the second contract of the department of	
	Mode Applicability:	2 - Startun 3 - Hot Shutdown 4 - Hot Standby Start 2 2014 2017 2019 2019 2019	
		2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby states a state of the	
	Basis:		
	<u>Generic</u>	The action of the parameters of the second	-
	power including RHR, E loss of all AC power to e	emergency busses compromises all plant safety systems requiring electric CCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged emergency <u>480V vital</u> busses will lead to loss of Fuel Clad, RCS, and the second second second second second event can escalate to a General Emergency.	-
	Fifteen minutes was sele	ected as a threshold to exclude transient or momentary losses of off-site.	
	F	un de la substancia de la companya d	

[At multi-unit stations, the EALs should allow credit for operation of installed design features, such as cross ties or swing diesels, provided that abnormal or omorgency operating procedures address

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their use. However, these stations must also consider the impact of this condition on other shared safety functions in developing the site specific EAL.]

[Plants that have a proceduralized capability to cross tie AC power from an off site power supply of a companion unit may take credit for the redundant power source in the associated EAL for this IC.]

Escalation to General Emergency is via Fission Product Barrier Degradation<u>EALs in Category F</u> or IC SG1, "Prolonged Loss of All Off site Power and Prolonged Loss of All On-site AC Power.<u>EAL</u> <u>SG1.1.</u>"

Plant-Specific

Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features required for hot shutdown and hot standby modes will be operable.

There are three offsite power sources available to these buses in the cold modes (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV
 Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and Alert must be declared. 12 - Santa Sant Santa Sant Santa Sant

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There are two onsite emergency AC power sources available in the cold modes:

· ·	EMERGENCY ACTION LEVEL	EPAD-XX Revision [Draft H] Page 217 of 336	
• EDG 1A		the second second	
EDG 1B			: · · · · · ·
	was selected as a threshold to exclude trans able of supplying all safety-related buses wit	·	an an an tha
Site Area Emergency is de	clared under this EAL.	· · · · · · · · · · · · · · · · · · ·	e e Tarta tarta
	iven to operable loads necessary to remove akeup capability when evaluating loss of all A	decay heat or	
safeguards buses.	and the second second second	Normal Carl Services	$(e_1, \dots, e_k) \in \mathcal{B}_{k+1}^{(k)}(e_1, \dots, e_k)$
Ginna Basis Reference(s 1. UFSAR Section 8 and F 2. ECA-0.0 Loss of All AC 3. NEI 99-01 SS1	Figure 8.1-1 Electrical Distribution System		
		u are d'an each d'aire Achte gus treiter (1892) a Marse de la Charles de la San de	and a star Star Maria Andreas Star Star Star Andreas Star Star Star Star

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Category:	S –System Malfunction	· · · · · ·
Subcategory:	1 – Loss of AC Power	
Initiating Condition:	Prolonged loss of all offsite and all onsite AC power to 480V safeguards buses	n an
EAL:	2、中国家11、11、中国家11、11、11、中国省大学11、11、11、11、11、11、11、11、11、11、11、11、11、	nee aa teen waarne een dagaa
SG1.1 General	Emergency	an din an Gran Sharan An
Loss of all offsite and	all onsite AC power, Table S-1, to 480V safeguards buses	s or strategic for the
AND EITHER:	$(x_{i}, y_{i}) \in \mathcal{O}(x_{i})$,	and the second second second
Restoration of a	t least one 480V safeguards bus within 4 hours is not likely	A second state of the
OR		
ORANGE or RE	D path condition exists F-0.2 Core Cooling	
[

	Table S-1 AC Power Sources
site	• EDG 1A (Bus 14)
Onsit	• EDG 1B (Bus 16)
	Station Auxiliary Transformer 12A
Offsite	Station Auxiliary Transformer 12B
	 Unit Auxiliary Transformer 11 backfeed (if currently established)

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

[The (site specific hours) to restore AC power can be based on a site blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155, "Station Blackout," as available. Appropriate allowance for off site emergency response including evacuation of surrounding areas should be considered. Although this IC may be viewed as redundant to the

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		L Revision [Draft H]	
	TECHNICAL BASES DOCUME	NT sectors (Page 219 of 336) ***	
Fission Product Barrier L recognition and emerger	Degradation IC, its inclusion is necessary ncy rosponse.]	lo bottor assuro timoly and a subscription of the sub-	مىنى يە
This IC-EAL is specified	to assure that in the unlikely event of a p		., , (
all AC power to 480V sat	feguards buses, timely recognition of the	seriousness of the event occurs	1 ⁴ 12
reasonable assessment	General Emergency occurs as early as i of the event trajectory.	s appropriate, based on a	· • • •
		s should be based on a realistic	
the event could result in	a since a delay in an upgrade decision ba a loss of valuable time in preparing and i	sed on only a chance of mitigating mplementing public protective	.: •
actions.		and the second second states and the second s	
In addition, under these	conditions, fission product barrier monito	ing capability may be degraded.	ς.
Although it may be diffic	sult to prodict when power can be restore	d. it is nocossary to give the	à C
Emergency-Director a re	asonable idea of how quickly (s)he may		
Emorgoncy based on two	-		
 Are there any press or potential loss of 	ent indications that core cooling is alread Fission Product Barriers is IMMINENT?	y dograded to the point that loss	2623 2623
	sent indications of such core cooling degr time to assure that a loss of two barriers		សមា
barrier can be prev		war a polonitariose or the timu A 1966 - Alexandre Alexandre Alexandre Alexandre Alexandre Alexandre Alexandre A	os "i
Thus, indication of contir	nuing core cooling degradation must be b	ased on Fission Product Barrier	•
топконну with particula	и өтрпасіс оп ≝төгдепсу Бігесіог juagr	TORE as it relates to invinively i	9272
barriors.]	ission product barriers and degraded abi	ity to monitor inssion product	1.00
Plant-Specific	 The state of the s	A REAL PROPERTY AND A REAL AND A R	<u>.</u>
		republic to a second of the transmission of the second	5
	ident trains provide the necessary red		
	ain A consists of 480V safeguards bu	and the second	· .
•	buses 16 and 17. Buses 14 and 16 p		
safety features that are	e essential in response to the analyze	d events and design basis	
accidents (e.g., SI pur	nps, RHR pumps, containment fans, e	tc.). Buses 17 and 18 provide	
power to the four servi	ce water pumps and are not listed in	Table S-1 because the	
	Buses 17 and 18 alone does not ens		ч . " -
availability of power to			·
	own and hot standby modes will be op	erable.	

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- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
 Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via
- CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV
 Main Transformer with the Main Generator bus disconnects (links) removed.

There are two onsite emergency AC power sources available in the cold modes:

- EDG 1A
- EDG 1B

Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of all AC power to safeguards buses.

Ginna is licensed for a four hour Station Black Out (SBO) coping category (ref. 2). The ability of the plant to cope with a four hour SBO duration was based on an assessment of condensate inventory required for decay heat removal, Class 1E battery capacity, compressed air availability or manual operation of certain valves, effects of loss of ventilation, containment isolation valve operability, and reactor coolant inventory loss. A plant-specific analysis indicates that the expected rates of reactor coolant inventory loss under SBO conditions do not result in core uncovery in a SBO for four hours. Therefore, makeup systems in addition to those currently available under SBO conditions are not required to maintain core cooling under natural circulation. Thus, conditions in which restoration of AC power within four hours is not likely are included in the EAL.

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 ED a reasonable idea of how quickly to declare a General Emergency based on two major considerations:

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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 products and the second	
	r monitoring with particular emphasis on ED judgment as it relates to imminent loss	
	ential loss of fission product barriers and degraded ability to monitor fission product	• •
barrie	rs. Indication of continuing core cooling degradation is manifested by the existence of	
condit	tions to Critical Safety Function Status Tree Core Cooling-ORANGE or RED paths	
(ref. 3)). $f_{\rm eff}(x) = f_{\rm eff}(x) + f$	
Ginna	a Basis Reference(s):	
2. Gi 3. Ci	FSAR Section 8 Electrical Power and Figure 8.1-1 Electrical Distribution System inna Station Blackout Program Section 3.7 SFST for F-0.2 Core Cooling El 99-01 SG1	•

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Category:	S – System Malfunction	t banda shek	6 M . 1	1996 (1996), 19	and a second second	:.
Subcategory:	2 – Loss of DC Power			et official a		
Initiating Condition:	Loss of all vital DC power					
EAL:					la de la carece	
	a Emergency 5 VDC buses 1A and 1B fo					
Note 4: The ED should not determined that the	wait until the applicable time has e condition has exceeded, or will like	lapsed, but should decla aly exceed, the applicabl	re the event as a time.	soon as it is	an an tha an ann an a	•
Mode Applicability:		· · · · · ·	· . ·			· · · ·
1 - Power Operation, 2	- Startup, 3 - Hot Shutdow	n, 4 - Hot Standby	,			, · · ·
Basis:						
Generic					anna An an Anna an Anna Anna Anna Anna A	
loss of all DC power will of	npromises ability to monitor a cause core uncovering and lo d sensible heat in the reactor	ss of containment in	ety functions. ntegrity when	there is	ا ما قرور از این می می از ا محمد به به از معترف از معقود های	

{Sito specific bus voltage should be based on the minimum bus voltage necessary for the oporation of safety related equipment. This voltage value should incorporate a margin of at least 15 minutes of operation before the onset of inability to operate those loads. This voltage is usually near the minimum voltage selected when battery sizing is performed. Typically the value for the entire battery set is approximately 105 VDC. For a 60 cell string of batteries the cell voltage is typically 1.75 Volts per cell. For a 58 string battery set the minimum voltage is typically 1.81-Volts per cell.}

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation to a General Emergency would occur by EALs in Category R and Category FAbnormal Rad Levels/Radiological Effluent, Fission Product Barrier Degradation.

Plant-Specific

The 125 VDC vital system is divided into two independent and isolated channels. Each channel consists of one battery, two battery chargers, one DC bus and one inverter. Each inverter has an associated vital AC distribution panel board. Power to the DC bus, DC unit control panels, and inverters is supplied by the station batteries and/or the battery

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	is fully rated and can recharge a on steady state power requirements	of the system.	e geographic de la composition de la co
	is designed with an intertie to eau ring maintenance and abnormal o	ch of the two main (A and	n an an an an an an an Arrenna an Arrenna An Arrenna an Arrenna Arrenna Arrenna An Arrenna
loads following a plant trip and l	ries have been sized to carry their oss of offsite power or following a pelow 108.6 volts for a period of 4	station blackout without	liter (konstanting) Literation (konstanting) Literation (konstanting)
The fifteen-minute interval was power losses.	selected as a threshold to exclude		entare constants official constants official constants
•	es not constitute an entry condition		1997 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 2017 - 1011 - 2017 - 201 - 2017 - 201
This EAL is the hot condition eq EAL CU2.1. Ginna Basis Reference(s): 1. UFSAR Section 8.3.2 Direct	an stàite anns an t-airte Mart an t-airte an t-airte an t-airte an t-airte	- 1997年1月1日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日	n general an an sairte sai 1930 - Sairte sairte 1930 - Anton Sairte Mathematica sairte s 2030 - Anton Sairte
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	EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 224 of 336
Category: S – Sy Subcategory: Initiating Condition: EAL:	stem Malfunction 3 – Criticality & RPS Failure Inadvertent criticality
SU3.1 Unusual An unplanned sustained	Event I positive startup rate observed on nuclear instrumentation
Mode Applicability: 3 - Hot Shutdown, 4 - H Basis: <u>Generic</u>	a second a second a second a second development and the second development and the second second second second
degradation of the level o excludes inadvertent critic	advertent criticality events. While the primary concern of this IC- <u>EAL</u> is resses inadvertent criticality events. This IC- <u>EAL</u> indicates a potential safety of the plant, warranting a NO UE classification. This IC-<u>EAL</u> alities that occur during planned reactivity changes associated with cality earlier than estimated).
used in order to allow exc control rod movements fo	ntified using period monitors/startup rate monitor. The term "sustained" is lusion of expected short term positive periods/startup rates from planned - PWRs and BWRs (such as shutdown bank withdrawal for PWRs). periods/startup rates are the result of the increase in neutren pepulation ation.]
Escalation would be by th operating mode at the time	e Fission Product Barrier TableEALs in Category F, as appropriate to the e of the event.
Plant-Specific	
	used to allow exclusion of expected short-term positive startup bundle or control rod movements during core alteration. These

short-term positive startup rates are the result of the rise in neutron population due to subcritical multiplication. Short-term positive startup rates can also be due to welding activities.

Definitions:

Unplanned

	EMERGENCY ACTION LEVEL			
A parameter change or an that is not the result of an	n event, the reasons for which ma intended evolution or expected p	ay be known plant respons		an a
Ginna Basis Reference(s): 1. NEI 99-01 SU8	i tana ara-guta ang salama ang salama salama salama salama	En, in	an de se dan	an suite in propage. S
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Category:	S – System Malfunction
Subcategory:	3 – Criticality & RPS Failure
Initiating Condition:	Automatic trip failed to shut down the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor

EAL:

SA3.1 Alert

An automatic trip failed to shut down the reactor

AND

Manual actions taken at the reactor control console successfully shut down the reactor as indicated by reactor power $\leq 5\%$

Mode Applicability:

1 - Power Operation

Basis:

Generic

The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (typically 3 to 5% power). For plants using CSFSTs, this EAL oquates to the criteria used to determine a valid Subcriticality Red Path. For BWRs this EAL should be the APRM downscale trip setpoint.]

Manual scram-(trip) actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

[If the manual scram (trip) switches/pushbuttons on the control room console panels are considered an automatic input into the Reactor Protection System, a failure to scram (trip) without any other automatic input would make this threshold applicable.]

This condition indicates failure of the automatic protection system to scram (trip) the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transienttrip signal. Thus the plant safety has been compromised because design limits of the fuel may have been exceeded. An Alert is indicated because conditions may exist that lead to potential loss of fuel clad barrier or RCS barrier and because of the failure of the Reactor Protection System to automatically shut down the plant.

If manual actions taken at the reactor control console fail to shut_down the reactor, the event would escalate to a Site Area Emergency.

Plant-Specific

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A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined setpoints. The symptoms that require an automatic reactor trip are defined in procedure P-1(ref. 4): Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power drops into the source range (ref. 2).

The operator ensures that the reactor has tripped by (ref. 1):

- Verifying that at least one train of reactor trip breakers are open
- Checking that all control rod position rod bottom lights are on
- Observing neutron flux is decreasing

If these responses cannot be verified, operators perform contingency actions that manually insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room to actuate reactor trip switches or deenergize 480 V buses 13 and 15 (ref. 1, 2).

In the event that the operator identifies a reactor trip is imminent and successfully initiates a manual reactor trip before the automatic trip setpoint is reached, no declaration is required. The successful manual trip of the reactor before it reaches its automatic trip setpoint or reactor trip signals caused by instrumentation channel failures do not lead to a potential fission product barrier loss. If manual reactor trip actions in the Control Room fail

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to reduce reactor power below 5% (ref. 3), the event escalates to the Site Area Emergency

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Gi	nna Basis Reference(s):		ere general	
2	E-0 Reactor Trip or Safety Injection FR-S.1 Response to Reactor Restart/ATWS	San Chitta	E. L. K. L. Sorre S	a second a second
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Category:	S – System Malfunction				
Subcategory:	3 - Criticality & RPS Fallure	a s <mark>y</mark> fan e a a syfar a	-		
Initiating Condition:	Automatic trip and manual actions taken from the reactor cor console failed to shut down the reactor	ntrol			

EAL:

SS3.1 Site Area Emergency

An automatic trip failed to shut down the reactor as indicated by reactor power > 5% AND

Manual actions taken at the reactor control console failed to shut down the reactor as indicated by reactor power > 5%

Mode Applicability:

1 - Power Operation

Basis:

Generic

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS.

[The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (typically 3 to 5% power). For plants using CSFSTs, this EAL equates to the criteria used to determine a valid-Subcriticality Rod Path. For BWRs this EAL should be the APRM downscale trip sotpoint.]

Manual scram (trip) actions taken at the reactor control console are any set of actions by the reactor operator(s)-at which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual scram (trip) actions are not considered successful if action away from the reactor control console is required to scram (trip) the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

[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.]

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

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Plant-Specific

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A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined setpoints. The symptoms that require an automatic reactor trip are defined in procedure P-1 (ref. 4): Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a negative startup rate as nuclear power drops into the source range (ref. 2).

The operator ensures that the reactor has tripped by (ref. 1):

- Verifying that at least one train of reactor trip breakers are open
- Checking that all control rod position rod bottom lights are on
- Observing neutron flux is decreasing

If these responses cannot be verified, operators perform contingency actions that manually insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room to actuate reactor trip switches or deenergize 480V buses 13 and 15 (ref. 1, 2).

If reactor power is above 5%, the reactor is producing more heat than the maximum decay heat load safety systems are designed to remove (ref. 3). Emergency boration is thus required and there is an actual major failure of a system intended for protection of the public. The combination of failure of both front line and backup protection systems to function in response to a plant transient, along with the continued production of heat poses

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a direct threat to the Fuel Clad and RCS barriers and warrants declaration of a Site Area Emergency. the second se and the second Ginna Basis Reference(s): 1. E-0 Reactor Trip or Safety Injection a de la companya de l 2. FR-S.1 Response to Reactor Restart/ATWS 3. CSFST for F-0.1 Subcriticality 4. Procedure P-1 Reactor Control and Protection System 5. NEI 99-01 SS2 a na traditional segmentaria a subfiguraria a strategica di anala a cara a subfiguraria a subfiguraria a subfig and the second en en el completa de la substance en el completa de la completa de la completa de la completa de la completa d and the second · . · · · والمعاجزة والمعاجز والمعارفة والمناصب والمعاجز والمعاد والمعاد والمعاد والمعاد والمعاد والمعاد والمعاد and the second and the second second second second second المحاجة والاستقولي فالتفار ويحار الاستانية . í. and the second and the second ing have been all the acceleration of search and the second second second second second second second second se and the second • and the second secon . . , .÷ . . and the second state of the se (a) State of the state of th 199 - L $(r_1,r_2,\ldots,r_{n-1},\ldots,r_{$ and the second second the system of the probability of the states

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Category:	S – System Malfunction						
Subcategory:	3 – Criticality & RPS Failure						
Initiating Condition:	Automatic trip and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists						
EAL:	್ ಸ್ಟೇಟಿಗಳು ಸಂಸ್ಥೆ ಮಾಡಿದ್ದಾರೆ. ಆಗರು ಕಾರ್ಯಕ್ರಮ ಕೊಡಲಾಗಿ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿದ್ದಾರೆ. ಆಗರಿಗಳು ಆಗಳಿಗಳು ಸಂಸ್ಥೆ ಸಂಸ್ಥೆಯಿಂದ ಆಗರಿ ಸಂಸ್ಥೆಯ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿ ಸಂಸ್ಥೆಯಿಂದ ಸಂಸ್ಥೆಯ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿದ್ದಾರೆ. ಇದು ಸಂಸ್ಥೆಯಿಂದ ಮಾಡಲಾಗಿ ಸಂಸ್ಥೆಯಿಂದ ಸಂಸ್ಥೆಯ ಸಂಸ್ಥೆಯ ಸಂಸ್ಥೆಯ ಸಂಸ್ಥೆಯ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿ ಸಂಸ್ಥೆಯಾಗಿ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿ ಮಾಡಲಾಗಿ ಸಂಸ್ಥೆಯ ಸಂಸ್ಥೆಯ ಸಂಸ್ಥೆಯಿಂದ ಸಂಸ್ಥೆಯಾಗಿ						
SG3.1 General	Emergency 1920 Televice States of a relative at a trade of the size tour takes and the size at a second takes of the size of t						
An automatic trip failed	to shut down the reactor as indicated by reactor power > 5%						
AND							
All manual actions fail	to shut down the reactor as indicated by reactor power > 5% Contract relations and at the subject of						
AND EITHER of the	e following exist or have occurred: Verometrolece; here a concount of the other diseasement of reading of						
RED path condi	tion exists F-0.2 Core Cooling assomed as brentmanent of the neutrophysics and a second provider of the second						
OR	and the second second of the second of the second						
RED path condi	tion exists F-0.3 Heat Sink and the end many sector and the sector for the sector of the sector structure and the						
	– Article and Control and C						
Mode Applicability:	an a						
1 - Power Operation	atter para en on sou est l'ador autor sous de la secte de la companya de la companya de la companya de sectemen						
Basis:	anna a' star ann an stàrtachta ann a' threann a' threann ann ann ann ann ann an tha tha ann ann ann ann ann an						
Generic							
Under these conditions, the which the safety systems	the reactor is producing more heat than the maximum decay heat load for s are designed and efforts to bring the reactor subcritical are unsuccessful.						
[The reactor should be considered shutdown when it producing less heat than the maximum decay and the state of the state o							
[For PWRs, the extreme challenge to the ability to cool the core is intended to mean that the core exit temperatures are at or approaching 1200 degrees F or that the reactor vessel water level is below the top of active fuel. For plants using CSFSTs, this EAL equates to a Core Cooling RED condition combined with a Subcriticality RED condition.]							
	challenge to the ability to cool the core is intended to mean that the challenge to the ability to cool the core is intended to mean that the of cannot be restored and maintained above Minimum Steam Cooling RPV. d in the EOP bases.]						
[Another consideration is the inability to initially remove heat during the early stages of this sequence. For PWRs, if emergency feedwater flow is insufficient to remove the amount of heat required by design from at least one steam generator,"an extreme challenge should be considered							

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to exist. For plants using CSFSTs, this EAL equates to a Heat Sink RED condition combined with a Subcriticality RED condition.]	
[For BWRs, considerations include inability to remove heat via the main condenser, or via the suppression pool or torus (e.g., due to high pool water temperature).]	
In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is	
intended to be anticipatory of the fission product barrier table declaration to permit maximum off-	
Plant-Specific	19 - 43 diremane priv 24 S
A reactor trip is automatically initiated by the Reactor Protection System (RPS) when	Sec. P. M. S. Sagara
certain continuously monitored parameters exceed predetermined setpoints. The set of a set of the s	
symptoms that require an automatic reactor trip are defined in procedure P-1 (ref: 6).	e e estere e
Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear	
power promptly drops to a few percent of the original power level and then decays to a	ar Carl
level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop	uter and the second
continues until reactor power reaches the point at which the influence of source neutrons	n andre sin synthesis and Thanks sin the second second
on reactor power starts to be observable. A predictable post-trip response from an	
automatic reactor trip signal should therefore consist of a prompt drop in reactor power as	an singer a
sensed by the nuclear instrumentation and a negative startup rate as nuclear power drops into the source range (ref. 2).	and the second
 The operator ensures that the reactor has tripped by (ref. 1): Verifying that at least one train of reactor trip breakers are open 	an an an an Arna an Arna An an Anna Anna Anna Anna Anna Anna A
 Checking that all control rod position rod bottom lights are on 	
Observing neutron flux is decreasing	
If these responses cannot be verified, operators perform contingency actions that manually	
insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets.	
Local opening of these breakers requires actions outside of the Control Room, rapid	
control rod insertion by these methods is therefore not considered a "successful" manual	:
reactor trip. For purposes of emergency classification, a "successful" manual reactor trip,	
therefore, includes only those immediate actions taken by the reactor operator in the	

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Control Room to actuate reactor trip switches or deenergize 480V buses 13 and 15 (ref. 1, here a sugar the second se 2). senate central to the senate of the senate o

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CSFST Core Cooling RED path condition represents a severe challenge to the core cooling function (ref. 4). Core Exit Thermocouples (CETs) are an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. RCS temperatures > 1200 °F or > 700 °F with reactor vessel water level below the top of active fuel signals the transition from a subcooled to a superheated regime. In a superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to film boiling and a rapid rise in clad temperatures. This condition is considered a Fuel Clad barrier loss condition because the possible rapid rise in clad temperatures may lead to clad failure.

CSFST Heat Sink RED path condition represents a severe challenge to the heat removal function (ref. 5). Inability to remove heat from the RCS to the ultimate heat sink (lake or atmosphere) is a loss of function required for hot shutdown with the reactor at pressure and temperature and thus represents potential loss of the Fuel Clad and RCS barriers. Heat Sink RED path conditions are based on a combination of inadequate S/G level (< 5%) and inadequate feedwater flow (< 200 gpm total S/G feedwater flow).

The combination of these conditions (reactor power greater than 5% with loss of core cooling or inability to remove heat from the RCS) indicates the ultimate heat sink function is under extreme challenge, a core melt sequence may exist and rapid degradation of the fuel clad could begin. To permit maximum offsite intervention time, the General Emergency declaration is appropriate in anticipation of an inevitable General Emergency declaration due to loss and potential loss of fission product barriers.

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1.11.1 EPAD-XX EMERGENCY ACTION LEVEL $\frac{1}{2} \frac{1}{2} \frac{1}{$ TECHNICAL BASES DOCUMENT Page 237 of 336

Category:	S – System Malfunction	and an the second second second second	
Subcategory:	4 - Inability to Reach or Maintain Shutdown Condition	ns we also many a state of the state of the state of the	
Initiating Condition:	Inability to reach required shutdown within Technical limits	Specification	
EAL:		· · · · · · · · · · · · · · · · · · ·	•
SU4.1 Unusual	Event		
Plant is not brought to required action comple	required operating mode within Technical Specification time		•
Mada Applicability	· · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Mode Applicability: 1 - Power Operation, 2	- Startup, 3 - Hot Shutdown, 4 - Hot Standby	(1) We start a start of the	
Basis:		· · · · · · · · · · · · · · · ·	• .
<u>Generic</u>	 A state of the second se	en 1945 - Andrew Arthur, and an	•
the circumstances, this n In any case, the initiation four hour report under 10 envelope when being shi the Technical Specification required operating mode Technical Specifications. required action statemen	al Specification required configuration cannot be restored. D nay or may not be an emergency or precursor to a more sev of plant shutdown required by the site Technical Specificat O CFR 50.72 (b) Non-emergency events. The plant is within ut down within the allowable <u>required</u> action statement <u>comp</u> ons. An immediate NOUE is required when the plant is not to within the allowable <u>required</u> action statement <u>completion</u> to be claration of a NOUE is based on the time at which the L the <u>completion</u> time period elapses under the site Technical S long a condition may have existed.	vere condition. tions requires a differentiation of the second s	
{Other required Technica are addressed by other \$	al Specification shutdowns that involve precursors to more s System Malfunction, Hazards, or Fission Product Barrier De	gradation (Cs.)	
Plant-Specific		ter en la companya de la companya d La companya de la comp	
None	and the water of the according to the	un trata de la compositiva de la compos	•
Ginna Basis Reference 1. Technical Specifica 2. NEI 99-01 SU2	ee(s): East of the backword backword at the vertice of the vertice	undo a de la composition la composition de la composition de la composition de la composition de la composition de la la composition de la c	

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			ERGENCY HNICAL BA				EPAD-XX m [Draft H] 238 of 336		
Category		S – Syste	m Malfuncti		<i>,</i> ,		ant sa a ta sa		
Subcateg	jory:	5 – Instru	mentation			re pite seta			
Initiating	Condition:		d loss of sation of for ≥ 1 :		annunciati	on or indicati	on in the		· · · ·
EAL:							·		з·
SU5.1	Unusual	Event :			••••	<u></u>		🔪 an an an an t-the	6 1 4 4
	d loss of 6 or in. (Note 4)	-	unciator pan	els, Table :	S-2, or >75%	% of MCB inc	lications		
	ne ED should not etermined that the						oon as it is	- ⊬⊴: . • •	u îngo Azor Tauxî Gertî ew olayî
								ר	
	······	Table S	S-2 Vital Co		n Paneis			4	· · .
A	AA	В	c	D	E.	F	G	l an	
Mode An	plicability:		· · · ·	i i i i i i i i i i i i i i i i i i i		i india.			т
	Operation, 2	- Startun			Hot Standby				· · · · · · · · · · · · · · · · · · ·
Basis:	opolation, 2	otartap,					, И.		
Generic			1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	 		· ;•	i escuel de tu El segui	electron of the second	
This IC and changing p equipment	d its associate lant condition	d-EAL are <u>i</u> s s without the	<u>s</u> intended to e use of a ma	recognize th ijor portion c	ne difficulty a of the annunc	ssociated with iation or indic	n monitoring ation	1 3 1 1 1.	
Recognitio	n of the availa outor, oto.].	bility of com	puter based	indication e	quipment is c	onsidered (o.	g., SPDS,		<u>e in K</u> alan
l "Planned"	loss of annund	ciators or inc	dicators inclue	des schedul	ed maintena	nce and testin	g activities.		
annunciato go undeteo	ion is arbitrary ors or indicator cted. It is not in ation lost but u itions.	rs are lost, the tended that	here is an inc t plant persor	reased risk nel perform	that a degrad	led plant conc ount of the	lition could	an ta an A Star Maria	Secolaria 12 an articla 12 an articlar
1						4	e		

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It is further recognized that <u>most-plant</u> designs provides redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or

11 - 11 - 11 - 11 - 11 - 11 - 11 - 11		EPAD-X	X .		
EMERGENCY A		Revision [Draft]	-		
TECHNICAL BASE		Page 239 of 33	36;		
several, safety system indicators should remain a fu operability status. This will be addressed by the spe				. * • •	•
Technical Specification imposed plant shutdown rel	ated to the instrument	loss will be reported via	1.015	. •	•. •
10 CFR 50.72. If the shutdown is not in compliance wi is based on <u>EAL</u> SU2 "Inability to Reach Required S Limits."4.1.	Shutdown Within Tech	nical-Specification		AND AN BUILD	17 ⁷⁶ 61
[Site specific aAnnunciators or indicators for this EA		dentified in the Abnorm			
Operating Procedures, and in the Emergency Oper	ating Procedures, and	in other EALs (e.g.,	ai 		
area, process, and/or effluent rad monitors, etc.).]					
Fifteen minutes was selected as a threshold to excl	ude transient or mome	ntary power losses.	16.+	·•	
[Due to the limited number of safety systems in ope defueled modes, no IC is indicated during those mo	ration during cold shut des of operation.}	down, rofuoling, and		an a	41. i
This NOUE will be escalated to an Alert based on a if a significant transient is in progress during the loss	concurrent loss of cor s of annunciation or in		or State	i statu i se po se g	1
Plant-Specific	مربي 		· · · · ·		
	provide safety-related	d indications and	ntaen 102 i Sierre Room tee	4	н Д.
annunciation in the Main Control Room (ref. 1, 2		ona ann an ann an Chữim gia thiện thiện			• ,
A 75% loss of annunciators is defined as loss o	f 6 of 8 annunciator	panels listed on Table		• •	•
S-2. Loss of 75% of MCB indications is loss of					•
left sections of the main control board indication					
			i da i		
Definitions:	• • • •			· ·	
11	•	ACCEPTION CONTRACTOR		4	
Unplanned		$\operatorname{and} \mathcal{O} = \operatorname{cond} \mathcal{O} = con$			
A parameter change or an event, the reasor that is not the result of an intended evolution	ns for which may be in or expected plant re	known or unknown, esponse to a transien	ť		
- - -					
Ginna Basis Reference(s):			· • · ·		
1. UFSAR Sections 7.5 Safety-Related Display	Instrumentation			tin in sparse it i	R. 1. 1. 1. 1.
2. ER-INST.2 Loss of Annunciators	a da setta a				
3. NEI 99-01 SU3					

		EME	RGENCY NICAL BAS				Revisio	EPAD-XX n [Draft H 240 of 336]				
Category	:	S – System	Malfunctio	on i	a tai	e jan	an an an an an		ana Maria		ent entre es		к d
Subcateg	ory:	5 – Instrum	entation	1 2 ¹		99. g. s. 7	• • •	e tels set des	· ·				
Initiating (Condition:	Unplanned Control Ro (2) comper	om with eit	her (1) a :	significa	ant transier						,	
EAL:		,				-			•				
				•		• •			٦.			· · · · ·	/)
SA5.1	Alert												
for ≥ 15 m	l loss of 6 o in. (Note 4) ITHER:	r more annur	nciator pan	els, Table	S-2, oi	>75% of I	MCB ind	ications		•			•.
(ÔR	insient is in p indications a	69 ⁻ , 177, 177,			n tanınışı Niyyataşı t		a an san Na taona an a		•	2 2 . []	, · ·	
·													4.19
Note 4: Th de	e ED should no termined that th	t wait until the ap e condition has e	plicable time h xceeded, or w	nas elapsed, ill likely exce	but should ed, the ap	d declare the oplicable time.	event as so	ion as it is					
				• • •		•							
	· · · · · · · · · · · ·	Table S-	2 Vital Co	ntrol Roo	m Pan	els				*.			
A	AA	B	C	D		E	F	G			·		
							<u></u>	1.1.1.804					t for
		Table	S-3 Signifi	icant Tra	nsients	6							
		Automotic tu		ack > 25%	thorm		_					14.1.1	
	1	Automatic tu Electric load				•					· .		

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1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby Basis:

<u>Generic</u>

Mode Applicability:

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This IC-EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a significant transient.

Recognition of the availability of computer based indication equipment is considered (e.g.: SPDS. plant computer, etc.).]

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

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the

plant conditions. It is also not intended that the Shift Supervisor Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on EAL SU2 "Inability to Reach Required Shutdown Within Technical Specification Limits."4.1.

[Site specific aAnnunciators or indicators for this EAL must-include those identified in the Abnormal Operating Procedures, and in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).]

"Compensatory indications" in this context includes computer based information such as Plant Process Computer System and SPDS. [This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.] If both a major pertion of the annunciation system and all computer monitoring are unavailable, the Alert is required.

[Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no IC is indicated during these modes of operation.]

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a significant transient in progress during the loss of annunciation or indication.

Plant-Specific

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Control Room Panels A through G, Table S-2, provide safety-related indications and annunciation in the Main Control Room (ref. 1, 2).

PPCS is considered compensatory indication.

•

. . .

Significant transients are listed in Table S-3.

Definitions:

Unplanned A parameter change or an event, the reasons for which may be known or unknown, • .1 . s te that is not the result of an intended evolution or expected plant response to a transient. $(1,2,2,2,3) \in \mathbb{R}^{n}$, we apply the ensemble of the second state of the theory of 14 - A

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Ginna Basis Reference(s):

andre and the state of the second s 1. UFSAR Sections 7.5 Safety-Related Display Instrumentation

- 2. ER-INST.2 Loss of Annunciators
- 3. NEI 99-01 SA4

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Category:	S – System Malfunction
Subcategory:	5 – Instrumentation
Initiating Condition:	Inability to monitor a significant transient in progress
EAL:	a de la composición de la composición En 1860 de la composición de la composi La composición de la c
SS5.1 Site Area	• Emergency and a second se
Unplanned loss of 6 or for \geq 15 min. (Note 4)	more annunciator panels, Table S-2, or >75% of MCB indications
AND	and a second
AND	s in progress, Table S-3. The factor of the factor of the subscription of the subscrip
Compensatory indication	ons are unavailable (PPCS)
Note 4: The ED should not w	ait until the applicable time has elapsed, but should declare the event as soon as it is has exceeded, or will likely exceed, the applicable time

Table S-2 Vital Control Room Panels					and the product of the second			
A AA E		В	С	D	E	F	G	
				an a		1999 - 1997 - 19	1. B ¹	and a second s
	•	Automatic t	urbine runb d rejection >		ermal pov	wer d	N14× − − − 1	 A second s
Mode App 1 - Power Basis: <u>Generic</u>	Operation,		3 - Hot Shu	dówn, 4 - Ho	t Standby			

This IC-EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a significant transient.

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"Planned" and "unplanned" actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not an ameliorating factor.

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift <u>Supervisor Manager</u> be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on EAL_SU2-"Inability to Reach Required Shutdown Within Technical Specification Limits."4.1

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

[Site specific aAnnunciators for this EAL should beare limited to include those identified in the Abnormal Operating Procedures, and in the Emergency Operating Procedures, and in other EALs (e. g., area, process, and/or effluent rad monitors, etc.)]

Site specific indications needed to monitor safety functions necessary for protection of the public must 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 coolant system intact, maintain the spent fuel cooled, and to maintain containment intact.]

"Compensatory indications" in this context includes computer based information such as <u>Plant</u> <u>Process Computer System and SPDS</u>. This should include all computer systems available for this use depending on specific plant design and subsequent retrofits.

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Fifteen minutes was selected as a threshold to evolude transient or momentary power losses	· · ·			•	
Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.	. ·	*		2 A *	
[Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no IC is indicated during these modes of operation.]					
			•	·•• · · ·	

(1,1) = (1,1

Plant-Specific

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Control Room Panels A through G, Table S-2, provide	$(X_{ij}) = (y_{ij}) $	
annunciation in the Main Control Room (ref. 1, 2).	en en de mintre indigent de volagi (de	i e Negover (* 1717)
PPCS is considered compensatory indication.	ja i stational de la construcción d	avan da wasili viriki si S. Wati + S.a.(11)

Significant transients are listed in Table S-3.

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Ginna Basis Reference(s):	, the second states of the states and the second
1. UFSAR Sections 7.5 Safety-Related Display Instrumentation	gen i Marine a faire cuide al der state const
 2. ER-INST.2 Loss of Annunciators 3. NEI 99-01 SS6 	je staten marshipte operations to
	$= e^{2\pi i \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} + \frac{1}{2} \right)} e^{-2\pi i \frac{1}{2} \left(\frac{1}{2} + \frac$

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Category:	S – System Malfunction		a principal de la construcción de Construcción de la construcción de l
Subcategory:	6 – Communications	:	an a Burna an an Araba an Araba
Initiating Condition:	Loss of all onsite or offsite communications of	apabilities	· · · · · · · · · · · · · · · · · · ·
EAL:			enande de la estatut de la composition de la composition de la composition de la composition de la composition Notae de la composition de la compositio

SU6.1 Unusual Event

Loss of **all** Table S-4 onsite (internal) communication methods affecting the ability to perform routine operations

OR

Loss of all Table S-4 offsite (external) communication methods affecting the ability to perform offsite notifications

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Table S-4 Communication			
System	Onsite (internal)	Offsite (external)	n 1995 - 1995 an 1999an (Lawin) (Lawy) 1994 - Ang Kabagara, a Afrika (Lawy)
Commercial phone system	X	X	(a) 374 (875) (a. 1. 147)
Direct Dial POTS Lines (Blue Phones)	x	nen in x onit	an an the second state of the second s
Plant Page Party system	x		and an ender solden solden an an An Republication and an Antonio
Radios/Walkie Talkies	x		
FTS 2001 telephone system (ENS, HPN)		x	
Control Room Hard Wired Satellite Phone		x	
Control Room Emergency Cell Phone		x	

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

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 issues with off-site authorities.

ω_{2} . The	:		EPAD	-XX	
	NCY ACTIO		Revision [Drat	-	
TECHNICA	L BASES D	OCUMENT	Page 248 of	336	
The loss of off-site communications ability in than the condition addressed by 10 CFR 50		be significantly n	nore comprehensive		5 · · · · · · · · · · · ·
The availability of one method of ordinary of	-	niactions is suffici	ont to inform fodorol		
 state, and local authorities of plant problems 	5. This EAL is	intended to be us	sed only when	r. , ,	
extraordinary means (e.g., relaying of inform being sent to off-site locations, etc.) are beir				lals	, '2
Site specific list for on site communications	loss must on	compass the loss	of all means of		1 2
communications (o.g., commercial tolophon (Gaitronics) and radios / walkio talkios) routi			oms, pago party syst	lom	
	•	, .			and the American
[Site specific list for off site communications communications with off site authorities. The	s should inclu	de the ENS, com	mercial telephone lin		e estászárasztare
tolocopy transmissions, and dodicatod phon notifications.	o systems th	at are routinely us	ed for offsite emorge	ncy	n an tha an tha
	· · · · ·		· · · ·	., . .	
Plant-Specific			e data da da da		
Onsite/offsite communications systems a	are listed in	Table S-4 (ref. 1	, 2).		•
This EAL is the hot condition equivalent	of the cold o	ondition EAL CL	J5.1.		
Ginna Basis Reference(s):				1 m 1 m 2	1
1. A-56 Communication Systems at Gin		,		etta di serie	and
 ER-COMM.1 Loss of Communication NEI 99-01 SU6 	S				ч. ¹ (
3. NEI 33-01 300					
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Category:	S – System Malfunction		. • ••	Frank (1914) - M	e sa sa sa sa t
Subcategory:	7 – Fuel Clad Degradation		an an an an an an	the state of the s	
Initiating Condition:	Fuel clad degradation			1919 - S.	べき システキ パー
EAL:	and the second	ار به المنظرية معرورين			المراجع والمرجع

SU7.1 Unusual Event

RCS specific activity > 60 µCi/gm dose equivalent I-131

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product-BarriersEALs in Category F.

<u>EAL #1</u>

This threshold addresses site specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

[Such as BWR air ejector monitors, PWR failed fuel monitors, etc.]

<u>EAL #2</u>

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

Plant-Specific

This EAL addresses reactor coolant samples exceeding Technical Specification 3.4.16 which is applicable in Modes 1, 2 and in Mode 3 with RCS average temperature $(T_{avg}) \ge 500$ °F. Though the referenced Technical Specification limits are mode dependent, it is appropriate that the EAL be applicable in all hot modes, as it indicates a potential degradation in the level of safety of the plant. The Technical Specification limits accommodate an iodine spike phenomenon that may occur following changes in thermal power and during reactor startup and shutdown. The Technical Specification LCO limits

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are e	established to minimize the offsite radioactivity dose consequences in the event of a	
stear	m generator tube rupture (SGTR) accident (ref. 1).	
Ginn	a Basis Reference(s):	ł
1. T	echnical Specification 3.4.16 Reactor Coolant System - RCS Specific Activity	
2. N	IEI 99-01 SU4	
	الألاق المحمد والمعولية من المحمد والمحمد ومن المعرفين القلاق المرود. المحمد المحمد	
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•	•	•	2	۳.	•

Category:	S – System Malfunction	· . `
Subcategory:	7 – Fuel Clad Degradation	
Initiating Condition:	Fuel clad degradation paper and a provided attempts the end of the second statements of the	and the second second
EAL:	er og en som en	en fan de ferste de ferste steren. De stêre fan de ferste stere
SU7.2 Unusua	l Event	
Valid Letdown Monitor	r (R-9) reading ≥ 4800 mR/hr	and the second second second second
Mode Applicability:	the state of the s	
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Basis:		a presidente de la deserva.
Generic	(1) (1) (1) (1) (1) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	$(1, 1, 4)$ $(1, 1, 2)$ $H_{1,2}^{1,1} (2^{2n} + 2^{2n} $
This EAL is included ber	cause it is a precursor of more serious conditions and as result is	the share of the set

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the EALs in Category F.

This threshold addresses site specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

Plant-Specific

This EAL addresses indication of gross failed fuel that may be in excess of Technical Specification (ref. 1) coolant activity limits.

The Letdown Line Monitor (R-9) gross radiation channel continuously monitors the activity in a sample drawn from the RCS (NaOH tank room) and actuates an alarm in the Control Room if a predetermined activity level is reached. The high alarm setting of 200 mRad/hr ensures timely detection of failed fuel increases greater than 0.1% (ref. 2, 3, 4).

The 4800 mR/hr value for R-9 is based on total RCS activity corresponding to 60 µCi/gm I-

131 equivalent and 1% failed fuel (100 / \vec{E}). A shielding calculation was performed to obtain this value (ref. 5).

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Definitions:		
Valid	$(S^{(n+1)}, S^{(n+1)}) \in S^{(n+1)}$	1997 (B)
instrument channel check, or (2) indication by direct observation by plant personnel operability, the condition's existence, or	, such that doubt related to the indicator's the report's accuracy is removed. Implicit in	ny de Maria Alexandre de Maria de Maria
this definition is the need for timely asse	ssment.	
Ginna Basis Reference(s):	$= \left(\frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) \right) \left(\frac{1}{2} + \frac{1}{2} \right) \left(\frac{1}{2} +$	$e^{i t} = -\frac{1}{2} \lambda_{1} + \frac{1}{2} \lambda_{2} + \frac{1}{2} \lambda_{1}$
 Technical Specification 3.4.16 Reactor C AP-RCS.3 High Reactor Coolant Activity AR-RMS-9 R9 Letdown Line Monitor 		n an
4. P-9 Radiation Monitoring System	diation Monitor NEI 99-01 Rev. 5 Evaluation"	1. de - 1. 1. de - 1.
·	en andre statistica en la construcción de la construcción de la construcción de la construcción de la construc Presentação de la construcción de la	an a
	$(1,1) = \frac{1}{2} \frac{\partial (1,1)}{\partial t} + \frac{1}{2} $	· · · · ·
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Category:	S – System Malfunction	An province of the second s
Subcategory:	8 – RCS Leakage	ag 1973年19月1日日,1973年1月1日(1973年1月1日)(1973年1月1日)(1973年1月1日)(1973年1月1日)(1973年1月1日)(1973年1月1日)(1973年1月1日)(1973年1月1日)
Initiating Condition:	RCS leakage	는 가는 것 있다는 것 같은 동네는 한 지난 것으로 가지 않는 것이다. 전문 것은 것은 것은 것은 것이다.

EAL:

SU8.1 Unusual Event

Unidentified or pressure boundary leakage > 10 gpm for \ge 15 min. (Note 4)

OR

Identified leakage > 25 gpm for \ge 15 min. (Note 4)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

This IC-EAL is included as a NOUE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this ICEAL. However, a relief valve that operates and fails to close per design should be considered applicable to this ICEAL if the relief valve cannot be isolated. <u>15 minutes allows time to evaluate the source and take corrective actions to isolate the leak.</u>

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. In either case, escalation of this IC-EAL to the Alert level is via Fission Product Barrier Degradation ICsEALs in Category F.

Plant-Specific

Technical Specifications Section 3.4.13 RCS Operational Leakage prescribes RCS

leakage limits for pressure boundary (none allowed), unidentified (1 gpm) and identified

(10 gpm) leakage (ref. 1). AP-RCS.1 Reactor Coolant Leak provide direction for

determining RCS leakage for off normal events and for operations troubleshooting (ref. 2).

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Ginna Basis Reference(s):		
1. Technical Specifications 3.4.13, RCS Operational Leakage		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
2. AP-RCS.1 Reactor Coolant Leak	and the first second second	

3. NEI 99-01 SU5

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Category F - Fission Pro	oduct Barrier Degrada	tion	a and the second states	the state
	Hot Conditions (RCS t			
•			the date de care	
	one or more hot opera	ating modes	. • .	· 11、11、11、11、12、
EALs in this category repr	esent threats to the def	ense in depth design con	cept that	,
precludes the release of hi				e se la transferie
concept relies on multiple	physical barriers any or	ne of which, if maintained	l intact,	
precludes the release of si				
environment. The primary	fission product barriers	are:	1941 - N ^{art} a	an the second
A. Reactor Fuel Clad (FC): The Fuel Clad bar	rrier consists of the zircall	oy or stainless	erangeran en foras
steel fuel bundle tul	pes that contain the fue	l pellets.	e su truñor cueder de la	t anna 1851 - A
B. Reactor Coolant Sy	stem (RCS): The RCS	Barrier includes the RCS	primary side	and data to a
and its connections	up to and including the	e préssurizer safety and re	elief valves, and attended to a	e tradition de la companya de la com
			$= \frac{1}{2} \left(\left(\frac{1}{2} + \frac{1}{2} \right) + \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} + \frac{1}{2} \right) + \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} + \frac{1}{2} \right) \right)$	
C. <u>Containment (CNM</u>	T): The Containment B	arrier includes the contair	nment building	
		utermost containment isol		· "我们,我们就能
This barrier also inc	ludes the main steam,	feedwater, and blowdowr	n line extensions a	
outside the containr	ment building up to and	rincluding the outermost s	secondary side	a server de
isolation valve.		tati shekarar	the state of the second second	ethologi (The Control
The EALs in this category	require evaluation of th	e loss and potential loss t	thresholds listed and the second	
in the fission product barrie	er matrix of Table F-1 (/	Attachment 2). "Loss" and	d "Potential Las and Astronomy	1.25 (1.21) 12
Loss" signify the relative d	amage and threat of da	amage to the barrier. "Los	s" means the log along the test	Et the pot of the
barrier no longer assures of	containment of radioact	tive materials. "Potential L	.oss" means	
integrity of the barrier is the	reatened and could be	lost if conditions continue	to degrade.	
The number of barriers that	at are lost or potentially	lost and the following crit	eria determine	
the appropriate emergency	y classification level:			
<u>Unusual Event:</u>				

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ANY loss or ANY potential loss of Containment Alert:

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ANY loss or ANY potential loss of either Fe				
<u>Site Area Emergency:</u>				. .
Loss or potential loss of ANY two barriers	1 · · · · · ·		11 C	
<u>General Emergency:</u> Loss of ANY two barriers and loss or poter				
The logic used for Category F EALs reflects the	ne following considera	tions:	en la company. Alternations	
The Fuel Clad Barrier and the RCS Bar	rier are weighted more	e heavily than th	e y y	··· . · · · · · ·
Containment Barrier. UE EALs associa	ed with RCS and Fue	l Clad Barriers a	re .	· · · ·
addressed under Category S.			۰. ب	
• At the Site Area Emergency level, there	must be some ability	to dynamically a	ssess	· ·
how far present conditions are from the	threshold for a Gener	ral Emergency. F	or the context	at the second
example, if Fuel Clad and RCS Barrier	"Loss" thresholds exis	ted, that, in addi	tion to	
off-site dose assessments, would require	re continual assessme	ents of radioactiv	e	
inventory and containment integrity. Alte				
"Potential Loss" thresholds existed, the	ED would have more	assurance that t	here	····
was no immediate need to escalate to a	General Emergency.		an a	
The ability to escalate to higher emerge	ency classification leve			
deteriorates must be maintained. For e	xample, RCS leakage	steadily increasi	ng, a part of set	e tegi e tegi j
would represent an increasing risk to pu	ublic health and safety	1.	•	Maria di Kara
• The Containment Barrier should not be	declared lost or poter	ntially lost based	on a di ta para	na tha chuir tha c
exceeding Technical Specification actio	n statément criteria, u	Inless there is an	eventer a ser in unit	and a state of the
in progress requiring mitigation by the 0	Containment barrier.		1	st i ja A
	and a strange of the	a start and a	an an ta ag	
$r \sim 10^{-11}$	• • • • • • • •	Na pana Pana	the constant of	en all and some
· _ ·	N	METHIC TO A ST	an an an an an	$r = e_1 + e_2$
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Category: Subcategory: Initiating Condition: EAL:	Fission Product Barrier Degradation N/A ANY loss or ANY potential loss of Containment	•	,
FU1.1 Unusual ANY loss or ANY pote	Event Intial loss of Containment (Table F-1)	A	2
Mode Applicability:	2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby		· · · ·
None <u>Plant-Specific</u>		.4	
Fuel Clad, RCS and C (Attachment 2) lists the	ontainment comprise the fission product barriers. Table F-1	omennen vir son	n in ingen
Fuel Clad and RCS ba Unlike the Fuel Clad a FA1.1), loss of the Con radioactive materials o loss or potential loss o	rriers are weighted more heavily than the Containment barrier. nd RCS barriers, the loss of either of which results in an Alert (EAL ntainment barrier in and of itself does not result in the relocation of	Ellawit megati i katal Ila i porteget atalik Informati i ella i ella Informati i ella i ella i ella Teleficia i i ella i ella	en an an the Alexan Alexandro an Alexandro an the Alexandro an
Ginna Basis Referen	ce(s):	، خې ور کې کې کې د د د د د کې کې	anta balan Generat

1. NEI 99-01 FU1

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Category: Subcategory: Initiating Condition: EAL:	Fission Product Barrier Degradation N/A ANY loss or ANY potential loss of either Fuel Clad or RCS	a baran ar an
FA1.1 Alert ANY loss or ANY poter	ntial loss of either Fuel Clad or RCS (Table F-1)	land the second to the second se
Mode Applicability: 1 - Power Operation, 2 Basis: <u>Generic</u>	- Startup, 3 - Hot Shutdown, 4 - Hot Standby	n 1998 - Angel Landon Angel Angel Angel Angel Angel Angel Angel Ang Angel Angel Ang Angel Angel Ang
None <u>Plant-Specific</u>		
Fuel Clad, RCS and Co (Attachment 2) lists the	ontainment comprise the fission product barriers. Table F-1 fission product barrier thresholds, bases and references.	a da ang sa
than the Containment to either the Fuel Clad or degradation of core con- barrier in combination	RCS barrier may result in the relocation of radioactive materials or pling capability. Note that the loss or potential loss of Containment with loss or potential loss of either Fuel Clad or RCS barrier results	n de la composition d La composition de la c
Ginna Basis Reference 1. NEI 99-01 FA1	:ə(s):	an a

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Category:Fission Product Barrier DegradationSubcategory:N/AInitiating Condition:Loss or potential loss of ANY two barriersEAL:

Logintakan (Lohaman Sanakan S Logintari (Lohaman)

FS1.1 Site Area Emergency

Loss or potential loss of ANY two barriers (Table F-1)

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

<u>Generic</u>

None

Plant-Specific

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the Site Area Emergency classification level, each barrier is weighted equally. A Site Area Emergency is therefore appropriate for any combination of the following conditions:

- One barrier loss and a second barrier loss (i.e., loss loss)
- One barrier loss and a second barrier potential loss (i.e., loss potential loss)
- One barrier potential loss and a second barrier potential loss (i.e., potential loss potential loss)

At the Site Area Emergency classification level, the ability to dynamically assess the proximity of present conditions with respect to the threshold for a General Emergency is important. For example, the existence of Fuel Clad and RCS Barrier loss thresholds in addition to offsite dose assessments would require continual assessments of radioactive inventory and Containment integrity in anticipation of reaching a General Emergency classification. Alternatively, if both Fuel Clad and RCS potential loss thresholds existed, the Emergency Director would have greater assurance that escalation to a General Emergency is less imminent.

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Category:	Fission Product Barrier Degradation
Subcategory:	N/A
Initiating Condition:	Loss of ANY two barriers and loss or potential loss of the third barrier
EAL:	
FG1.1 General	Emergency
Loss of ANY two barri	ers
AND	· · · · · · · · · · · · · · · · · · ·
Loss or potential loss	of the third barrier (Table F-1)
Mode Applicability:	
1 - Power Operation, 2	2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby
Basis:	$(2^{+})_{ij} = 2^{+}$
<u>Generic</u>	
None	
Diant Cassifie	이는 가지? 성원과 가족에게 한 것은 가지가 실망가 있다.
Plant-Specific	
Fuel Clad, RCS and C	ontainment comprise the fission product barriers. Table F-1

(Attachment 2) lists the fission product barrier thresholds, bases and references.

At the General Emergency classification level each barrier is weighted equally. A General Emergency is therefore appropriate for any combination of the following conditions:

- Loss of Fuel Clad, RCS and Containment barriers
- Loss of Fuel Clad and RCS barriers with potential loss of Containment barrier
- · Loss of RCS and Containment barriers with potential loss of Fuel Clad barrier
- Loss of Fuel Clad and Containment barriers with potential loss of RCS barrier

Ginna Basis Reference(s):

1. NEI 99-01 FG1

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FISSION PRODUCT BARRIER LOSS/POTENTIAL LOSS MATRIX AND BASES

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(A) Some som and the second state of the state of the state of the first state of the state o

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Introduction (c) a first which is a subscription to the end of the weak of the back of t Table F-1 lists the threshold conditions that define the Loss and Potential Loss of the three dand in the three dand in the second seco fission product barriers (Fuel Clad, Reactor Coolant, System, and Containment). The table of a state state and a more than the state of is structured so that the three barriers occupy adjacent columns. Each fission product 2.11 (C. P. 41) barrier column is further divided into two columns; one for Loss thresholds and one for Potential Loss thresholds. a service and the second of the tradition of the service of the service services services and the services and The first column of the table (to the left of the Fuel Clad Loss column) lists the categories and the second state and the (types) of fission product barrier thresholds. The fission product barrier categories are: 100 and Cent Channel Control of the control of the control of the Handle Control of the c A. CSFSTs exection of the second state in the level of the second state state of the second state of B. Core Exit TCs C. Inventory and the approximation of the standard strategic strategic strategic and the standard strategic strategic to D. Radiation / Coolant Activity E. Isolation Status the contract of the meny control and the ment of department of the second F. Judgment الم^{يري}ة الأمني وإهريهما والعن الراجي التي التي والتي عن المناطق والتي المنظم المنظم المنظم المنظم ا Each category occupies a row in Table F-1 thus forming a matrix defined by the category

rows and the Loss/Potential Loss columns. The intersection of each category row with each Loss/Potential Loss column forms a cell in which one or more fission product barrier thresholds appear. If NEI 99-01 does not define a threshold for a barrier Loss/Potential Loss, the word "None" is entered in the cell.

Thresholds are assigned sequential numbers within each Loss and Potential Loss column beginning with number one. In this manner, a threshold can be identified by its category title and number. For example, the first Fuel Clad barrier Loss in Category A is "FC Loss A.1," the third Containment barrier Potential Loss is "CNMT P-Loss B.3," etc.

If a cell in Table F-1 contains more than one numbered threshold, each of the numbered thresholds, if exceeded, signifies a Loss or Potential Loss of the barrier. It is not necessary to exceed all of the thresholds in a category before declaring a barrier Loss/Potential Loss.

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Subdivision of Table F-1 by category facilitates association of plant conditions to the applicable fission product barrier Loss and Potential Loss thresholds. This structure the second s promotes a systematic approach to assessing the classification status of the fission 1.1 10.000 a set for end on the attention product barriers.

en al la marchi de la erre de p When equipped with knowledge of plant conditions related to the fission product barriers, the EAL-user first scans down the category column of Table F-1, locates the likely category and then reads across the row of fission product barrier Loss and Potential Loss thresholds in that category to determine if any threshold has been exceeded. If a threshold has not been exceeded in that category row, the EAL-user proceeds to the next likely category and continues review of the row of thresholds in the new category

The EAL-user must examine each of the three fission product barriers to determine if other barrier thresholds in the category are lost or potentially lost. For example, if Containment radiation is sufficiently high (i.e., greater than 1.0E+03 R/hr), a Loss of the Fuel Clad and RCS barriers and a Potential Loss of the Containment barrier exist. Barrier Losses and Potential Losses are then applied to the algorithms given in EALs FG1.1, FS1.1, FA1.1 and FU1.1 to determine the appropriate emergency classification.

Red and a • • • • In the remainder of this Attachment, the Fuel Clad barrier threshold bases appear first, followed by the RCS barrier and finally the Containment barrier threshold bases. In each barrier, the bases are given according category Loss followed by category Potential Loss beginning with Category A, then B...E.

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Fuel Clad Barrier			Reactor Coolant System Barrier		Containment Barrier		
Category	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss	
A CSFST	1. RED path condition exists F-0.2 Core Cooling	ORANGE path condition exists F-0.2 Core Cooling RED path condition exists F-0.3 Heat Sink and heat sink is required	· None	RED path condition exists F-0.4 Integrity RED path condition exists F-0.3 Heat Sink and heat sink is required	None	1. RED path condition exists F-0.5 Containment	
B Core Exit TCs	2. Core Ext1 TCs ≥ 1,200"F	3. Core Exit TCs ≥ 700°F	None	None	None	Core Exit TCs cannot be restored < 1,200°F within 15 min. Core Exit TCs ≥ 700°F AND RVUS level cannot be restored > 52% (> 55% adverse CNMT] with no RCPs running within 15 min.	
C	None	4. RVUS level ≤ 52% [≤ 55% adverse CNMT] OR Al least one RCP running RVUS fluid fraction ≤ 66%	 RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (< EOP Fig. MIN SUBCOOLING) Ruptured S/G results in an ECCS (SI) actuation 	3. RCS leak rate > 50 gpm with letdown isolated	A containment pressure rise followed by a rapid unexplained drop in containment pressure Containment pressure or sump level resports not consistent with LOCA conditions Ruptured S/G is also faulted outside of containment Primary-to-secondary leakrate > 10 gpm AND Unisolable prolonged steam release from affected S/G to the emvironment	 Containment pressure ≥ 60 psig and rising Containment hydrogen concentration ≥ 4% Containment pressure ≥ 28 psig and < two CRFC units and one C pump operating per design 	
D Radiation / Coolant Activity	3. Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr 4. Valid Letdown Monitor (R-9) reading ≥ 24.000 mR/hr 5. Cootant activity >300 µCl/gm dose equivalent i-131	None	3. Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr	None	None 5. Failure of all valves in ANY one	7. Containment radiation monitor R-29/R-30 reading > 1.0E+03 R/I	
E Isolation Status	None	None	None	None	Ine to close AND Direct downstream pathway to the environment exists after containment isolation signal	None	

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			Table F-1 Fission Produ	uct Barrier Matrix				
Fuel Clad Barrier			Reactor Coolant System Barrier		Containment Barrier			
Category	Loss	Potential Loss	Loss	Potential Loss	Loss Potential Loss			
F Judgment	 ANY condition in the opinion of the Emergency Director that indicates loss of the fuel clad barrier 	5. ANY condition in the opinion of the Emergency Director that indicates potential loss of the fuel clad barrier	4. ANY condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	4. ANY condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	ANY condition in the opinion of the Emergency Director that indicates loss of the containment barrier S. ANY condition in the opinion of the Emergency Director that indicates potential loss of the containment barrier			
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Barrier:	Fuel Clad	34.1 ²	a ga bara a shi a An a shi a shi a
Category:	A. Critical Safety Function Status	and the star is sufficient as the	an the second
Degradation Threat:	Loss	A Handa A	nta Allan, Asuma
Threshold:			112 - A. S. S.
1. RED path condition	n exists F-0.2 Core Cooling	gradonia such a construction a sono s	
Basis:			
<u>Generic</u>			
Core Cooling - RED indii indicate loss of the Fuel	cates significant superheating and core ur Clad Barrier.	acovery and is considered to a subsect of the subse	an Alban Shafi Sh
<u>Plant-Specific</u>			
Critical Safety Function	n Status Tree (CSFST) Core Cooling-F	RED path is given in F-0.2 and	
indicates significant co	ore exit superheating and core uncover	y (ref. 1).	
RED path conditions e	xist if either:	\$P\$夏1111-1111-1111-1111-1111-1111-1111-1	a farra shiriya a shir
Core Exit TCs a	are <u>></u> 1200⁰F	en ek elle har da er hoeken elle skran	and the first of the state of the
 Core Exit TCs a running 	are ≥ 700°F with RVLIS ≤ 52% [≤ 55%	adverse CNMT] with no RCPs	n dan seri seri seri seri seri seri seri seri
•	parameters determine when a harsh e	erange in the area of the second s	$0 \leq (q_{1} + 1) \leq (d_{1} + 1)$
	d inside Containment. The following in		ere talen er
	values should be used in the EOPs (re		Carl Contraction
	essure > 4 psig, or		. • •
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	and the second second areas	こうえた とのない。 そうない とぼりがみ	at an an an an a
Ginna Basis Referen		an to selecte a sector access y acto	
1. CSFST for F-0.2 C 2 FR-C 1 Response 1	Core Cooling to Inadequate Core Cooling	The state is a strategy of the state of the	
	to materiality opin opposing	المروب المراجع	
		1. Sec. 10. 10.	na in an in c
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Barrier:	Fuel Clad		·£i.	N. 4.
Category:	A. Critical Safety Function Status	en de la companya de	e de la sec	N. 1. ¹
Degradation Threat:	Potential Loss		at an the state	•
Threshold:				an an the start of
1. ORANGE path cond	lition exists F-0.2 Core Cooling	appele 2 ⁰⁰ – La constante		
Basis:				. •
<u>Generic</u>				•
Core Cooling - ORANGE	indicates subcooling has been lost and that s	ome clad damage may		н н н 1
Heat Sink - RED when extreme challenge.	heat sink is required indicates the ultimate			
Plant-Specific		an a		
Critical Safety Function	n Status Tree (CSFST) Core Cooling-ORA	NGE path is given in 👘 🔔	n in second	
F-0.2 and indicates su	ocooling has been lost and that some fuel	clad damage may		
potentially occur (ref. 1) .	and the second		·
ORANGE path Core C	ooling conditions exist if, with RCS subcoo			·.
EOP Fig. MIN SUBCO	OLING, either:	k i eziti i iz	.	1
 with no RCPs rule 	Inning Core Exit TCs are ≥ 700°F or RVLI		an a	
adverse CNMT]	-	en de la construcción de la constru La construcción de la construcción d	,	
OR				
 with at least one 	RCP running RVLIS fluid fraction < 66%		an an an Anna Anna Anna Anna Anna	
Adverse containment	parameters determine when a harsh enviro			
•	d inside Containment. The following indica	-	•••	
	alues should be used in the EOPs (ref. 2):			
Containment pr	essure > 4 psig, or			

• Containment radiation > 10⁵ R/hr

Ginna Basis Reference(s):

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 CSFST for F-0.2 Core Cooling FR-C.2 Response to Degraded Core Cooling 		્ય (કે કેલ્સ કે ફિ	and the same	
2. FR-C.2 Response to Degraded Core Cooling	en du colt	en transforma	: 25 ;,	
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Barrier: Fuel Clad

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 Category:
 A. Critical Safety Function Status

 Degradation Threat:
 Potential Loss

Threshold:

2. RED path condition exists F-0.3 Heat Sink and heat sink is required

Basis:

<u>Generic</u>

Core Cooling ORANGE indicates subcooling has been lost and that some clad damage may occur.

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

Plant-Specific

Indication that heat removal is extremely challenged is manifested by entry to CSFST Heat Sink-RED path in F-0.3 (ref. 1). The phrase "and heat sink required" precludes the need for classification for conditions in which RCS pressure is less than SG pressure or Heat Sink-RED path entry was created through operator action directed by an EOP. Procedure FR-H.1, Response to Loss of Secondary Heat Sink, indicates heat sink is required when RCS pressure is greater than any non-faulted SG pressure and RCS cold leg temperature is greater than 350°F (ref. 2).

RED path Heat Sink conditions exist if both of the following:

- Narrow Range level in both S/Gs is ≤ 7% [≤ 25% adverse CNMT]
 - AND
- Total feedwater flow to SGs is ≤ 200 gpm

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 3):

• Containment pressure > 4 psig, or

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 Containment radiation > 10⁵ R/hr 	$[A_{i}^{\mu\nu}]_{\mu\nu} + i_{\mu\nu} [\frac{11}{2}]$. (* 4
The combination of these conditions indicates the ultimate heat si	ink function is under	N. 2080
extreme challenge. This threshold addresses loss of functions req	quired for hot shutdown	
with the reactor at pressure and temperature and thus a potential		· • • • • • • •
barrier. This is also a potential loss of the RCS barrier and therefor	pre results in at least a	••••
Site Area Emergency.	Market and the second	i kang di kang di kang di
Ginna Basis Reference(s): CSFST for F-0.3 Heat Sink FR-H.1 Response to Loss of Secondary Heat Sink FR-C.2 Response to Degraded Core Cooling 	la su	
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Barrier:	Fuel Clad		1997 (A)	n an airtean	€t, t	; ,	
Category:	B. Core Ex	t TCs and the second second cases are not a second second	. est and	ter an Early	. 99-74	·	·. ·
Degradation Threat:	Loss	a tang ang ang 2000 na tang mang ang ang ang					
Threshold:		namhailte an suidean chaoine dheasaige bhaire an Aerlta. Iomraiche an suidean chaomraiche an an Aonaichte Ar Air					
2. Core Exit TCs ≥ 1.2	200°F			۰			

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1. A. J. . . .

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Basis:

Generic

[Core Exit Thermocouple Readings are included in addition to the Critical Safety Functions to include conditions when the CSFs may not be in use (initiation after SI is blocked) or plants which do not have a CSF scheme.]

Loss Threshold A

The 1.200°Fsite specific reading should corresponds to significant superheating of the coolant.

[This value typically corresponds to the temporature reading that indicates core cooling RED in Fuel Clad Barrier loss threshold 1.A which is usually about 1200 degrees F.]

Potential Loss Threshold A

The site specific reading should correspond to loss of subcooling.

[This value typically corresponds to the temperature reading that indicates core cooling ORANGE in Fuel Clad Barrier potential loss threshold 1.A which is usually about 700 to 900 degrees F.]

Plant-Specific

Core Exit Thermocouples (TCs) reading at or in excess of 1200°F corresponds to the CSFST Core Cooling RED path entry condition (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). Although clad rupture due to high temperature is not expected for CET readings less than the threshold, temperatures of this magnitude signal significant superheating of the reactor coolant and core uncovery. Events that result in Core Exit TC

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re	adings above the loss threshold are classified severe accidents and lead to e	entry into 🗐 🔅 👌 🔤 🔤	ज्याते सन्दर्भते. सन्दर्भते
Se	evere Accident Management Guidelines (ref. 3).	stall the start of	
Gi	nna Basis Reference(s):	anga taga sakara	ta an
2 .	CSFST for F-0.2 Core Cooling EPIP-2-16 Core Damage Estimation		
	Ginna Severe Accident Management Guidelines FR-C.1 Response To Inadequate Core Cooling		a a second a Second a second a sec
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Barrier:	Fuel Clad	$(x_1, y_2) \in \mathbb{R}^{n-1} \times R$
Category:	B. Core Exit TCs	$_{\rm eff}$, the the figure is that are a set of the set of 2
Degradation Threat:	Potential Loss	and the second
Threshold:		an a
3. Core Exit TCs ≥ 70	0°F	en e

Basis:

<u>Generic</u>

[Coro Exit Thormocouple Roadings are included in addition to the Critical Safety Functions to include conditions when the CSFs may not be in use (initiation after SI is blocked) or plants which do not have a CSF scheme.]

Loss Threshold A

The site specific reading should correspond to significant superheating of the coolant.

[This value typically corresponds to the temperature reading that indicates core cooling - RED in Fuel Clad-Barrier loss threshold 1.A which is usually about 1200 degrees F.]

Potential Loss Threshold A

The site specific reading should Core Exit TC readings 2 700°F correspond to loss of subcooling.

[This value typically corrosponds to the temperature reading that indicates core cooling – ORANGE in Fuel Clad Barrier potential loss threshold 1.A which is usually about 700 to 900 degrees F.]

Plant-Specific

Core Exit Thermocouples (TCs) reading at or in excess of 700°F corresponds to the CSFST Core Cooling ORANGE path entry criteria (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). RCS superheat, as indicated by Core Exit TCs reading at or in excess of 700°F, signals the transition from a subcooled to a superheated regime. In a superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to a rapid rise in clad temperatures. Valid indication of superheated

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is	a potential Fuel Clad barrier loss condition because the possible rapid rise in clad	(
te	mperatures may lead to clad failure.	termise (1		¥
Gi	inna Basis Reference(s):	Sec.	i e se anti i e	e en state gant i
	CSFST for F-0.2 Core Cooling			ates exercite
	EPIP-2-16 Core Damage Estimation FR-C.1 Response To Inadequate Core Cooling			tational and an and an and a second and a s
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Barrier:	Fuel Clad	En sonas en l'en el el Brenzo, en ser el construction el construction el construction. El construction de la co
Category:	C. Inventory	(1,1) and $(1,1)$ and $(1,1)$ and $(1,1)$ and $(1,1)$ and $(1,1)$ and $(1,1)$
Degradation Threat:	Loss	
Threshold:		や、1975年1日では、1月1日によりに対応。 1、1日本教会によりによった。1日本教授会
None		

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Barrier: Fuel Clad

Category: C. Inventory

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Degradation Threat: Potential Loss

Threshold:

4. RVLIS ≤ 52% [≤ 55% adverse CNMT]

OR

At least one RCP running RVLIS fluid fraction $\leq 66\%$

Basis:

Generic

There is no Loss threshold associated with this item.

The site specific value for the Potential Loss threshold corresponds to the top of the active fuel.

[For sites using CSFSTs, the Potential Loss threshold is defined by the Core Cooling ORANGE path. The site specific value in this threshold should be consistent with the CSFST value.]

Plant-Specific

The Reactor Vessel water level threshold is used in the EOPs to signal core uncovery and is, therefore, indication of inadequate coolant inventory. If the RVLIS indication drops to 52% [\leq 55% adverse CNMT] **OR** with at least one RCP running RVLIS fluid fraction \leq 66%, a core covered condition cannot be confirmed. According to the Core Cooling-ORANGE path, this water level indicates subcooling has been lost and that some fuel clad damage may occur. (ref. 1, 2)

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 2):

- Containment pressure > 4 psig, or
- Containment radiation > 10⁵ R/hr

Ginna Basis Reference(s):

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<u>^</u> 1. CSFST for F-0.2 Core Cooling 2. FR-C.2 Response to Degraded Core Cooling الأهلي والمراوي والمراجع المراوي والمؤلف والمحافظ . . Constants and the state of the state of the . . and the second of the second according to · . · • · . المرجع المرجع والمرجع المحاجي المحاجي والمحاج المحملة الراب المراجع والمراجع والأروانيون فالعام المراجع والمراجع Notes and the second second

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Barrier:		مريحة الأرباط ويتكري (1997). المريحة الأرباط ويتكري (1997)	 Buddense att 127 a 103 (see 4) - p. 46.
Category:	D. Radiation / Coolant Activity		(1995) en sin d'hin der Album
Degradation Threat:	Loss		and the second state of th
Threshold:			·····································

3. Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr

Basis:

<u>Generic</u>

The site specific1.0E+02 <u>R/hr containment radiation monitor</u> reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment.

[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 µCi/gm dose equivalent [-131 into the containment 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 threshold #36. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency.

[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 threshold associated with this item.

Plant-Specific

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 1.0E+01 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 1.0E+02 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors

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gr	eater than 1.0E+03 R/hr is indi	cative of significant fuel activ	vity and thus considered a		•** · · ·
pc	otential loss of Containment (re	f. 2).	$x \to x \to x + z \to z$	- 1 ₂ 1	
Ginna Basis Reference(s):				:	a tha a speak
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Barrier: Fuel Clad				
Category:	D. Radiation / Coolant Activity	1 ÷ 1		1.
Degradation Threat: Threshold:	Loss			er al company
	Monitor (R-9) reading ≥ 24,000 mR/hr	<u>.</u>]	
Basis: Generic		· · · · .	to attu datto o co Secondario	1

The site specificLetdown Monitor dose rate value corresponds to 300 µCi/gm I-131 equivalent. Assessment by the <u>NEL</u>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. Assessment by the <u>NEI</u>EAL Task Force indicates that this amount of coolant activity is well above

[The value can be expressed either in mR/hr observed on the sample or as μ Ci/gm results	from
analysis.]	

There is no Potential Loss threshold associated with this item.

Plant-Sp	ecific
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The Letdown Line Monitor (R-9) gross radiation channel continuously monitors the activity
in a sample drawn from the RCS (NaOH tank room) and actuates an alarm in the Control
Room if a predetermined activity level is reached. A Letdown Line Monitor reading of
24,000 mR/hr represents fuel clad damage of approximately 5% corresponding to the
reactor coolant activity fuel Clad loss threshold of 300 µCi/gm dose equivalent I-131 (ref.
2).

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Ginna Basis Reference(s):

1. P-9 Radiation Monitoring System

2. CALC-2011-0019, R9 Letdown Line Radiation Monitor NEI 99-01 Rev. 5 Evaluation.

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,		•
Barrier:	Fuel Clad	
Category:	D. Radiation / Coolant Activity	
Degradation Threat:	Loss	• `, `
Threshold:		• :
	· · · ·	
5. Coolant activity >30	00 µCi/gm dose equivalent I-131	
		947 - U
Basis:		• ÷
<u>Generic</u>	± 2 and ± 2 . The second	
EAL Task Force indicate spikes and corresponds	orresponds to 300 μ Ci/gm I-131 <u>dose</u> equivalent. Assessment by the <u>NEI</u> es that this amount of coolant activity is well above that expected for iodine to less than 5% fuel clad damage. This amount of radioactivity indicates and thus the Fuel Clad Barrier is considered lost.	•
	ssed either in mR/hr observed on the sample or as µCi/gm results from	
analysis.] There is no Potential Los	ss threshold associated with this item.	. '
Plant-Specific	an and a case of the state of the state of the case of the state of the state of the state of the state of the	
None	2001 A CONTRACTOR AND A CO	· ·
Sinna Basis Referenc	n an	• • •
I. NEI 99-01 Revision		· • • •
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	EMERGENCY ACTION LEVEL		、
Barrier:	Fuel Clad	$[1^m-2]^{(n)}$	9 . 2.1
Category:	D. Radiation / Coolant Activity	, as into the last	$\omega_{1} \in M_{2}$
Degradation Threat:	Potential Loss		2000 A. 1. 200 A. 200 A. 20
Threshold:			
None			· · · · · · · · · · · · · · · · · · ·

	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT		
Barrier:	Fuel Clad	~ 1.5 . The set	
Category:	E. Isolation Status	$(x_1, x_2, x_3, x_4) \in \operatorname{sp}(1, x_2, x_3)$	а. А. Ч
Degradation Threat:	Loss	and a state of the state of the	
Threshold:			alla si tata
None	······································		

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		And the second	
Barrier:	Fuel Clad	Maria Della Sa	
Category:	E. Isolation Status	e got states at	e e navel
Degradation Threat:	Potential Loss		···· · · · · · · · · · · · · · · · · ·
Threshold:	···· · · · · · · · · · · · · · · · · ·		
None	in the second	Contraction of the second seco	1
			•••

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	EMERGENCY ACTION LEVEL	Page 286 of 336	
Barrier:	Fuel Clad		
Category:	F. Judgment		5 A. 64
Degradation Threat:	Loss		1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
Threshold:		ender Bergenhaufen an er h	
	e opinion of the Emergency Director that indi	cates loss of the Fuel	t disaria
Clad barrier			1.122.5

Basis:

Generic

These <u>This</u> thresholds 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 threshold as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier: Fuel Clad		1 The second	\$ r. ⁷ *	
Category:	F. Judgment	$\label{eq:constraint} \left($. .	
Degradation Threat: Potential Loss		ar start	search ann anns	
Threshold:			a an the	
5. ANY condition in the fuel Clad barri	or	cy Director that indicates potential loss of		

Basis:

Generic

These-<u>This</u> thresholds address<u>es</u> any other factors that are to be used by the Emergency <u>DirectorCoordinator</u> in determining whether the Fuel Clad barrier is potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency <u>DirectorCoordinator</u> judgment that the barrier may be considered lost or potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

	EMERGENCY ACTION LEVEL Revision TECHNICAL BASES DOCUMENT Page 2			
Barrier:	Reactor Coolant System	1. 1.	4.	····
Category:	A. Critical Safety Function Status	• •		
Degradation Threat:	Loss	the sing.	· · :	
Threshold:				
None		-		• • • • • • • •
		•		
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				North Constants 1994

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Barrier:	Reactor Coolant System	and the second	
Category:	A. Critical Safety Function Status	That will be a start of the sta	97). 1973
Degradation Threat:	Potential Loss	and the second	
Threshold:			- 1 P
1. RED path condition	exists F-0.4 Integrity	AG - VINAR MARKET - 2000 Constraints - 2000	
Basis:	· ·· ·		• •
<u>Generic</u>			
RCS Integrity - RED indic instrument readings.	cates an extreme challenge to the safety fur	nction derived from appropriate	
Heat Sink - RED when he extreme challenge.	eat sink is required indicates the ultimate he	e <mark>at sink function is under</mark> provident and a second s	
There is no Loss thresho	Id associated with this item.	1980 March 1997 - State Brazilia Constanting	·. i [:]
Plant-Specific			• ••• •
Critical Safety Function	Status Tree (CSFST) Integrity-RED pa	th is given in F-0.4 and a margine sector and a sector of the sector of	
entry is indicative of a c	direct threat to RCS integrity due to imm	ninent pressurized thermal.	•
shock (ref. 1, 2).	where is a start of the	na oran ta	
RED path Integrity con-	ditions exist if:	nan ^a sin water tradical ta the bottless of the	
 temperature low 	ers in either RCS cold leg <u>></u> 100ºF/hr ا	weither many spectra in a souther and prove	1. 1 9
AND	$\int d\mathbf{r}_{1} \mathbf{t}_{2} = \mathbf{t}_{1} + \mathbf{t}_{2}$. The state of the state of gravity of the state $\lambda_{\rm eff}$	з÷,
• temperature in e	either RCS cold leg is <u><</u> 284°F		, :•
Ginna Basis Reference	:e(s):	and the second Market and Market and Articles and	. și
	o Imminent Pressurized Thermal Shock	Condition	
		ار در میں در میں میں میں میں میں اور اور اور میں	
		and a second	•.
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		n in sense in the sense of the	• .*

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Barrier:	Reactor Coolant System			- 1 - 1	•	• • • • •
Category:	A. Critical Safety Function Status	• . • .	•••••	. ;	:	1994 - 1912
Degradation Threat:	Potential Loss			. • • •		
Threshold:						
2. RED path condition	exists F-0.3 Heat Sink and heat sink is rec					$c(x,\zeta) = c^{1} c^{1} c^{2} c$
Basis: Generic						ta sati Dina sati
RCS Integrity - RED indic instrument readings.	cates an extreme challenge to the safety functi	iòn derived	from a	ppropriate	·· .	e de la constante de la consta La constante de la constante de
Heat Sink - RED when he extreme challenge.	eat sink is required indicates the ultimate heat	sink functio	on is un	der		:
There is no Loss thresho	ld associated with this item.		4	ter an a	s en ren	en terre a deservant
Plant-Specific						
Indication that heat ren	noval is extremely challenged is manifested	d by entry	to CSF	ST Heat		and the state
Sink-RED path in F-0.3	(ref. 1). The phrase "and heat sink require	ed" preclu	des the	need for	··· ,"	
	ions in which RCS pressure is less than SC					the second second
RED path entry was cro	eated through operator action directed by a	an EOP. F	Procedu	re FR-	an a	
H.1, Response to Loss	of Secondary Heat Sink, indicates heat sin	nk is requ	ired wh	en RCS 🤉	n bootsea	de la trapica de
pressure is greater that	n any non-faulted SG pressure and RCS o	old leg ter	mperati	ure is		·,
greater than 350°F (ref	. 2).	. ئې	· · _ ·		24 1 1 2	4
RED path Heat Sink co	onditions exist if both of the following:					eneral provide
Narrow Range le AND	evel in both S/Gs is ≤ 7% [≤ 25% adverse (CNMT]	•] : .	к.,		
Total feedwater	flow to SGs is <u><</u> 200 gpm					
	parameters determine when a harsh enviro	nment be	gins to	affect		
	I inside Containment. The following indicat					

adverse containment values should be used in the EOPs (ref. 3):

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Containment pressure > 4 psig, or	Bernard Constant	1. J. A.
 Containment radiation > 10⁵ R/hr 	S. A. Star	
The combination of these conditions indicates the ultimate heat sink function is u	nder	
extreme challenge. This threshold addresses loss of functions required for hot sh		
with the reactor at pressure and temperature and thus a potential loss of the RCS	S barrier.	• .
This is also a potential loss of the Fuel Clad barrier and therefore results in at lea	ist a Site	
Area Emergency.	•	

Ginna Basis Reference(s):

1. FR-P.1 Response to Imminent Pressurized Thermal Shock Condition

2. FR-H.1 Response to Loss of Secondary Heat Sink

3. CSFST for F-0.4 Integrity

$\gamma = \rho + \epsilon$ EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 292 of 336

Barrier:	Reactor Coolant System	(1,1) = (1,1) + (1,1
Category:	B. Core Exit TCs	$= \sum_{i=1}^{n} \frac{1}{i} \sum_$
Degradation Threat:		
Threshold:	(a) An and the second s Second second secon second second sec	
None	a di sana si sana si sana si si sana si si sana si	a an

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EMERGENCY ACTION LEVEL	Revision [Draft H]
TECHNICAL BASES DOCUMEN	Terrar (Page 293 of 336 🔤
Reactor Coolant System	 A state of the second se
B. Core Exit TCs	

Barrier:

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Category:	B. Core Exit TCs	a at a c	· · · · ·
Degradation Threat:	Potential Loss		• • • • • •
Threshold:			la service National de la companya de la company International de la companya de la co
None	and the second sec		
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	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT	EPAD-XX Revision [Draft H] Page 294 of 336	
Barrier:	Reactor Coolant System		214 - 144 214
Category:	C. Inventory	the second second	jest s
Degradation Threat:	Loss		an Marina an
Threshold:			
1. RCS leak rate > av (< EOP Fig. MIN S	vailable makeup capacity as indicated by a log	ss of RCS subcooling	

Basis:

Generic

Loss Threshold A

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss Threshold A

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

[For plants with low capacity charging pumps, a 50 gpm indicated loak rate value may be used to indicate the Potential Loss.]

Plant-Specific

Critical Safety Function Status Trees (CSFST) Core Cooling indicates that if subcooling margin based on core exit TCs is in the Inadequate Subcooling Region of EOP Fig. MIN SUBCOOLING, a loss of RCS subcooling has occurred (ref. 1, 4). E-0, Reactor Trip or Safety Injection and AP-RCS.1, Reactor Coolant Leak, provide appropriate actions to prevent and mitigate the consequences of RCS leakage (ref. 2, 3).

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AP-RCS.1 provides a list of co	nditions that may be observed when excess	ive RCS	
leakage occurs and provides a	ppropriate actions to prevent and mitigate t	he waterwards of	
consequences of RCS leakage	e (ref. 3).	100 pc - 5 pc - 5	the there is find
The loss of subcooling as a rea	sult of inability to establish RCS heat transfe		
heat sink is indicative of poten	tial losses of the Fuel Clad and RCS barriers	S.	
Ginna Basis Reference(s):		n an ann an Anna an Ann An ann an Anna a	- Calegoria de la composición de la com El calegoria de la composición de la com
1. F-0.2 CSFST Core Cooling		· · · • · · · · · · · · · · · · · · · ·	
 E-0 Reactor Trip or Safety AP-RCS.1 Reactor Coolant 	•		の時には数
4. EOP Figure MIN SUBCOO	LING		
5. AP-CVCS.1 CVCS leak	an an ann an Augus ann an an an an Aireannacht an Airean An an Airean an Airean an Aireannacht an Aireannacht an Aireannacht Aireannacht an Aireannacht an Aireannacht an Aireannacht an Aireannacht an Aireannacht an Aireannacht an Airean	- HAR BARTAN I, TREAD CHEAN ANNA A MITTER I CHEAN A CANTALA HING	a dav stradi se se
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	Neta Antonio Okonina - presidente da Secono Antonio espectorente in pesidente en solar su	Contrara e produce ell'en él	en brand Milline - Synth Royan an Singer Africa - Royan Anger
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	and approximate a strand ball when	et al (110 - de la dés) - la	Harris Strategica
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		States - Marcaston	
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	$a_{1}^{(1)} (t_{\mathbf{a}}^{(1)} + t_{\mathbf{a}}^{(1)} (t_{\mathbf{a}}^{(1)} + t$	Ne mail roads for a 1. Mine me.	1. 17

		Y ACTION LEVEL	-	
Barrier:	Reactor Coolant Sy			e se surre e server
Category:	C. Inventory	1777-60、 建 体的人们的一种。		Neg – Steffensk († 1945 - Agterne) Se
Degradation Threat:				general of the second
Threshold:	1			an an an Anna Anna a' taonairte an Anna An Anna Anna Anna Anna Anna Ann
2. Ruptured S/G resu	ilts in an ECCS (SI) a	ctuation		
Basis:			÷	n an an Anna a Anna an Anna an
Generic				and the second

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Generic

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with containment barrier loss thresholds. It addresses ruptured SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent to the RCS leak rate barrier potential loss threshold.

For plants that have implemented Westinghouse Owners Group emergency response guides, this condition is described by "entry into E-3 required by EOPs".]

By itself, this threshold will result in the declaration of an Alert. However, if the SG is also faulted (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier loss thresholds.

There is no potential loss threshold associated with this item.

Plant-Specific

In conjunction with Containment Loss C.3 and the Fuel Clad barrier thresholds, this

threshold addresses the full spectrum of Steam Generator Tube Rupture (SGTR) events.

A ruptured SG is primary-to-secondary leakage through the steam generator tubes. ECCS

(SI) actuation is caused by (ref. 1):

- Containment pressure > 4 psig
- Pressurizer pressure < 1750 psig ٠
- Steam line pressures < 514 psig

Indications of a ruptured S/G include (ref. 2):

- Unexpected rise in either S/G narrow range level
- High radiation on Main Steamline Radiation Monitors •

	EMERGENCY ACTION LEVEL: 44 TECHNICAL BASES DOCUMENT	EPAD-XX Revision [Draft H] Page 297 of 336	
Local indications or	f increase steamline radiation	and the second second	· · · ,.
Definitions:		$\sum_{i=1}^{n} e_{i}$	· · · · · · · · · · · · · · · · · · ·
Ruptured			and the strategic strategic
	existence of primary-to-secondary leakage cause a reactor trip and safety injection.	of a magnitude	trise etter var 1. Nor etter var 1.
Ginna Basis Reference(2).	the state of the second second	total total total of
 E-0 Reactor Trip or Sa E-3 Steam Generator AP-RCS.1 Reactor Co 	ifety Injection Tube Rupture	· · · · ·	
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Barrier:	Reactor Coolant System	· · · · ·	e di la del	1.6	· · · ·	· · · ·	
Category:	C. Inventory						51
Degradation Threat:	Potential Loss						
Threshold:	··· ·· ···	 South Annual An Annual Annual Annua 	n n Selan An transformation	-	1) 1)		
3. RCS leak rate > 50) gpm with letdown isolated				· .		
Basis:							
<u>Generic</u>							

Loss Threshold A

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss Threshold A

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

[For plants with low capacity charging pumps, a 50 gpm indicated loak rate value may be used to indicate the Potential Loss.]

Plant-Specific

The CVCS includes three positive displacement horizontal pumps with a capacity of 46 gpm each (ref. 1). The pressurizer level control program regulates letdown purification subsystem flow by adjusting the letdown flow control valve so that the reactor coolant pump (RCP) controlled leak-off plus the letdown flow matches the input from the operating charging pump. Equilibrium pressurizer level conditions may be disturbed due to RCS temperature changes, power changes, or RCS inventory loss due to leakage. A decrease in pressurizer water level below the programmed level results in a control signal to start

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one or both standby charging pumps to restore water level. The need for a second or third charging pump to makeup leakage in excess of letdown flow would be indicative of substantial RCS leakage. The single charging pump capacity is rounded up to 50 gpm, for a second or the second second

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(JINDA KASIS KATATANCA(S)'	
1. UFSAR Table 9.3.6 CVCS Performance Parameters	and the second second standard second se
2. UFSAR Section 9.3.4.2.2.2 Charging Pump Control	an tarte state of the state of the state of the
	na haran 1997 yang seri kanalar na seri kanalar dari seri
	$\pm 1 + 1.000$ and

EPAD-XX EMERGENCY/ACTION LEVEL TECHNICAL BASES DOCUMENT

Barrier: Reactor Coolant System

Category: D. Radiation / Coolant Activity

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Degradation Threat: Loss

Threshold:

3. Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr

Basis:

Generic

The site specific reading is a value which indicates the release of reactor coolant to the containment.

[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 containment atmosphere.]

This reading <u>will beis</u> less than that specified for Fuel Clad barrier threshold <u>63</u>. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

[However, if the site specific physical location of the containment 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 coelant activity, this threshold should be omitted and other site specific indications of RCS leakage substituted.]

There is no Potential Loss threshold associated with this item.

Plant-Specific

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 1.0E+01 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 1.0E+02 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment (ref. 2).

Ginna Basis Reference(s):

EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT

P-9 Radiation Monitoring System
 EPIP-2-16 Core Damage Estimation
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	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT		V
Barrier:	Reactor Coolant System		
Category:	D. Radiation / Coolant Activity		water in the second second
Degradation Threat:	Potential Loss	$\mathbb{Q}(\mathbb{Q}_{2}) = \mathbb{Q}(\mathbb{Q}_{2})$	and the
Threshold:			and the design of the
None		~	⁴⁴⁴ ایر ۲۰۰۹ از ایر ۲۰۰۹ از ۲۰۰۹ از ۲۰۰۰ از
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		1.	1921 - 11 - 12 -	
Barrier:	Reactor Coolant System		1	
Category:	E. Isolation Status		and a set to set with	•• ·
Degradation Threat:	Loss			5.655 ·
Threshold:	· • • ·			
None	· · ·	· · · · · · · · · · · · · · · · · · ·		

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EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Revision Page 305 of 336

Barrier:	Reactor Coolant System			
Category:	E. Isolation Status	NAME RECORD	11. ¹	5 A A
Degradation Threat:	Potential Loss	1. 51.254	· · · ·	
Threshold:	,		nt comment	•
None			. .	· · · · ·
	· · · · · · · · · · · · · · · · · · ·	. <i>.</i>		· · · ·
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	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT		
		$M_{\rm ext} = 0.000 \pm 0.000$	· · · · · · · ·
Barrier:	Reactor Coolant System		. A. 1
Category:	F. Judgment		and the second
Degradation Threat:	Loss		
Threshold:	· · · · · · · · · · · · · · · · · · ·	•••	
	· · · · · · · · · · · · · · · · · · ·		. ¹

4. **ANY** condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

Basis:

Generic

Thisese thresholds 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 threshold as a factor in Emergency Director judgment that the barrier may be considered lost-or potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier: Reactor Coolant System		$\sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left(\sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left(\sum_{j$	ж.
Category:	F. Judgment	2 and the contract of the second of the	and the second
Degradation Threat: Potential Loss		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	s (Vertica), Hans (Star)
Threshold:			
4. ANY condition in the the RCS barrier	ne opinion of the Emergency Direc	tor that indicates potential loss of	47.31 47.31

Basis:

<u>Generic</u>

Thisese thresholde 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 threshold as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier:	Containment	and the second	- ¹ 21
Category:	A. Critical Safety Function Status	$\{0,1,1,1,\dots,N\}$	
Degradation Threat:	Loss	$(2^{n+1})^{1/2} (1+1)^{1/2} $	
Threshold:			and the second second
None	$\sum_{i=1}^{n} \frac{\partial f_{i}^{i}}{\partial x_{i}} = \sum_{i=1}^{n} \frac{\partial f_{i}^{i}}{\partial x_{i}} = \frac{\partial f_{i}}{\partial x_{i}} = \frac{\partial f_{i}}$		а
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EPAD-XX EMERGENCY ACTION LEVEL . Revision [Draft H] TECHNICAL BASES DOCUMENT State Page 309 of 336

Barrier:	Containment		Sector States	N
Category:	A. Critical Safety Function Status	and the second second	grand to be a	
Degradation Threat:	Potential Loss		. NE PRIMINE	o ga til a bhanag all
Threshold:				tu offan 19
1. RED path condition	n exists F-0.5 Containment		······································	
Basis:			····	4 . SP 4
Generic				or system
	xtreme challenge to the safety function	derived from appropriate	the first teach an	$(A, A) = \left\{ \left\{ \left\{ \frac{1}{2}, \frac{1}{2} \right\} : \left\{ \left\{ \frac{1}{2}, \frac{1}{2} \right\} \right\} \right\} \in \left\{ \frac{1}{2}, \frac{1}{2} \right\} \right\}$
	or sampling results, and thus represen		nment. 🚓 🚓	
Loss. Thus, this threshol	containment RED path result from RCS d is primarily a discriminator between s a potential loss of the third barrier.	Site Area Emergency and G	arrier 11	
There is no Loss thresho	old associated with this item.			
Plant-Specific	ار این از این از این باین این این این این این این این این این	n - Maria Paris Resperator - State Res (2000) - State Res (2000)	to y or second to taylog data Son futo on statistico en al Anto en al second	ta en entra a constante 1955 - Entra Alexandre, entra entr 1950 - Entra en
Critical Safety Function	n Status Tree (CSFST) Containmen	t-RED path is given in F-	0.5 and	na ana ang katalan na sang katalan Na
is entered if Containme	ent pressure is equal to or greater th	nan 60 psig (ref. 1).		

This threshold is indicative of a loss of both RCS and Fuel Clad barriers. This combination

of conditions would be expected to require the declaration of a General Emergency.

Ginna Basis Reference(s):

1. CSFST for F-0.5 Containment

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		EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT	Revision [D	-			
	Barrier:	Containment	2.	$\overline{D} = \left\{ \frac{1}{2} \right\}^{2} = \left\{ \frac{1}{2} \right\}^{2}$	• • •		
	Category:	B. Core Cooling / Heat Removal	al officiants and the	in anti-ta	19 - St 41 - 4		
	Degradation Threat:	Potential Loss		eris Phristerie			
	Threshold:						
	2. Core Exit TCs can	not be restored < 1,200°F within 15 min.	eta a di second		.*		
	Basis:	· · ·		<u> </u>			
	Generic						
	There is no Loss threshold associated with this item.						
	corrected, could lead to v conjunction with the Core columns, this threshold v	his thresholde represents an imminent core r vessel failure and an increased potential for c e Cooling and RCS Leakage criteria in the Fu vould result in the declaration of a General E I loss of a third. If the function restoration pro	containment failure. In iel <u>Clad</u> and RCS barrie mergency – loss of two	en rational t			
	recovery of the core cool	procedures are those emergency operating p ling critical safety functions. The procedure is ing or if the vessel water level is increasing.	considered effective if	the			
	[For units using the CSF offectiveness of the reste	status trees, a direct correlation to those sta pration procedures is also evaluated as state	tua traca can ha mada i	ftha			
	procodures can arrest co damage scenarios, and t	es (e.g., NUREG-1150) have concluded that for degradation within the reactor vessel in a that the likelihood of containment failure is ve to to provide a reasonable period to allow fu quence.]	significant fraction of th ry small in those events	o coro S . duros			
	Emergency Director show have been, or will be iner		ithin 15 minutes. The ermined that the procedu				
	Potential Loss Threshold	<u>LB</u>					

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[The reactor-vessel level chosen should be consistent with the emergency-response guides applicable to the facility.]

Plant-Specific

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Core Exit Thermocouples (TCs) reading in excess of 1200°F corresponds to the CSEST and the excession of Core Cooling RED path entry condition (ref. 1). Core Exit TCs are a component of the excession of the excession of the excession of the reactor cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). Although clad rupture due to high temperature is not expected for CET readings less than the threshold, temperatures of this magnitude signal significant superheating of the reactor coolant and core uncovery. Events that result in Core Exit TC readings above the loss threshold are classified severe accidents and lead to entry into Severe Accident Management Guidelines (ref. 3).

Events that result in Core Exit TC readings above the Fuel Clad loss threshold are classified severe accidents and lead to entry into Severe Accident Management Guidelines and signify possible core overheating to the point that clad ballooning/collapse may occur and portions of the core may have melted (ref. 3).

It must also be assumed the loss of RCS inventory is a result of a loss of the RCS barrier. These conditions, if not mitigated, can lead to core melt which in turn may result in a loss of containment. Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the Reactor Vessel in a significant fraction of the core damage scenarios, and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. The phrase "cannot be restored <" implies Core Exit TC readings have exceeded the threshold temperature and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful (ref. 4). Whether or not guidance is effective should be apparent within fifteen minutes. The ED should make the declaration as soon as it is determined the guidance has not been or will not be effective in restoring temperature below the threshold.

Ginna Basis Reference(s):

- 1. CSFST for F-0.2 Core Cooling
- 2. EPIP-2-16 Core Damage Estimation

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Ginna Severe Accident Management Guidelines descriptions in the second of the second of

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EPAD-XX EMERGENCY ACTION LEVEL TO THE Revision [Draft H] -TECHNICAL BASES DOCUMENT: A Page 313 of 336 of 3

I.

Barrier:	Containment	Alam a age d
Degradation Threat:	Potential Loss (1973) and the largement of New Broadcook, release	gente nation de la company
Category:	B. Core Cooling / Heat Removal Statute is a classification of the statute is a classi	are des la desiña presión pour Comente entre como la regione
Threshold:	and a state of the	•
 Core Exit TCs ≥ 70 AND 	0°F USAN SETUCIAL CELEMENTALSEA SERVICES IN REAL EXPOSITION CONTRACTOR SETUCION	
RVLIS level canno within 15 min.	t be restored > 52% [> 55% adverse CNMT] with no RCPs running	e in the second seco
Basis:	and and an and a state of the second and an an an and an and an and an 	
<u>Generic</u>	an 15、15、15、16、15、15、15、15、15、15、15、15、15、15、15、15、15、	n er and take i all in john
There is no Loss thresho	ld associated with this item.	A BAD PERFORMENTAL OF STREET
corrected, could lead to v conjunction with the Correct columns, this threshold v barriers and the potentia is no "success" path. The function restoration precovery of the core cool	his thresholds represent an imminent core melt sequence which, if not vessel failure and an increased potential for containment failure. In a Cooling and RCS Leakage criteria in the Fuel <u>Clad</u> and RCS barrier would result in the declaration of a General Emergency — loss of two I loss of a third. If the function restoration procedures are ineffective, there procedures are those emergency operating procedures that address the ing critical safety functions. The procedure is considered effective if the g or if the vessel water level is increasing.	 Contract Antipartic Structure and the second structure and
For units using the CSF offectiveness of the reste	status troos, a direct corrolation to those status frees can be made if the pration procedures is also evaluated as stated below.]	e estatementes entres el compositiones els estas entres activitas de la composition el
proceduros can arrost co damago sconarios, and t Givon this, it is appropria to arrost the coro melt sc	2. 1. 引用的机器 人名法格特拉法德德 法无证书 化电子放射器 化合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金合金	🖁 on staal on Noord vaar op dat de Arak Newsker Naar Mellingen oor de anderste dat ferste vaar Noord se anderste keel het oorde woord de dat
Whether or not the proce Emergency Director shou have been, or will be ine	dures will be effective should be apparent within 15 minutes. The Ild make the declaration as soon as it is determined that the procedures	and the engine group of the last
Potential Loss Threshold	· · · · · · · · · · · · · · · · · · ·	•
[The_reactor_vessel_lev applicable to the facility.]		e and the second way of the second

EMERGENCY ACTION LEVEL Revision [Draft H] / TECHNICAL BASES DOCUMENT Page 314 of 336

Plant-Specific

Core Exit Thermocouples (TCs) reading in excess of 700°F corresponds to the CSFST and some transmission and Core Cooling ORANGE path entry criteria (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). RCS superheat, as indicated by Core Exit TCs reading in 化化学学 经收益 excess of 700°F, signals the transition from a subcooled to a superheated regime. In a superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to a rapid rise in clad temperatures. Valid indication of superheat 1.1 is a potential Fuel Clad barrier loss condition because the possible rapid rise in clad temperatures may lead to clad failure. and the first special production of

This threshold indicates: subcooling has been lost (Core Exit TC readings \geq 700°F), the core is uncovered and some fuel clad damage may be occurring (ineffective functional restoration procedures) (ref. 1, 3). It must be assumed that the loss of RCS inventory is a result of a loss of the RCS barrier.

These conditions, if not mitigated, can lead to core melt which in turn may result in a loss of containment. Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the Reactor Vessel in a significant fraction of the core damage scenarios, and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. The phrase "cannot be restored <" implies Core Exit TC readings have exceeded the threshold temperature and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful (ref. 3). Whether or not guidance is effective should be apparent within fifteen minutes. The ED should make the declaration as soon as it is determined the guidance has not been or will not be effective in restoring temperature below the threshold.

Ginna Basis Reference(s):

EPAD-XX

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1. CSFST for F-0.2 Core Cooling	Asses provided a		
2. EPIP-2-16 Core Damage Estimation			
3. FR-C.2 Response to Degraded Core Cooling			
4. Drawing 03021-0687 Reactor Vessel Level Monitoring System Elevations	eaction to stuff motio n the julia		

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A MARK AND A STREET

New States and the Edited States

Barrier:

Containment

Category: C. Inventory

Degradation Threat: Loss

Threshold:

1. A containment pressure rise followed by a rapid unexplained drop in containment pressure

Basis:

Generic

Loss Thresholds A and B

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should increase as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

Potential Loss Threshold A

The site specific pressure is based on the containment design pressure.

Potential Loss Threshold B

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The indications of potential loss under this EAL corresponds to some of those leading to the RED path in potential loss threshold 1.A above and may be declared by those sites using CSFSTs.

Potential Loss Threshold C

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Plant-Specific

			EF Revision [I Page 317		
	UFSAR Figure 15.6-34 describes containmer				
-	(ref. 1). Containment pressure peaks at appro	oximately 45 psig	at approximately 25		and the second second
se	seconds after event initiation.				
	Ginna Basis Reference(s):				
1.	1. UFSAR Figure 15.6-34 Containment Pres Large Break LOCA	sure Used for the	R.E. Ginna Best-Est	imate	
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Barrier:	Containment		, 1 ¹ 7.	•	••		19.21 1	:: .	·. · ·,	
Category:	C. Inventory	:			Ť.	6 -	n in de tra			· · ·
Degradation Threat:	Loss								and Marka and Metal	
Threshold:	2000									
		, ·	•	• • • • • •	•••••••••••••••••••••••••••••••••••••••		al transition			
2. Containment press	ure or sump lev	el re	spons	e not	cons	sistent wit	h LOCA condi	itions		

Basis:

Generic

Loss Thresholds A and B

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should increase as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

Potential Loss-Threshold A

The site specific pressure is based on the containment design pressure.

Potential Loss Threshold B

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The indications of potential loss under this EAL corresponds to some of those leading to the RED path in potential loss threshold 1.A above and may-be declared by those sites using CSFSTs.

Potential Loss Threshold C

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice-condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

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	sponse and containment sump water = 1000 (minipati)
	UFSAR Figures 6.2-1 through 6.2-6 for the
most severe LOCAs (ref. 1).	and the second
Ginna Basis Reference(s):	
1. UFSAR Figures 6.2-1 through 6.2-6	······································
	an ann ann an thairte ann an thairte an thairte an thairte an th
: 	e de la construcción de la constru La construcción de la construcción d
	14-01 ⁰
$z \mapsto z^{-1}$	$r^2 = r^2 + r^2 $
· · · · · · · · · · · · · · · · · · ·	رای ایران این این این ۲۹۵ این ۱۹۵۵ این این ۲۹۵ این این ۲۹۹۹ کورکی کرد. این ایران ایران ایران ایران ایران کرد ایران کرد ایران کرد کورکی کرد ایران ایران ایران کرد ایران ایران ایران ایر ایران ایران ایران ایران ایران کرد ایران کرد ایران کرد ایران ایران ایران ایران ایران ایران کرد ایران کرد ایران ک ایران کرد
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Barrier:		there are a finite dual to the definition of the dispersion of the dispersion of the dispersion \mathbb{R}^{n}
Category:	C. Inventory	(2) List and the complete field and the second states of the second states of the complete second states and second states and second states and second states and second states and second states and second states and s second states and second stat second states and second stat second states and second states and
Degradation Threat:	Loss	the second s
Threshold:		The set of

3. Ruptured S/G is also faulted outside of containment

Basis:

<u>Generic</u>

The loss threshold recognizes that SG tube leakage can represent a bypass of the containment barrier as well as a loss of the RCS barrier.

Users should realize that the two lossis threshold and containment Potential-loss C.4s could be considered redundant. This was recognized during the development process. The inclusion of an threshold that uses Emergency Procedure commonly used terms like "ruptured and faulted" adds to the ease of the classification process and has been included based on this human factor concern.

This threshold results in a NOUE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

Loss Threshold A

This threshold addresses the condition in which a ruptured steam generator is also faulted. This condition represents a bypass of the RCS and containment barriers and is a subset of the <u>containment Petential-loss</u> <u>C.4second threshold</u>. In conjunction with RCS leak rate barrier loss threshold, this would always result in the declaration of a Site Area Emergency.

Loss Threshold B

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an UNISOLABLE release path to the environment from the affected steam generator. The threshold for establishing the UNISOLABLE secondary side release is intended to be a prolonged release of radioactivity from the RUPTURED steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the RUPTURED steam generator is required for plant cooldown or a stuck open relief valve). If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways.

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		ntent-of-an_UNISOLABLE_release using Abnormal Rad Levels / Radiok		ent.	5. F.
ய	he lookage threshold for this the	eshold has been increased with		ttan in ti	
rei	vision, the threshold was leakage	groator than T/S allowable. Since	the prior revision, m	any .	ustan ann an an ann an an an an an an an an
as lov	sociated with alternate steam gene v for use as an emergency threshe	eam generator T/S limits (e.g., 150 (erator plugging critoria. The 150 gp old. A prossure boundary leakage o and is deemed appropriate for this th	d throshold is deemed f 10 gpm was used as	too	1
trm	oanola in ro 300, r co Loakago, a	and to doomod appropriato tor time tr	n conoid:1 Tage th	a ann an t-suit	Tubble terminalis
<u>P\</u>	ant-Specific				$\{ i_{i_{j}}, i_{j} \}$
A	faulted S/G means the existence	e of secondary side leakage that	results in an	* 1 * 11	n starty i sin e e e trif
		enerator pressure or the steam g		•	• . •
со	mpletely depressurized (ref. 1).	A ruptured S/G means the existe	ence of primary-to-		
se	condary leakage of a magnitude	e sufficient to require or cause a r	eactor trip and safety	/	
inj	ection (ref. 2).	ut provinsi ta substanti tagenta di ta			and the state of the second
De	efinitions:	$w \in \mathcal{T}_{2}$	1947 (1944) 1947 - 1944 (1944)	;	a di tanta sa
	Faulted	e de la companya de La companya de la comp	a de la companya de A companya de la comp	grad bar direk. Britiske	
	uncontrolled drop in steam ger	ence of secondary side leakage nerator pressure or the steam get	that results in an nerator being comple	tely	nt Bruck (* 1997) Gwelenius Gwelenius
	depressurized.	المحاوية والمراجع والمحاج والأخرية والمحاج	1 Contraction	·• . :	 Constraint of the second s
	Ruptured			•	
	sufficient to require or cause a	e of primary-to-secondary leakag reactor trip and safety injection.	1. 2	in the And	and a start of the second s Second second second Second second
	́ ч	a Charlest Beenrade Robert Charles			16 General - Color Calendary I. General 1811 - Calendary I.
Gi	nna Basis Reference(s):		•		natur (APD) - Alia (
	E-2 Faulted Steam Generator E-3 Steam Generator Tube Ru				

ি কিছিল হয় বিশ্ব বিভাগ সহায় হয় হয় বিভাগ কৰেছে বিভাগৰে হৈ বিশ্ব হৈ বিশ্ব বিভাগ বিভাগ বিভাগ বিভাগ হয়। বিভাগ হয় কিছিল বিভাগ সহায় বিভাগ সভাৱ বিভাগ বিভা বিভাগ বি

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	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT		
Barrier:	Containment		
Category:	C. Inventory		1
Degradation Threat:	Loss		
Threshold:			i
AND	dary leakrate > 10 gpm ged steam release from affected S/G to th	ne environment	413
	• • • • • • • • • • • • • • • • • • •		
Basis:	•	An an at an ing the factor	
Generic			
The loss threshold reco barrier as well as a loss	gnizes that SG tube leakage can represent a l		
considered redundant. threshold that uses Eme to the ease of the classi concern.	at the two- <u>this</u> loss threshold <u>and containment</u> This was recognized during the development p ergency Procedure commonly used terms like fication process and has been included based a a NOUE for smaller breaks that; (1) do not ex	process. The inclusion of an "ruptured and faulted" adds d on this human factor	e types e e e e e e e e e e e e e e e e e e e
actuation in RCS SG tu criteria would result in a or unisolable secondary thresholds and would re	CS leak rate barrier Potential Loss threshold, of be rupture barrier Loss threshold. For larger b in Alert. For SG tube ruptures which may invol v line breaks, this threshold would exist in conj ssult in a Site Area Emergency. Escalation to of is" of the Fuel Clad Barrier.	reaks, RCS barrier threshold lve multiple steam generators junction with RCS barrier General Emergency would be	
Loss Threshold A			end of each the second s
This condition represen	es the condition in which a RUPTURED steam ts a bypass of the RCS and containment barri njunction with RCS leak rate barrier loss thres ite Area Emergency.	enerator is also FAULTED.	•
Loss Threshold B			
release path to the envi the unisolable secondar the ruptured steam gen	es SG tube leaks that exceed 10 gpm in conju ronment from the affected steam generator. T ry side release is intended to be a prolonged n erator directly to the environment. This could b unavailable to accept the contaminated steam	he threshold for establishing elease of radioactivity from be expected to occur when	

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	N LEVEL 🧠 📿 Revision [Draft H]		
	OCUMENT Page 323 of 336	3 1 1	
concurrent loss of off-site power and the ruptured steam or a stuck open relief valve). If the main condenser is ava	ailable, there may be releases via air		
ejectors, gland seal exhausters, and other similar control These pathways do not meet the intent of an unisolable r minor releases are assessed using Abnormal Rad Levels	elease path to the environment. These		the second s
Category R.		.)≓ 1-4 (j.(j. 6 .)	
[The leakage threshold for this threshold has been in			
revision, the threshold was leakage greater than T/S			• • • • • • •
plants have implemented reduced steam generator T/S I associated with alternate steam generator plugging crite low for use as an emergency threshold. A pressure bou	oria. The 150 gpd threshold is deemed too	ан алар алтан сайнай сойн бар ба Э	
threshold in IC SU5, RCS Leakage, and is deemed appre		-	e, er h
<u>Plant-Specific</u>			
Cooldowns conducted to allow controlled isolation of	f the affected S/G per emergency		:
procedures are not considered prolonged releases.	The criterion for prolonged release is		
met if the objective of E-3 to isolate the affected S/G	cannot be met (ref. 2).		· · · ·
An ARV or Safety valve performing as designed is n	ot considered a "failed" barrier.	. •	
Definitions:			
Unisolable			
A breach or leak that cannot be promptly isolated	d from the Main Control Board.		
Ginna Basis Reference(s):	A subject work to ever been	bees interesting	PRO ST
1. ECA-1.2 LOCA Outside Containment			
2. E-3 Steam Generator Tube Rupture			
3. F-0.2 Core Cooling			r
	· · · · · · · · ·		•
			• :
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Barrier:	Containment service and the data set of the state of the set of th	
Category:	C. Inventory	
Degradation Threat:	Potential Loss	n an
Threshold:		
4. Containment press	ure ≥ 60 psig and rising	
Basis:		
Generic		$a_0 = 1$
Loss Thresholds A and E		
effects) following an initi indicates a loss of conta as a result of mass an	of pressure (i.e., not attributable to containment spray or condensation al pressure increase from a primary or secondary high energy line breat inment integrity. Containment pressure and sump levels should increat d energy release into containment from a LOCA. Thus, sump level ndicates containment bypass and a loss of containment integrity.	ak Se
therefore does not have	operator recognition of an unexpected response for the condition ar a specific value associated with it. The unexpected response is importa r for a containment bypass condition.	
Potential Loss Threshold	🕰 – – – – – – – – – – – – – – – – – – –	$(k_1, M_1, M_2) = \sum_{i=1}^{n} (k_1, \dots, k_{n-1}, M_{n-1}, M_{n-1}, \dots, M_{n-1}, M_{n-1}, \dots, M_{n-1}, M_{n-1}, \dots, \dots, M_{n-1}, \dots, M_{n-1}, \dots, \dots, \dots, M_{n-1}, \dots, \dots, M_{n-1}, \dots, \dots, \dots, \dots, \dots, M_{n-1}, \dots, \dots,$
The site specific pressure	e is based on the containment design pressure.	
Potential Loss Threshold	<u>B</u>	an an an the second second Second second
lower deflagration limit c		he status tatus tatus tatus tatus tikan tita. te

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This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

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This threshold is the containment design pressure and is in excess of that expected from <i>even</i>	Sally States and
the design basis loss of coolant accident (LOCA) (ref. 1, 2). Proper actuation and	
operation of the containment spray system when required should maintain containment	
pressure well below the design pressure. The peak containment pressure of 45 psig	ning instant prosperit
occurs ~ 25 seconds after event initiation for the most limiting design basis LOCA (ref. 3).	
The pressure-time responses for the spectrum of LOCAs considered in the plant design	··· • • •
basis are described in Section 15 of the UFSAR, Accident Analyses. The threshold is	and a start Mar 1999 and a start
therefore indicative of a loss of both RCS and Fuel Clad barriers in that it should not be	· .
reached without severe core degradation (metal-water reaction) or failure to scram in	1.451 e
combination with RCS breach. This condition would be expected to require the declaration	
of a General Emergency.	

Ginna Basis Reference(s):

- 1. CSFST for F.0.5 Containment
- 2. UFSAR 3.1.2.2.7 General Design Criterion 16 Containment Design
- 3. UFSAR Figure 15.6-34 Containment Pressure Used for the R.E. Ginna Best-Estimate Large Break LOCA

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Barrier:	Containment in all the second of the second
Category:	C. Inventory
Degradation Threat:	Potential Loss
Threshold:	
5. Containment hydro	gen concentration ≥ 4%
Basis: Generic	a se a comercia de la segue de l <mark>abora de castra de la servicia de la 4926 € 934 E 934 C</mark> astra de la servicia Esta de la servicia de la servici Antenencia de la servicia de la servi

Loss Thresholds A and B

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure and sump levels should increase as a result of mass and energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

· -

Potential Loss Threshold A

The site specific pressure is based on the containment design pressure.

Potential Loss Threshold B

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The indications of potential loss under this EAL corresponds to some of those leading to the RED path in containment potential loss threshold <u>A.1</u>4.A above and may be declared by those sites using CSFSTs.

Potential Loss Threshold C

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

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In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a state state of the core uncovery could result in an explosive mixture of dissolved gases in Containment. However, Containment monitoring (CH-EPIP-CVH2) and/or sampling should be performed Abangle in the state to verify this assumption (ref. 1). A combustible mixture can be formed when hydrogen gas . concentration in the Containment atmosphere is greater than 4.1% (rounded to 4%) by **..** volume (ref. 2). entrange and the second and the second states are equipped and the set

After a LOCA, the containment atmosphere is a homogeneous mixture of steam, air, solid and gaseous fission products, hydrogen, and water droplets containing boron and sodium hydroxide. During and following a LOCA, the hydrogen concentration in the Containment results from radiolytic decomposition of water, metal-water reaction, and aluminum/zinc reaction with the spray solution (ref. 2). If hydrogen concentration reaches or exceeds the lower flammability limit (4%) in an oxygen rich environment, a potentially explosive mixture exists. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur. To generate such levels of combustible gas, loss of the Fuel Clad and RCS barriers must also have occurred. Since this threshold is also indicative of loss of both Fuel Clad and RCS barriers with the potential loss of the Containment barrier, it therefore will likely warrant declaration of a General Emergency.

Ginna Basis Reference(s):

1. SACRG-1 Severe Accident Control Room Guideline Initial Response

2. UFSAR 1.5.10 Development of Containment Hydrogen Recombiner

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Barrier:	Containment and the east of the second state o
Category:	C. Inventory
Degradation Threat:	Potential Loss
Threshold:	and and a second of the second se The second sec
•	ure ≥ 28 psig and < two CRFC units and one CS pump operating
per design	the second statement of the second statement of the second statement of the second statement of the second state
Basis:	ta en la companya de
Generic	$1/p$ and $1/p$ is the solution of the solution of $1/p^{2}$, $p \in \mathbb{R}^{d}$, $p \in \mathbb{R}^$
Loss Thresholds A and I	3 Sector and the sector of
effects) following an initi indicates a loss of conta as a result of mass an pressure not increasing i This indicator relies on	of pressure (i.e., not attributable to containment spray or condensation al pressure increase from a primary or secondary high energy line break ainment-integrity. Containment pressure and sump levels should increase d energy release into containment from a LOCA. Thus, sump level-or indicates containment bypass and a loss of containment integrity. operator recognition of an unexpected response for the condition and a specific value associated with it. The unexpected response is important
	r for a containment bypass condition.
Potential Loss Threshold	
The site specific pressur	e is based on the containment design pressure.
Potential Loss Threshold	
lower deflagration limit c	ve mixture means a hydrogen and oxygen concentration of at least the urve exists. The indications of potential loss under this EAL corresponds to the RED path in potential loss threshold 1.A above and may be declared ESTs.

Potential Loss Threshold C

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, ice condenser fansrecirc. fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

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Two means of post accident containment heat removal are provided; Containment Spray	1. A. A.
System and Containment Recirc Fan Cooler (CRFC) units. At least one train of each of	
these systems is required to provide sufficient steam-condensing capacity to ensure	
against containment overstress and to remove residual and chemical heat (ref. 1, 2).	: .

The CRFC system is comprised of four CRFC units, two of which are required in the post accident condition (ref. 3, 4). Each containment aircooling unit consists of cooling coils, accident backdraft damper, accident fan, service water outlet valves, and controls necessary to ensure an operable service water flow path. Following an SI actuation signal, CRFC System fans are designed to start automatically (ref. 4).

Each of two containment spray trains consists of a spray pump, spray header, nozzles, valves, piping, instruments, and controls to ensure an operable flow path capable of taking suction from the RWST upon an actuation signal (ref. 4).

During a steam line break or LOCA, a minimum of two CRFC units and one Containment Spray (CS) pump are required to maintain peak pressure and temperature below design limits (ref. 4).

The containment hi-hi pressure setpoint (28 psig) is the pressure at which the equipment should actuate and begin performing its function (ref. 5).

Ginna Basis Reference(s):

- 1. UFSAR Section 6.2.2 Containment Heat Removal Systems
- 2. UFSAR Section 6.2.1.2.3 Secondary System Pipe Break Analysis
- 3. UFSAR Section 6.2.2.1.3 Design Evaluation
- 4. Technical Specifications B 3.6. Containment Systems
- 5. CSFST for F-0.5 Containment

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Barrier:	Containment
Category:	D. Radiation / Coolant Activity
Degradation Threat:	Loss
Threshold:	and the set square of the set of
None	
	and a second s I second s
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	المحمولة من المروحية المحمد . 1995 - من المحمول المحمول المحمد المحمد المحمد وليون المحمد . 1996 - من المحمد المحمولي المحمد المحمد المحمد المحمد المحمد المحمد المحمد . 1996 - محمد المحمد المحمد المحمد . 1996 - محمد المحمد المحمد .

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Barrier:	Containment and there if many parts are wait grant to an Alance mail actively actively and
Category:	D. Radiation?/Coolant Activity? The formation of the propagation of the back of the back of the back of the office of the back
Degradation Threat:	. ಬಿಲ್ಲೇ ಸ್ಪರ್ಧಿಯನ್ನು ಸೇವಿಯನ್ನು ಕಾರಿಯನ್ನು ಸಂಸ್ಥಾನವರಿ ಸಂಸ್ಥೆ ಕಾರ್ಯಕ್ರಿಯನ್ನು ಕೊರಿತಿ ಮಾಡಿ ಸೇವಿ ಸಾಮ್ರಾಂಗಿ ಸಂಕಾರಣಗಳು Potential Loss ಗಡ ಕಾರ್ಯಕ್ರಿಯಕ್ಕೆ ಸುತ್ತಿ ತಾರ್ಯಕ್ರಿಯ ಕಾರ್ಯಕ್ರಿಯ ಕಾರ್ಯಕ್ರಿಯ ಸಂಸ್ಥೆ ಕ್ರಾರ್ಯಕ್ರಿಯ ಸಂಸ್ಥೆ ಕಾರ್ಯಕ್ರಿಯಾಗಿ ಕಾರ್ಯಕ್ರಿಯ ಸ
Threshold:	langen an im seiter von der den eine der der eine der der der der der der der der der einen einen der der der d Inn gen an im seiter von der
7. Containment radia	tion monitor R-29/R-30 reading > 1.0E+03 R/hr Statistics (Section 2010) - 2010
Basis:	নিয়াল কৰি মহাবিধাৰ প্ৰথম আৰু বিধায় বিধায় বিধায় বিধায় বিধায় বিধায় হয়। মহাবিধায় বিধায়িক বিধায় বিধায় ব
Generic	a langanan kulasi a siya kula sinan na manan na saga basay balaminin ing manan kula si kula sa na na sina sa s
There is no Loss thresho	old associated with this item. Banks and the second of a fact own telenul the end of the process of end pound

The site specific reading is a value which indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers. As stated in Section 3.8, a major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel clad allows radioactive material to be released from the core into the reactor coolant. 均衡的 医颈椎间的 建苯乙基基乙酸乙基乙基

Regardless of whether containment is challenged, this amount of activity in containment, if Containing the second of the Containing Containing the second of the Containing released, could have such severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat this as a potential loss of the severe consequences that it is prudent to treat the severe consequences that the severe consequences the severe consequences that the severe consequences that the severe consequences the severe consequences the severe consequences that the severe consequences the severe con 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%. Unloss there is a (site specific) analysis justifying a higher value, it is recommended that a radiation monitor roading corresponding to 20% fuel clad damage be specified here.]

Plant-Specific

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 10 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 100 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment (ref. 2).

The containment radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of the RCS barrier and the Fuel Clad barrier.

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NUREG-1228 "Source Term	Estimations During Incident Response to Severe Nuclear Market in the second	trat for said
Power Plant Accidents" state	es that such readings do not exist when the amount of clad	
damage is less than 20% (re	ef. 3). A major release of radioactivity requiring offsite	en en la seguera
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	tainment could have severe consequences if released. It is, is as a potential loss of the Containment barrier.	n ka sa na bura di dana di dana Ana di dana di d
The reading is higher than th	nat specified for Fuel Clad barrier Loss #3 and RCS barrier	t terres at a
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loss threshold, therefore, sig	nify a loss of two fission product barriers and potential loss of	n an
a third, indicating the need to	o upgrade the emergency classification to a General	
Emergency.	ja – See ja See See See Jaar See See See See See See See See See Se	A A SECONDERS
Ginna Basis Reference(s):	· · · · · · · · · · · · · · · · · · ·	and the second
 P-9 Radiation Monitoring EPIP-2-16 Core Damage NUREG-1228 Source Te Power Plant Accidents 	System Assessment Estimation rm Estimation During Incident Response to Severe Nuclear	n an anglas Nganan ang anglas Nganan ang anglas ang ang ang

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Barrier:	Containment	at the second	化化物化物
Category:	E. Isolation Status		
Degradation Threat:	Loss	to a second second	$a^{(1)} = a^{(1)} a^{(1)} a^{(1)}$
Threshold:			· · · · · · · · · · · · · · · · · · ·
AND	s in ANY one line to close pathway to the environment exists after containment i		· · · · · · · · · · · · · · · · · · ·

Basis:

Generic

This threshold addresses incomplete containment isolation that allows direct release to the environment.

The use of the modifier "direct" in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

Plant-Specific

None

Ginna Basis Reference(s):

- 1. EOP Attachment 27 Attachment Automatic Action Verification
- 2. EOP Attachment 3 Attachment CI/CVI

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Barrier:	Containment			, .
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Threshold:	· · · · ·			$r_{\rm e} \sim 11$
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Barrier:	Containment		
Category:	F. Judgment		. 417 ^{- 1}
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sequences.			
Ginna Basis Referen	ce(s):		no acore clater e cher

None

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Barrier:	Containment	4	an as th
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8. ANY condition in th the Containment ba	e opinion of the Emergency Director that indicates potential loss of arrier	:] 24,	anta a su da cara a Cara a su da cara a s
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ATTACHMENT (2)

EAL TECHNICAL BASES

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ACRONYMS & ABBREVIATIONS

AC	Alternating Current
AC	
	č
	•
CCW	
CDE	•
CE	
CFR	• .
CNMT	
CSF	
CSFST	
DC	Direct Current
DHR	•
Disch	
DOT	
EAL	
ECCS	
ECL	
ED	Emergency Director
EOF	•••••
EOP	Emergency Operating Procedure
EPA	Environmental Protection Agency
EPG	Emergency Procedure Guideline
EPRI	Electric Power Research Institute
ERG	Emergency Response Guideline
EPIPEr	mergency Plan Implementing Procedure
ESF	Engineered Safety Feature
ESW	Emergency Service Water
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMAFe	ederal Emergency Management Agency
FSAR	Final Safety Analysis Report
GE	General Emergency
НОО	
HPSI	
IC	
IPEEEIndividual Plant Examination of	

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ACRONYMS & ABBREVIATIONS (continued)

ISFSI	Independent Spent Fuel Storage Installation
	Effective Neutron Multiplication Factor
LCO	Limiting Condition of Operation
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LPSI	Low Pressure Safety Injection
LWR	Light Water Reactor
MSIV	
MSL	Main Steam Line
mR	milliRoentgen
MVV	Megawatt
MWS	Miscellaneous Waste System
NEI	Nuclear Energy Institute
NESP	National Environmental Studies Project
NPP	Nuclear Power Plant
NRC	Nuclear Regulatory Commission
	Nuclear Steam Supply System
NORAD	North American Aerospace Defense Command
NUMARC	Nuclear Management and Resources Council
OBE	Operating Basis Earthquake
OCA	Owner Controlled Area
ODCM	Off-site Dose Calculation Manual
	Off-site Response Organization
	Once Through Core Cooling
	Protected Area
	Protective Action Guideline
	Point of Adding Heat
	Probabilistic Risk Assessment / Probabilistic Safety Assessment
	Pressurized Water Reactor
	Pounds per Square Inch Gauge
	Roentgen
	Reactor Core Isolation Cooling
	Reactor Coolant System
	Roentgen Equivalent Man
	Radiological Effluent Technical Specifications
RPS	
	Reactor Protection System Reactor Pressure Vessel

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ACRONYMS & ABBREVIATIONS (continued)

RVLIS	Reactor Vessel Level Indicating System
RWCU	Reactor Water Cleanup
SAE	Site Area Emergency
SBO	Station Blackout
SG	Steam Generator
SI	Safety Injection
SPDS	Safety Parameter Display System
SRO	Senior Reactor Operator
SSE	Safe Shutdown Earthquake
TEDE	Total Effective Dose Equivalent
TOAF	
TSC	Technical Support Center
UE	Unusual Event
WE	Westinghouse Electric
WOG	
WRNGM	Wide Range Noble Gas Monitor
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EMERGENCY ACTION LEVEL

1.0 PURPOSE

This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the EAL Upgrade Project for the R. E. Ginna Nuclear Power Plant (Ginna). It should be used to facilitate review of the Ginna EALs and provide historical documentation for future reference. Decision-makers responsible for implementation of EPIP-1-0 "Ginna Station Event Evaluation and Classification" and the Emergency Action Level Matrix may use this document as a technical reference in support of EAL interpretation. This information may assist the Emergency Director in making classifications, particularly those involving judgment or multiple events. The basis information may also be useful in training, for explaining event classifications to off-site officials, and for facilitating regulatory review and approval of the classification scheme.

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

2.0 DISCUSSION

2.1 Background

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

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

NEI 99-01 (NUMARC/NESP-007) Revision 4 was subsequently issued for industry implementation. Enhancements over earlier revisions included:

• Consolidating the system malfunction initiating conditions and example emergency action levels which address conditions that may be postulated to occur during plant shutdown conditions.

- Initiating conditions and example emergency action levels that fully address conditions that may be postulated to occur at permanently Defueled Stations and Independent Spent Fuel Storage Installations (ISFSIs).
- Simplifying the fission product barrier EAL threshold for a Site Area Emergency.

Subsequently, Revision 5 of NEI 99-01 has been issued which incorporates resolutions to numerous implementation issues including the NRC EAL FAQs. Using NEI 99-01 Revision 5 Final, February 2008 (ADAMS Accession Number ML080450149), Ginna conducted an EAL implementation upgrade project that produced the EALs discussed herein.

2.2 Fission Product Barriers

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

The primary fission product barriers are:

- A. <u>Fuel Clad (FC)</u>: The Fuel Clad barrier consists of the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.
- B. <u>Reactor Coolant System (RCS)</u>: The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.
- C. <u>Containment (CNMT)</u>: The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

2.3 Emergency Classification Based on Fission Product Barrier Degradation The following criteria are the bases for event classification related to fission product barrier loss or potential loss:

Unusual Event:

Any loss or any potential loss of Containment

Alert:

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

Site Area Emergency:

Loss or potential loss of any two barriers

General Emergency:

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

2.4 EAL Relationship to EOPs and Critical Safety Function Status

Where possible, the EALs have been made consistent with and utilize the conditions defined in the Ginna Emergency Operating Procedure (EOP) network. While the symptoms that drive operator actions specified in the EOPs are not indicative of <u>all</u> possible conditions which warrant emergency classification, they define the symptoms, independent of initiating events which indicate reactor plant safety and/or fission product barrier integrity are threatened. When these symptoms are clearly representative of one of the NEI 99-01 Rev. 5 Initiating Conditions, they have been utilized as an EAL. This permits rapid classification of emergency situations based on plant conditions without the need for additional evaluation or event diagnosis. Although some of the EALs presented here are based on conditions defined in the EOPs, classification of emergencies using these EALs is not dependent upon EOP entry or execution. The EALs can be utilized independently or in conjunction with the EOPs.

2.5 Symptom-Based vs. Event-Based Approach

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

ascribed have also been utilized as EALs since they may be indicative of potentially more serious conditions not yet fully realized.

2.6 EAL Organization

The Ginna EAL scheme includes the following features:

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

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

 Within each of the above three groups, assignment of EALs to categories/subcategories – category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user.
 Subcategories are used as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The Ginna EAL categories/subcategories and their relationship to NEI 99-01 Rev. 5 Recognition Categories are listed below.

EAL Groups, Categories and Subcategories

EAL Group/Category	EAL Subcategory
Any Operating Mode:	
R – Abnormal R ad Release / Rad Effluent	1 – Offsite Rad Conditions 2 – Onsite Rad Conditions & Spent Fuel Events 3 – CR/CAS/SAS Rad
H – Hazards and Other Conditions Affecting Plant Safety	 1 – Natural or Destructive Phenomena 2 – Fire or Explosion 3 – Hazardous Gas 4 – Security 5 – Control Room Evacuation 6 – Judgment
E – ISFSI	None
Hot Conditions:	
S – System Malfunction	 Loss of AC Power Loss of DC Power Criticality & RPS Failure Inability to Reach or Maintain Shutdown Conditions Instrumentation Communications Fuel Clad Degradation RCS Leakage
F – Fission Product Barrier Degradation	None
Cold Conditions:	
C – C old Shutdown / Refueling System Malfunction	 1 – Loss of AC Power 2 – Loss of DC Power 3 – RCS Level 4 – RCS Temperature 5 – Communications 6 – Inadvertent Criticality

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

2.7 Technical Bases Information

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

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Category Letter & Title

Subcategory Number & Title

Initiating Condition (IC)

Site-specific description of the generic IC given in NEI 99-01 Rev. 5.

EAL Identifier (enclosed in rectangle)

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

- First character (letter): Corresponds to the EAL category as described above (R, E, C, H, S or F)
- 2. Second character (letter): The emergency classification (G, S, A or U)

G = General Emergency

S = Site Area Emergency

A = Alert

U = Unusual Event

Third character (number): Subcategory number within the given category.
 Subcategories are sequentially numbered beginning with the number one (1). If

a category does not have a subcategory, this character is assigned the number one (1).

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

Classification (enclosed in rectangle):

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

EAL (enclosed in rectangle)

Wording of the EAL as it appears in the EAL Classification Matrix

Mode Applicability

One or more of the following plant operating conditions comprise the mode to which each EAL is applicable: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby, 5 - Cold Shutdown, 6 - Refuel, D - Defueled, or All. (See Section 2.8 for operating mode definitions)

Basis:

A Generic basis section provides a description of the rationale for the EAL as provided in NEI 99-01 Rev. 5. This is followed by a Plant-Specific basis section that provides Ginna-relevant information concerning the EAL. If the EAL wording contains a defined term, the definition of the term is included at the end of the plant-specific basis discussion.

Ginna Basis Reference(s):

Site-specific source documentation from which the EAL is derived

2.8 Operating Mode Applicability (Based on Technical Specifications Table 1.1-1)

1 Power Operation

Reactor shutdown margin is less than Technical Specification minimum required ($K_{eff} \ge 0.99$) and greater than 5% rated thermal power (excluding decay heat).

2 Startup

Reactor shutdown margin is less than Technical Specification minimum required ($K_{eff} \ge 0.99$) and less than or equal to 5% rated thermal power (excluding decay heat).

3 Hot Shutdown

Reactor shutdown margin greater than Technical Specification minimum required ($K_{eff} < 0.99$) with coolant temperature (Tavg) greater than or equal to 350°F.

4 Hot Standby

Reactor shutdown margin greater than Technical Specification minimum required $(k_{eff} < 0.99)$ with coolant temperature (Tavg) less than 350°F and greater than 200°F (all reactor vessel head closure bolts fully tensioned).

5 Cold Shutdown

Reactor shutdown margin greater than Technical Specification minimum required $(K_{eff} < 0.99)$ with coolant temperature (Tavg) less than or equal to 200°F (all reactor vessel head closure bolts fully tensioned).

6 <u>Refuel</u>

One or more reactor vessel head closure bolts less than fully tensioned.

D <u>Defueled</u>

All reactor fuel removed from reactor pressure vessel (full core off load during refueling or extended outage).

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

2.9 Validation of Indications, Reports and Conditions

All EALs and Fission Product Barrier thresholds assume valid indications. All emergency classifications shall be based upon valid indications, reports or conditions. An indication,

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

2.10 Planned vs. Unplanned Events

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

2.11 Classifying Transient Events

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

Existing guidance for classifying transient events addresses the period of time of event recognition and classification (15 minutes). However, in cases when EAL declaration criteria may be met momentarily during the normal expected response of the plant,

declaration requirements should not be considered to be met when the conditions are a part of the designed plant response, or result from appropriate Operator actions.

There may be cases in which a plant condition that exceeded an EAL was not recognized at the time of occurrence but is identified well after the condition has occurred (e.g., as a result of routine log or record review), and the condition no longer exists. In these cases, an emergency should not be declared. Reporting requirements of 10 CFR 50.72 are applicable and the guidance of NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73, should be applied.

2.12 Multiple Simultaneous Events and Imminent EAL Thresholds

When multiple simultaneous events occur, the emergency classification level is based on the highest EAL reached. For example, two Alerts remain in the Alert category. Or, an Alert and a Site Area Emergency is a Site Area Emergency. Further guidance is provided in RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events.

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

2.13 Emergency Classification Level Downgrading

Another important aspect of usable EAL guidance is the consideration of what to do when the risk posed by an emergency is clearly decreasing. A combination approach involving recovery from General Emergencies and some Site Area Emergencies and termination from Unusual Events, Alerts, and certain Site Area Emergencies causing no long term plant damage appears to be the best choice. Downgrading to lower emergency classification levels adds notifications but may have merit under certain circumstances.

3.0 **REFERENCES**

3.1 Developmental

- 3.1.1 NEI 99-01 Rev. 5 Final, Methodology for Development of Emergency Action Levels, February 2008, ADAMS Accession Number ML080450149
- 3.1.2 NRC Regulatory Issue Summary (RIS) 2003-18, Supplement 2, Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels Revision 4, Dated January 2003 (December 12, 2005)
- 3.1.3 RIS 2007-02 Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events, February 2, 2007.

3.2 Implementing

- 3.2.1 EPIP-1-0, Ginna Station Event Evaluation and Classification
- 3.2.2 EAL Comparison Matrix
- 3.2.3 EAL Matrix
- 3.3 Commitments

None



4.0 DEFINITIONS (ref. 3.1.1 except as noted)

Affecting Safe Shutdown

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

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

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

Airliner/Large Aircraft

Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

Bomb

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

Civil Disturbance

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

Confinement Boundary

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

Containment Closure

The site-specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to Ginna, Containment Closure is the action or condition that ensures Containment and its associated systems, structures or components (SSC), as listed in O-2.3.1A, provide a functional barrier to fission product release.

Explosion

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

Extortion

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

Faulted

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

Fire

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

Hostage

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

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Hostile Force

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

Imminent

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

Intrusion

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

Independent Spent Fuel Storage Installation (ISFSI)

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

Normal Levels

As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.



Normal Plant Operations

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

Owner Controlled Area

The site-specific facilities and property outside the the security Protected Area fence.

Projectile

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

Protected Area

The site specific area which normally encompasses all controlled areas within the security Protected Area fence.

RCS Intact

The RCS should be considered intact when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams).

Ruptured

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

Sabotage

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

Safety-Related Structures, Systems and Components (as defined in 10CFR50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

Security Condition

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

Site Boundary

The Site Boundary is approximately a 0.3-mile radius around the reactor.

Strike Action

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

Unisolable

A breach or leak that cannot be promptly isolated from the Main Control Board.

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

Valid

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

Visible Damage

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

Vital Area

Any area, normally within the Ginna Protected Area, that contains equipment, systems, components, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation.

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5.0 GINNA-TO-NEI 99-01 EAL CROSS-REFERENCE

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

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GINNA	NEI 99-01			
EAL	IC	Example EAL		
RU1.1	AU1	1, 2		
RU1.2	AU1	3		
RU2.1	AU2	1		
RU2.2	AU2	2		
RA1.1	AA1	1		
RA1.2	AA1	3		
RA2.1	AA2	2		
RA2.2	AA2	1		
RA3.1	AA3	1		
RS1.1	AS1	1		
RS1.2	AS1	2		
RS1.3	AS1	4		
RG1.1	AG1	1		
RG1.2	AG1	2		
RG1.3	AG1	4		
EU1.1	E-HU1	1		
CU1.1	CU3	1		

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GINNA	NEI	99-01	
EAL	IC	Example EAL	
CU2.1	CU7	1	
CU3.1	CU1	1	
CU3.2	CU2	1	
CU3.3	CU2	2	
CU4.1	CU4	1	
CU4.2	CU4	2	
CU5.1	CU6	1, 2	
CU6.1	CU8	2	
CA1.1	CA3	1	
CA3.1	CA1	1, 2	
CA4.1	CA4	1, 2	
CS3.1	CS1	1	
CS3.2	CS1	2	
CS3.3	CS1	3	
CG3.1	CG1	1	
FU1.1	FU1	1	
FA1.1	FA1	1	
FS1.1	FS1	1	
FG1.1	FG1	1	
HU1.1	HU1	1	
HU1.2	HU1	2	
HU1.3	HU1	3	
HU1.4	HU1	4	

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GINNA	NEI	99-01
EAL	IC	Example EAL
HU1.5	HU1	5
HU2.1	HU2	1
HU2.2	HU2	2
HU3.1	HU3	1
HU3.2	HU3	2
HU4.1	HU4	1, 2, 3
HU6.1	HU5	1.
HA1.1	HA1	1
 HA1.2	HA1	2
HA1.3	HA1	3
HA1.4	HA1	4
 HA1.5	HA1	6
HA1.6	HA1	5
HA2.1	HA2	1
HA3.1	HA3	1
. HA4.1	HA4	1, 2
HA5.1	HA5	1
HA6.1	HA6	1
HS4.1	HS4	1
HS5.1	HS2	1
HS6.1	HS3	1
HG4.1	HG1	1
HG4.2	HG1	2
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GINNA	NEI 99-01	
EAL	IC	Example EAL
HG6.1	HG2	1
SU1.1	SU1	1
SU3.1	SU8	2
SU4.1	SU2	1
SU5.1	SU3	1
SU6.1	SU6	1, 2
SU7.1	SU4	2
SU7.2	SU4	1
SU8.1	SU5	1, 2 [°]
SA1.1	SA5	1
SA3.1	SA2	1
SA5.1	SA4	1
SS1.1	SS1	1
SS2.1	SS3	1
SS3.1	SS2	1
SS5.1	SS6	1
SG1.1	SG1	1
SG3.1	SG2	1

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6.0 ATTACHMENTS

6.1 Attachment 1, Emergency Action Level Technical Bases

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

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ATTACHMENT 1

EMERGENCY ACTION LEVEL TECHNICAL BASES

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Category R - Abnormal Rad Release / Rad Effluent

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

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

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

Events of this category pertain to the following subcategories:

1. Offsite Rad Conditions

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

2. Onsite Rad Conditions & Spent Fuel Events

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

3. CR/CAS Rad

Sustained general area radiation levels which may preclude access to areas requiring continuous occupancy also warrant emergency classification.

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Category: R – Abnormal Rad Release / Rad Effluent
Subcategory: 1 – Offsite Rad Conditions
Initiating Canditian: ANX release of gaseous or liquid radioactivity to the environment

Initiating Condition: ANY release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer

EAL:

RU1.1 Unusual Event

ANY gaseous or liquid monitor reading > Table R-1 column "UE" for \geq 60 min. (Note 2)

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

Table R-1 Effluent Monitor Classification Thresholds				
Monitor	GE	SAE	Alert	UE
Gaseous				
CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan
(R-12)				5.1E+6 cpm w/ 2 fans
CNMT Vent Noble Gas Hi Range	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A
(R-12A - 7/9)				
Plant Vent Noble Gas	N/A	N/A	. N/A	6.0E+5 cpm
(R-14)				
Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A
(R-14A - 7/9)				
Air Ejector Noble Gas	N/A	N/A	: N/A	6.3E+5 cpm
(R-15)				
Air Ejector Noble Gas Hi Range				
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A
Main Steam Line				
(R-31/R-32)				
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A
<u>Liquid</u>				
Liquid Radwaste Effluent	N/A	N/A	N/A	3.6E+5 cpm
(R-18)				with no isolation
SFP HX Effluent				
(R-20A)	N/A	N/A	N/A	4.0E+4 cpm
(R-20B)	N/A	N/A	N/A	5.2E+3 cpm
Turbine Bldg FIr Drains				
(R-21)	N/A	N/A	N/A	5.0E+4 cpm
Hi Cond Waste				with no isolation
(R-22)	N/A	N/A	N/A	9.2E+4 cpm
				with no isolation



Mode Applicability:

All

Basis:

Generic

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

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

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

The 2x ODCM limit multiples are specified only to distinguish between non-emergency conditions. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

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

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

This EAL addresses radioactivity releases, that for whatever reason, cause effluent radiation monitor readings to exceed the threshold identified in the IC established by the radioactivity discharge permit. This value may be associated with a planned batch release, or a continuous release path.

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

Plant-Specific

Monitor indications are derived from release limits determined by the ODCM methodology and specified offsite dose criteria (ref. 1). These values are summarized in Reference 2.

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.

Ginna Basis Reference(s):

- 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor Emergency Action Levels (EALs)
- 3. NEI 99-01 AU1

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Category:	R – Abnormal Rad Release / Rad Effluent		
Subcategory:	1 – Offsite Rad Conditions		
Initiating Condition:	ANY release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer		

EAL:

RU1.2 Unusual Event

Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x P-9 limits for \ge 60 min. (Note 2)

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

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

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

The 2x P-9 (ODCM) limit multiples are specified only to distinguish between non-emergency conditions. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged. For example, a release exceeding 4x P-9 (ODCM) for 30 minutes does not meet the threshold.

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

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

Plant-Specific

Offsite Dose Calculation Manual (ODCM) release limits are specified in Technical Procedure P-9 (ref. 1).

Releases in excess of two times the site ODCM (ref. 2) instantaneous limits that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes. Therefore, it is not intended that the release be averaged over 60 minutes. For example, a release of 4 times the ODCM limit for 30 minutes does not exceed this initiating condition. Further, the ED 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.

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 3. NEI 99-01 AU1



Category:R – Abnormal Rad Release / Rad EffluentSubcategory:1 – Offsite Rad ConditionsInitiating Condition:ANY release of gaseous or liquid radioactivity to the environment
greater than 200 times the ODCM for 15 minutes or longer

EAL:

RA1.1 Alert

ANY gaseous monitor reading > Table R-1 column "Alert" for \geq 15 min. (Note 2)

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

Table R-	1 Effluent Mor	nitor Classifica	tion Thresholds	
Monitor	GE	SAE	Alert	UE
Gaseous				
CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan
(R-12)				5.1E+6 cpm w/ 2 fans
CNMT Vent Noble Gas Hi Range	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A
(R-12A - 7/9)				
Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm
(R-14)				
Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A
(R-14A - 7/9)				
Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm
(R-15)				
Air Ejector Noble Gas Hi Range				
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A
Main Steam Line				
(R-31/R-32)				
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	 8.0E+0 mR/hr
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A
Liquid				
Liquid Radwaste Effluent	N/A	N/A	N/A	3.6E+5 cpm
(R-18)				with no isolation
SFP HX Effluent				
(R-20A)	N/A	N/A	N/A	4.0E+4 cpm
(R-20B)	N/A	N/A	N/A	5.2E+3 cpm
Turbine Bldg Flr Drains				•
(R-21)	N/A	N/A	N/A	5.0E+4 cpm
Hi Cond Waste				with no isolation
(R-22)	N/A	N/A	N/A	9.2E+4 cpm
				with no isolation

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

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

The value of 1% (10 mrem) of the EPA PAG threshold (in lieu of 200 times the ODCM release rate limit) is specified to provide a realistic escalation path between the Unusual Event and Site Area Emergency classifications for gaseous releases. While these thresholds obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant. Releases should not be prorated or averaged. For example, a release exceeding 600x ODCM for 5 minutes does not meet the threshold.

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

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

Plant-Specific

The values shown correspond to a dose of 10 mrem in one hour at the site boundary. Monitor indications are calculated (ref. 2) based on annual average X/Q dispersion factors from the ODCM (ref. 1) and a source term representative of accident conditions. For the main steam line monitors (R-31/32), the variability of results based upon the number of ARVs and/or Main Steam Safety Valves precludes the use of any single default value for these monitors. For these cases, adjustments are made for expected flow rates.

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.

Ginna Basis Reference(s):

- 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor Emergency Action Levels (EALs)
- 3. NEI 99-01 AA1

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Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory:	1 – Offsite Rad Conditions
Initiating Condition:	ANY release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer

EAL:

RA1.2 Alert

Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x P-9 limits for \ge 15 min. (Note 2)

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

Mode Applicability:

All

Basis:

Generic

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

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

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

The 200x ODCM limit are specified only to distinguish between non-emergency conditions. While these multiples obviously correspond to an off-site dose or dose rate, the emphasis in classifying these events is the degradation in the level of safety of the plant, not the magnitude of the associated dose or dose rate.

Releases should not be prorated or averaged. For example, a release exceeding 600x ODCM for 5 minutes does not meet the threshold.

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

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

Plant-Specific

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Offsite Dose Calculation Manual (ODCM) release limits are specified in Technical Procedure P-9 (ref. 1).

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Releases in excess of two hundred times the site ODCM (ref. 2) instantaneous limits that continue for 15 minutes or longer represent an uncontrolled situation and hence, a potential significant degradation in the level of safety. The final integrated dose (which is very low in the Alert emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not isolated within 15 minutes. Therefore, it is not intended that the release be averaged over 15 minutes. For example, a release of 400 times the ODCM limit for 7.5 minutes does not exceed this initiating condition. Further, the ED 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.

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 3. NEI 99-01 AA1

Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory:	1 – Offsite Rad Conditions
Initiating Condition:	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

RS1.1 Site Area Emergency

ANY gaseous monitor reading > Table R-1 column "SAE" for \geq 15 min. (Note 1)

- Do not delay declaration awaiting dose assessment results
- If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RS1.2)

Note 1:	The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is
	determined that the condition will likely exceed the applicable time

Table R-1 Effluent Monitor Classification Thresholds				
Monitor	GE	SAE	Alert	UE
Gaseous CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan
(R-12)				5.1E+6 cpm w/ 2 fans
CNMT Vent Noble Gas Hi Range (R-12A - 7/9)	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A
Plant Vent Noble Gas (R-14)	N/A	N/A	N/A	6.0E+5 cpm
Plant Vent Noble Gas Hi Range (R-14A - 7/9)	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A
Air Ejector Noble Gas (R-15)	N/A	_ N/A	Ņ/A	6.3E+5 cpm
Air Ejector Noble Gas Hi Range				
(R-48) Main Steam Line	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A
(R-31/R-32)				
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A
Liquid				
Liquid Radwaste Effluent	N/A	N/A	N/A	3.6E+5 cpm
(R-18)				with no isolation
SFP HX Effluent				
(R-20A)	N/A	N/A	N/A	4.0E+4 cpm
(R-20B)	N/A	N/A	N/A	5.2E+3 cpm
Turbine Bldg Flr Drains				
(R-21)	N/A	N/A	N/A	5.0E+4 cpm
Hi Cond Waste			ſ	with no isolation
(R-22)	N/A	N/A	Ń/A	9.2E+4 cpm
				with no isolation

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Mode Applicability:

All

Basis:

<u>Generic</u>

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

The site specific monitor list in Table R-1 includes effluent monitors on all potential release pathways.

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

Plant-Specific

The values shown correspond to a dose of 100 mrem in one hour at the site boundary. Monitor indications are calculated (ref. 2) based on annual average X/Q dispersion factors from the ODCM (ref. 1) and a source term representative of accident conditions. For the main steam line monitors (R-31/32), the variability of results based upon the number of ARVs and/or Main Steam Safety Valves precludes the use of any single default value for these monitors. For these cases, adjustments are made for expected flow rates.

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.

Ginna Basis Reference(s):

- 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor Emergency Action Levels (EALs)
- 3. NEI 99-01 AS1

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Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory:	1 – Offsite Rad Conditions
Initiating Condition:	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

RS1.2 Site Area Emergency

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

Mode Applicability:

All

Basis:

Generic

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

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

Plant-Specific

The 100 mRem TEDE dose is set at 10% of the EPA PAG, while the 500 mRem thyroid

CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Dose assessment may be performed by either manual or computer based methods (ref. 1,

2, 3).

Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

- 1. EPIP-2-18 Control Room Dose Assessment
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method
- 3. EPIP-2-4 Emergency Dose Projections Manual Method
- 4. NEI 99-01 AS1

Category: R – Abnormal Rad Release / Rad Effluent

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Subcategory: 1 – Offsite Rad Conditions

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

EAL:

RS1.3 Site Area Emergency

Field survey results indicate closed window dose rates > 100 mRem/hr expected to continue for \ge 60 min. at or beyond the site boundary

OR

Analyses of field survey samples indicate thyroid CDE > 500 mRem for 1 hr of inhalation at or beyond the site boundary

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

Plant-Specific

Real time field surveys and sample analysis is performed by offsite field monitoring teams per EPIP-2-12 "Offsite Surveys" (ref. 1) and assessed for radiological dose consequences per EPIP-2-5 " Emergency Dose Projections - Personal Computer Method" (ref. 2).

Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

- 1. EPIP-2-12 Offsite Surveys
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method
- 3. NEI 99-01 AS1

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Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:	1 – Offsite Rad Conditions	
Initiating Condition:	 Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology 	

EAL:

RG1.1 General Emergency

ANY gaseous monitor reading > Table R-1 column "GE" for \geq 15 min. (Note 1)

- Do **not** delay declaration awaiting dose assessment results
- If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RG1.2)

Note 1:	The ED should not wait until the applicable time has elapsed, but should declare the ever	nt as soon as it is
	determined that the condition will likely exceed the applicable time	

Table R-1 Effluent Monitor Classification Thresholds				
Monitor	GE	SAE	Alert	UE
Gaseous				
CNMT Vent Noble Gas	N/A	N/A	N/A	7.4E+6 cpm w/ 1 fan
(R-12)				5.1E+6 cpm w/ 2 fans
CNMT Vent Noble Gas Hi Range	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A
(R-12A - 7/9)				
Plant Vent Noble Gas	N/A	N/A	N/A	6.0E+5 cpm
(R-14)				
Plant Vent Noble Gas Hi Range	2.1E+1 µC/cc	2.1E+0 µC/cc	2.1E-1 µC/cc	N/A
(R-14A - 7/9)				
Air Ejector Noble Gas	N/A	N/A	N/A	6.3E+5 cpm
(R-15)				
Air Ejector Noble Gas Hi Range				
(R-48)	5.7E+2 µC/cc	5.7E+1 µC/cc	5.7E+0 µC/cc	N/A
Main Steam Line				
(R-31/R-32)				
1 ARV	5.0E+3 mR/hr	5.0E+2 mR/hr	5.0E+1 mR/hr	8.0E+0 mR/hr
1 Safety	2.3E+3 mR/hr	2.3E+2 mR/hr	2.3E+1 mR/hr	3.7E+0 mR/hr
2 Safety	1.1E+3 mR/hr	1.1E+2 mR/hr	1.1E+1 mR/hr	N/A
3 Safety	7.7E+2 mR/hr	7.7E+1 mR/hr	7.7E+0 mR/hr	N/A
4 Safety	5.7E+2 mR/hr	5.7E+1 mR/hr	5.7E+0 mR/hr	N/A
Liquid				
Liquid Radwaste Effluent	N/A	N/A	N/A	3.6E+5 cpm
(R-18)				with no isolation
SFP HX Effluent				
(R-20A)	N/A	N/A	N/A	4.0E+4 cpm
(R-20B)	N/A	N/A	N/A	5.2E+3 cpm
Turbine Bldg Flr Drains				
(R-21)	N/A	N/A	N/A	5.0E+4 cpm
Hi Cond Waste				with no isolation
(R-22)	N/A	N/A	N/A	9.2E+4 cpm
				with no isolation

Mode Applicability:

All

Basis:

Generic

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

The monitor list in Table R-1 includes effluent monitors on all potential release pathways.

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

Plant-Specific

The values shown correspond to a dose of 1000 mrem in one hour at the site boundary. Monitor indications are calculated (ref. 2) based on annual average X/Q dispersion factors from the ODCM (ref. 1) and a source term representative of accident conditions. For the main steam line monitors (R-31/32), the variability of results based upon the number of ARVs and/or Main Steam Safety Valves precludes the use of any single default value for these monitors. For these cases, adjustments are made for expected flow rates.

A radiation monitor reading is valid when a release path is established. If the release path to the environment has been isolated, the radiation monitor reading is not valid for classification.



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Ginna Basis Reference(s):

- 1. R. E. Ginna Nuclear Power Plant Off-Site Dose Calculation Manual (ODCM)
- 2. CALC-2011-0020, NEI 99-01 Technical Basis for the Ginna Effluent Monitor Emergency Action Levels (EALs)
- 3. NEI 99-01 AG1

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Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:	1 – Offsite Rad Conditions	
Initiating Condition:	Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology	

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EAL:

RG1.2 General Emergency

Dose assessment using actual meteorology indicates doses > 1,000 mRem TEDE or 5,000 mRem thyroid CDE at or beyond the site boundary

Mode Applicability:

All

Basis:

Generic

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

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

Plant-Specific

The 1000 mRem TEDE dose is set at 100% of the EPA PAG, while the 5000 mRem

thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Dose assessment may be performed by either manual or computer based methods (ref. 1, 2, 3).

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

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- 1. EPIP-2-18 Control Room Dose Assessment
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method
- 3. EPIP-2-4 Emergency Dose Projections Manual Method
- 4. NEI 99-01 AG1

EMERGENCY ACTION LEVEL
TECHNICAL BASES DOCUMENT

Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory:	1 – Offsite Rad Conditions
Initiating Condition:	Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology

EAL:

RG1.3 General Emergency

Field survey results indicate closed window dose rates > 1,000 mRem/hr expected to continue for \ge 60 min. at or beyond the site boundary

OR

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

Mode Applicability:

All

Basis:

Generic

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

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

Plant-Specific

Real time field surveys and sample analysis are performed by offsite field monitoring teams per EPIP-2-12 "Offsite Surveys" (ref. 1) and assessed for radiological dose

consequences per EPIP-2-5 " Emergency Dose Projections - Personal Computer Method"

(ref. 2).



Definitions:

Site Boundary

The site boundary is approximately a 0.3-mile radius around the reactor.

Ginna Basis Reference(s):

- 1. EPIP-2-12 Offsite Surveys
- 2. EPIP-2-5 Emergency Dose Projections Personal Computer Method
- 3. NEI 99-01 AG1

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Category:	R – Abnormal Rad Release / Rad Effluent	
Subcategory:	2 – Onsite Rad Conditions & Spent Fuel Events	
Initiating Condition:	Unplanned rise in plant radiation levels	

EAL:

RU2.1 Unusual Event

Unplanned water level drop in a reactor refueling pathway as indicated by inability to restore and maintain level > SFP low water level alarm setpoint (Note 3)

AND

Area radiation monitor reading rise on EITHER:

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R-2 Containment

OR

R-5 Spent Fuel Pool

Note 3: If loss of water level in the refueling pathway occurs while in Mode 5, 6 or D, consider classification under EALs CU3.1, CU3.2 or CU3.3

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

For refueling events where the water level drops below the Reactor Vessel flange classification would be via EAL CU3.1, CU3.2 or CU3.3. This event escalates to an Alert per EAL RA2.1 if irradiated fuel outside the reactor vessel is uncovered. For events involving irradiated fuel in the reactor vessel, escalation would be via the Fission Product Barrier Table for events in operating modes 1-4.

Plant-Specific

The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

The SFP is equipped with a level switch (LC-661) that actuates a low level alarm at 20 in. from the top of the SFP (ref. 1). The minimum level per Technical Specifications is 23 feet above the fuel seated in the SFP (ref. 2).

The definition of "... cannot be restored and maintained above..." allows the operator to visually observe the low water level condition, if possible, and to attempt water level restoration instructions as long as water level remains above the top of irradiated fuel.

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

Technical Specifications requires that refueling cavity water level be maintained 23 ft above irradiated fuel seated in the reactor vessel when moving fuel (ref. 3).

Area radiation monitors R-2 and R-5 are located in the proximity of where spent fuel may be located and have been selected to be indicative of a decrease in radiation shielding due to decreasing refueling pathway water level (ref. 4). While a radiation monitor could detect a rise in dose due to a drop in the water level, it might not be a reliable indication, in and of itself, of whether or not the fuel is uncovered. For example, the reading on an area radiation monitor located on the refueling bridge may rise due to planned evolutions such as head lift, or even a fuel assembly being raised in the manipulator mast. Elevated radiation monitor indications will need to be combined with another indicator (or personnel report) of water loss.

This event escalates to an Alert if irradiated fuel outside the reactor vessel is uncovered.

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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- 1. AR-K-29 SFP HI TEMP 115 °F HI-LO LEVEL 20" 12"
- 2. Technical Specifications Section 3.7.11 Spent Fuel Pool (SFP) Water Level
- 3. Technical Specifications Section 3.9.6 Refueling Cavity Water Level
- 4. P-9 Radiation Monitoring System
- 5. NEI 99-01 AU2



Category:	R – Radioactivity Release / Area Radiation
Subcategory:	2 – Onsite Rad Conditions & Spent Fuel Events
Initiating Condition:	Unplanned rise in plant radiation levels
EAL:	· ·

RU2.2 Unusual Event

Unplanned area radiation reading increases by a factor of 1,000 over normal levels

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL addresses increased radiation levels as a result of water level decreases above irradiated fuel or events that have resulted, or may result, in unplanned increases in radiation dose rates within plant buildings.

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

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

Plant-Specific

Assessment of this EAL may be made with survey readings using portable instruments as

well as installed radiation monitors.

Definitions:

Normal Levels

As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

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Ginna Basis Reference(s):

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1. NEI 99-01 AU2

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Category:	R – Abnormal Rad Release / Rad Effluent
Subcategory:	2 – Onsite Rad Conditions & Spent Fuel Events
Initiating Condition:	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the Reactor Vessel
EA1 -	

EAL:

RA2.1 Alert

Alarm on **ANY** of the following radiation monitors due to damage to irradiated fuel or loss of water level:

- R-12 Containment Vent Noble Gas
- R-14 Plant Vent Noble Gas
- R-2 Containment
- R-5 Spent Fuel Pool

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

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

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

Escalation of this emergency classification level, if appropriate, would be based on RS1.1, RS1.2, RS1.3, RG1.1, RG1.2 or RG1.3.

Plant-Specific

This EAL is defined by the specific areas where irradiated fuel is located such as the

refueling cavity, reactor vessel, or spent fuel pool.

The bases for the area radiation alarms include a spent fuel handling accident and are, therefore, appropriate for this EAL. Elevated readings on ventilation monitors may also be indication of a radioactivity release from the fuel, confirming that damage has occurred (ref. 1). However, elevated background at the monitor due to water level lowering may mask elevated ventilation exhaust airborne activity and needs to be considered. However, while radiation monitors may detect a rise 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 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. Interpretation of these EAL thresholds requires some understanding of the actual radiological conditions present in the vicinity of the monitors.

- 1. P-9 Radiation Monitoring System
- 2. NEI 99-01 AA2

	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT	EPAD-XX Revision [Draft H] Page 63 of 278
Category: Subcategory:	R – Abnormal Rad Release / Rad Effluent 2 – Onsite Rad Conditions & Spent Fuel Even	ts
Initiating Condition:		
EAL		

EAL:

RA2.2 Alert

A water level drop in a reactor refueling pathway that will result in irradiated fuel becoming uncovered

Mode Applicability:

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All

Basis:

<u>Generic</u>

This event represents a loss of control over radioactive material and represents an actual or substantial potential degradation in the level of safety of the plant.

Escalation of this emergency classification level, if appropriate, would be based on RS1.1, RS1.2, RS1.3, RG1.1, RG1.2 or RG1.3.

Plant-Specific

The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

There is no indirect indication that water level in the spent fuel pool or refueling cavity has dropped to the level of the fuel other than visual observation. Since there is no level indicating system in the fuel transfer canal, visual observation of loss of water level would also be required. If available, video cameras may allow remote observation. Depending on available level indication, the declared threshold may need to be based on indications of makeup rate or lowering in Reactor Coolant Drain Tank (RCDT) level (ref. 1).

The movement of irradiated fuel assemblies within containment requires a minimum water level of 23 ft above the reactor vessel flange and the top of spent fuel in the SFP. During refueling activities, this maintains sufficient water level in the refueling cavity, fuel transfer

canal and SFP. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident (ref. 2, 3).

Allowing level to decrease could result in spent fuel being uncovered, reducing spent fuel decay heat removal and creating an extremely hazardous radiation environment.

- 1. ER-SFP.1 Loss of Spent Fuel Pool Cooling
- 2. Technical Specifications Section 3.9.6 Refueling Cavity Water Level
- 3. Technical Specifications Section 3.7.11 Spent Fuel Pool (SFP) Water Level
- 4. NEI 99-01 AA2

	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT	EPAD-XX Revision [Draft H] Page 65 of 278
Category:	R – Abnormal Rad Release / Rad Effluent	.* .
Subcategory:	3 – CR/CAS Rad	
Initiating Condition:	Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions	
EAL:		

RA3.1 Alert

Dose rates > 15 mRem/hr in **EITHER** of the following areas requiring continuous occupancy to maintain plant safety functions:

Control Room (R-1) OR

CAS

Mode Applicability:

All

Basis:

<u>Generic</u>

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

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

Areas requiring continuous occupancy include the Control Room and any other control stations that are staffed continuously, such as the security alarm stations CAS and SAS.

Plant-Specific

The Control Room and Central Alarm Station (CAS) must be continuously occupied in all plant operating modes at Ginna.

Area radiation monitor (ARM) R-1 detects radiation levels in the vicinity of the main Control

Room. This ARM alarms at 2 mR/hr giving personnel sufficient warning of changing levels

(ref. 1). There is no area radiation monitoring system at Ginna for the CAS. Abnormal

radiation levels may be initially detected by routine radiological surveys.

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Ginna Basis Reference(s):

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- 1. P-9 Radiation Monitoring System
- 2. NEI 99-01 AA3

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<u>Category E – Independent Spent Fuel Storage Installation (ISFSI)</u>

EAL Group: Not Applicable (the EAL in this category is applicable independent of plant operating mode)

An independent spent fuel storage installation (ISFSI) is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask/canister must escape its packaging and enter the biosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety.

A Notification of Unusual Event is declared on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask/canister confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

A hostile security event that leads to a potential loss in the level of safety of the ISFSI is a classifiable event under Security category EAL HA4.1.

Minor surface damage that does not affect storage cask/canister boundary is excluded from the scope of these EALs.

 Category:
 E – ISFSI

 Subcategory:
 Not Applicable

 Initiating Condition:
 Damage to a loaded cask confinement boundary

 EAL:

EU1.1 Unusual Event

Damage to a loaded cask confinement boundary

Mode Applicability:

Not applicable

Basis:

<u>Generic</u>

An UE in this EAL is categorized on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Plant-Specific

The Ginna ISFSI utilizes the NUHOMS dry spent fuel storage system.

This EAL addresses any condition which indicates a loss of a cask confinement boundary

and thus a potential degradation in the level of safety of the ISFSI. The cask confinement

boundary is considered the Dry Shielded Canister (DSC).

Definitions:

Confinement Boundary

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

Independent Spent Fuel Storage Installation (ISFSI)

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

Ginna Basis Reference(s):

1. R. E. Ginna ISFSI USAR

2. NEI 99-01 E-HU1



Category C – Cold Shutdown / Refueling System Malfunction

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

Category C EALs are directly associated with cold shutdown or refueling system safety functions. Given the variability of plant configurations (e.g., systems out-of-service for maintenance, containment open, reduced AC power redundancy, time since shutdown) during these periods, the consequences of any given initiating event can vary greatly. For example, a loss of decay heat removal capability that occurs at the end of an extended outage has less significance than a similar loss occurring during the first week after shutdown. Compounding these events is the likelihood that instrumentation necessary for assessment may also be inoperable. The cold shutdown and refueling system malfunction EALs are based on performance capability to the extent possible with consideration given to RCS integrity, containment closure, and fuel clad integrity for the applicable operating modes (5 - Cold Shutdown, 6 - Refuel, D – Defueled).

The events of this category pertain to the following subcategories:

1. Loss of AC Power

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

2. Loss of DC Power

Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of power to the 125 VDC buses.

3. RCS Level

Reactor Vessel or RCS water level is directly related to the status of adequate core cooling and, therefore, fuel clad integrity. RCS levels associated with Category C EALs are listed in Table C-5.

4. RCS Temperature

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

5. Communications

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

6. Inadvertent Criticality

Inadvertent criticalities pose potential personnel safety hazards as well as being indicative of losses of reactivity control.

		ACTION LEVEL SES DOCUMENT	EPAD-XX Revision [Draft H] Page 71 of 278
Category:	C – Cold Shutdown /	Refueling System Malfund	ction
Subcategory:	1 – Loss of AC Powe	r .	· · · ·
Initiating Condition:	AC power capability to 480V safeguards buses reduced to a single power source for ≥15 min. such that ANY additional single failure would result in a complete loss of all 480V safeguards bus power		
EAL:			

CU1.1 Unusual Event

AC power capability to 480V safeguards buses reduced to a single power source, Table C-1, for \geq 15 min. (Note 4)

AND

Any additional single power source failure will result in a complete loss of all 480V safeguards bus power

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

	Table C-1 AC Power Sources
Onsite	 EDG 1A (Safeguard train A, Buses 14 & 18) EDG 1B (Safeguard train B, Buses 16 & 17)
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established)

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel, D - Defueled

Basis:

<u>Generic</u>

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a complete loss of 480V safeguards bus AC power. This condition could occur due to a loss of off-site power with a concurrent failure of one emergency generator to supply power to its emergency bus. The subsequent loss of this single power source would escalate the event to an Alert in accordance with EAL CA1.1.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power.

Plant-Specific

Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., charging pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are specifically included in Table C-1 because service water pump operation is necessary for decay heat removal while in cold conditions.

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and an Unusual Event must be declared.

There are two onsite emergency AC power sources available in the cold modes:

- EDG 1A
- EDG 1B

The fifteen-minute interval was selected as a threshold to exclude transient power losses. If multiple sources fail to be capable of supplying one or more safety-related buses within

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15 minutes, an Unusual Event is declared under this EAL. The subsequent loss of the single remaining power source escalates the event to an Alert under EAL CA1.1.

Ginna Basis Reference(s):

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1. UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System

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2. NEI 99-01 CU3

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0.1	O O o bil Ob stoles un / Dofe o liner Osotore Molfsur	- 41
Category:	C – Cold Shutdown / Refueling System Malfur	ICTION
Subcategory:	1 – Loss of AC Power	
Initiating Condition:	Loss of all offsite and all onsite AC power to 4 buses for \geq 15 min.	80V safeguards

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EAL:

CA1.1 Alert

Loss of **all** offsite and **all** onsite AC power, Table C-1, to 480V safeguards buses for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

	Table C-1 AC Power Sources
Onsite	 EDG 1A (Safeguard train A, Buses 14 & 18) EDG 1B (Safeguard train B, Buses 16 & 17)
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established)

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel, D - Defueled

Basis:

<u>Generic</u>

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink.

The event can be classified as an Alert when in cold shutdown, refueling, or defueled mode because of the significantly reduced decay heat and lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL.

Escalating to Site Area Emergency, if appropriate, is by EALs in Category R.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Plant-Specific

Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., charging pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are specifically included in Table C-1 because service water pump operation is necessary for decay heat removal while in cold conditions.

There are three offsite power sources available to these buses in the cold modes (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and Alert must be declared.

There are two onsite emergency AC power sources available in the cold modes:

- EDG 1A
- EDG 1B

The fifteen-minute interval was selected as a threshold to exclude transient power losses. If all sources fail to be capable of supplying all safety-related buses within 15 minutes, an Alert is declared under this EAL.

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- 1. UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System
- 2. NEI 99-01 CA3



Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Loss of DC Power

Initiating Condition: Loss of **required** DC power for \ge 15 min.

EAL:

CU2.1 Unusual Event

< 108 VDC on **required** 125 VDC buses for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

The purpose of this EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Plant-Specific

The 125 VDC vital system is divided into two independent and isolated channels. Each channel consists of one battery, two battery chargers, one DC bus and one inverter. Each inverter has an associated vital AC distribution panel board. Power to the DC bus, DC unit control panels, and inverters is supplied by the station batteries and/or the battery chargers. Each battery charger is fully rated and can recharge a discharged battery while at the same time supplying the steady state power requirements of the system.

A separate TSC Battery system is designed with an intertie to each of the two main (A and B) distribution panels for use during maintenance and abnormal conditions.

The safety-related station batteries have been sized to carry their expected shutdown loads following a plant trip and loss of offsite power or following a station blackout without battery terminal voltage falling below 108.6 volts for a period of 4 hours (ref. 1).

The fifteen-minute interval was selected as a threshold to exclude transient or momentary power losses.

The loss of the TSC Battery does not constitute an entry condition for this EAL.

This EAL is the cold condition equivalent of the hot condition loss of DC power EAL SS2.1.

Ginna Basis Reference(s):

- 1. UFSAR Section 8.3.2 Direct Current Power Systems
- 2. O-6.13 Daily Surveillance Log
- 3. NEI 99-01 CU7

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Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Level

Initiating Condition: RCS leakage

EAL:

CU3.1 Unusual Event

RCS leakage results in the inability to maintain or restore RCS level within the target band established by procedure for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Mode Applicability:

5 - Cold Shutdown

Basis:

Generic

This EAL is considered to be a potential degradation of the level of safety of the plant. The inability to maintain or restore level is indicative of loss of RCS inventory.

Relief valve normal operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated.

Prolonged loss of RCS inventory may result in escalation to the Alert emergency classification level via either EAL CA2.1 or EAL CA3.1.

Plant-Specific

This EAL is applicable if RCS level cannot be restored and maintained within the

prescribed target band specified by procedure.

- 2. AP-RCS.1, Reactor Coolant Leak
- 3. NEI 99-01 CU1

Category:	C – Cold Shutdown / Refueling System Malfunction	
Subcategory:	3 – RCS Level	· .

Initiating Condition: RCS Leakage

EAL:

CU3.2 Unusual Event

Unplanned RCS level drop below **EITHER** of the following for ≥ 15 min. (Note 4): Reactor Vessel flange (84 in. on loop level indicators) (when the level band is established above the flange)

OR

RCS level target band established by procedure (when the level band is established below the flange)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Mode Applicability:

6 - Refuel

Basis:

<u>Generic</u>

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RCS water level below the Reactor Vessel flange are carefully planned and procedurally controlled. An unplanned event that results in water level decreasing below the Reactor Vessel flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the Reactor Vessel flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

The allowance of 15 minutes was chosen because it is reasonable to assume that level can be restored within this time frame using one or more of the redundant means of refill that should be available. If level cannot be restored in this time frame then it may indicate a more serious condition exists.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either EAL CA2.1 or EAL CA3.1.

This EAL involves a decrease in RCS level below the top of the Reactor Vessel flange that continues for 15 minutes due to an unplanned event. This EAL is not applicable to decreases in flooded reactor cavity level, which is addressed by EAL RU2.1, until such time as the level decreases to the level of the vessel flange.

Plant-Specific

The Reactor Vessel flange level (uncorrected) is at 84 in. (252' 6" ele.) on Loop A & B Level Indicators (LIT-432A and B) (ref. 1, 2).

This EAL involves a lowering in RCS level below the top of the Reactor Vessel flange, or the inability to maintain water level above the intended level when level is being intentionally maintained below the flange, that continues for fifteen minutes due to an unplanned event. This EAL is not applicable to drops in flooded refueling pool level (covered by lowering spent fuel pool water level in EAL RU2.1) until such time as the level lowers to the level of the vessel flange. If level continues to lower and reaches the bottom of the RCS Hot Leg reference level (0 in. indicated), escalation to the Alert level under EAL CA3.1 would be appropriate. If the level lowering is accompanied by RCS heatup, escalation to the Alert level under EAL CA4.1 may also be appropriate.

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel 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. Reactor Vessel water level is normally monitored in Refuel mode using the following instruments (ref. 3,5,6):

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass
- Cavity Water Level

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

- 1. RF-601 Fuel Handling Accident Instructions
- 2. O-2.3 Draining the Reactor Coolant System to < 84" but > 64"
- 3. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 4. NEI 99-01 CU2
- 5. O-15.1 Administrative Requirement Checklist for Entry to Mode 6 and Refueling Conditions
- 6. O-6.13 Daily Surveillance Log

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Category: C – Cold Shutdown / Refueling System Malfunction

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Subcategory: 3 – RCS Level

Initiating Condition: RCS Leakage

EAL:

CU3.3 Unusual Event

RCS level **cannot** be monitored with a loss of RCS inventory as indicated by an unexplained level rise in **ANY** Table C-2 sump / tank attributable to RCS leakage

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Mode Applicability:

6 - Refuel

Basis:

Generic

This EAL is a precursor of more serious conditions and considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease RCS water level below the Reactor Vessel flange are carefully planned and procedurally controlled. An UNPLANNED event that results in water level decreasing below the Reactor Vessel flange, or below the planned RCS water level for the given evolution (if the planned RCS water level is already below the Reactor Vessel flange), warrants declaration of a UE due to the reduced RCS inventory that is available to keep the core covered.

Continued loss of RCS Inventory will result in escalation to the Alert emergency classification level via either EAL CA3.1 or EAL CA4.1.

This EAL addresses conditions in the Refuel mode when normal means of core temperature indication and RCS level indication may not be available. Redundant means of RCS level indication will normally be installed (including the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted. However, if all level indication were to be lost during a loss of RCS inventory event, the operators would need to determine that RCS inventory loss was occurring by observing sump and tank level changes. Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Plant-Specific

In this EAL, all level indication would be unavailable and, the Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes (ref. 1, 2). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

- 1. UFSAR 5.1.3.6 Design Criteria
- 2. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
- 3. NEI 99-01 CU2

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Level

Initiating Condition: Loss of RCS inventory

EAL:

CA3.1 Alert

Loss of inventory as indicated by RCS water level < 0 in.

OR

RCS level **cannot** be monitored for \geq 15 min. with a loss of RCS inventory as indicated by an unexplained level rise in **ANY** Table C-2 sump / tank attributable to RCS leakage (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

This EAL serves as a precursor 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 RCS level decrease and potential core uncovery. This condition will result in a minimum emergency classification level of an Alert.

The inability to restore and maintain level after reaching this setpoint would be indicative of a failure of the RCS barrier.

If RCS level continues to lower then escalation to Site Area Emergency will be via EAL CS3.1, EAL CS3.2 or EAL CS3.3.

Plant-Specific

When RCS water level lowers to 0 in. (uncorrected) on loop level indicators, the bottom of the RCS hot leg level instrument tap is uncovered (ref. 1, 2). This level can be monitored by:

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass

This EAL serves as a precursor to a loss of ability to adequately cool the fuel. The magnitude of this loss of water indicates makeup systems have not been effective and may not be capable of preventing further RCS or Reactor Vessel level lowering and potential core uncovery. The bottom of the hot leg is the level equal to the bottom of the Reactor Vessel loop penetration, not the low point of the loop. This level was chosen because remote RCS level indication may be lost and loss of suction to decay heat removal systems has occurred. The inability to restore and maintain level after reaching this setpoint implies a failure of the RCS barrier.

In Cold Shutdown, the decay heat available to raise RCS temperature during a loss of inventory or heat removal event may be significantly greater than in the Refuel mode. Entry into Cold Shutdown mode may be attained within hours of operating at power or hours after refueling is completed. Entry into the Refuel mode may not occur for many hours after the reactor has been shutdown. Thus, the heatup and the threat to damaging the fuel clad may be lower for events that occur in the Refuel mode with irradiated fuel in the Reactor Vessel. Note that the heatup threat could be lower for Cold Shutdown conditions if the entry into Cold Shutdown was following a refueling.

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be available. Redundant means of Reactor Vessel level indication will normally be installed

(Cavity level monitoring with the ability to monitor level visually) to assure that the ability to monitor level will not be interrupted (ref. 7,8).

In the second condition of this EAL, all level indication would be unavailable and, the Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes (ref. 1, 2, 3, 5). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

The 15-minute interval for the loss of level indication was chosen because it is half of the Site Area Emergency EAL duration. The interval allows this EAL to be an effective precursor to the Site Area Emergency EAL CS3.1. Therefore this EAL meets the definition for an Alert emergency.

- 1. RF-601 Fuel Handling Accident Instructions
- 2. O-2.3 Draining the Reactor Coolant System to < 84" but > 64"
- 3. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 4. UFSAR 5.1.3.6 Monitoring Reactor Coolant Leakage
- 5. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
- 6. NEI 99-01 CA1
- 7. O-15.1 Administrative Requirement Checklist for Entry to Mode 6 and Refueling Conditions
- 8. O-6.13 Daily Surveillance Log

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – RCS Level

Initiating Condition: Loss of RCS inventory affecting core decay heat removal capability **EAL:**

CS3.1 Site Area Emergency

RCS level **cannot** be monitored with a loss of RCS inventory as indicated by **ANY** of the following for \geq 30 min. (Note 4):

- Containment radiation R-29 or R-30 > 1.0E+02 R/hr
- Erratic Source Range Nuclear Instrumentation indication
- Unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage
- Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

Under the conditions specified by this EAL, continued decrease in RCS level is indicative of a loss of inventory control. Inventory loss may be due to an RCS breach, pressure boundary leakage, or continued boiling in the RCS. Thus, declaration of a Site Area Emergency is warranted.

Escalation to a General Emergency is via EAL CG3.1, RG1.1, RG1.2 or RG1.3.

The 30-minute duration allows sufficient time for actions to be performed to recover inventory control equipment.

As water level in the Reactor Vessel lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

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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.

Plant-Specific

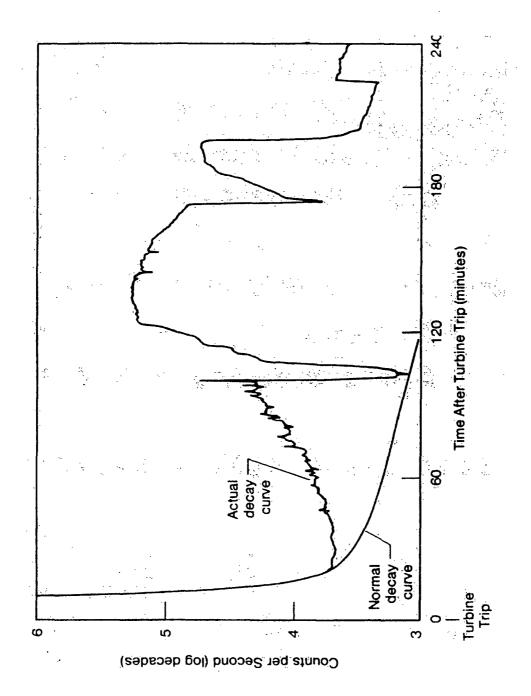
In Refuel or Cold Shutdown mode, normal RCS level indication may be unavailable but alternate means of level indication are normally installed (including visual observation) to assure that the ability to monitor level will not be interrupted. If all means of level monitoring are not available, however, the Reactor Vessel inventory loss may be detected by the following indirect methods:

- As water level in the Reactor Vessel lowers, the dose rate above the core will rise.
- Containment radiation is indicated on R-29 and R-30. The dose rate due to this core shine should result in on-scale Containment radiation monitor indication and possible alarm. Assuming total draindown of the upper cavity, line-of-sight dose rates from a fully exposed upper internal package would be approximately 300 R/hr. The containment radiation monitors high alarm is set at 1.0E+02 R/hr (ref 1). The 1.0E+02 R/hr setpoint has been selected to be operationally significant and above that expected under normal plant conditions while in the Refuel mode.
 - Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that source range monitors such as Source Range Nuclear Instrumentation N-31 and N-32 can be used as a tool for making such determinations (ref 2). Figure C-1 shows the response of the source range monitor during the first few hours of the TMI-2 accident. The instrument reported an increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel downcomer and the reduced shielding that the two-phase mixture provides to the source range monitor.
 - If water level indication is unavailable, Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes

(ref. 3, 4, 5, 6, 7). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

- 1. P-9 Radiation Monitoring System
- 2. P-6 Precautions, Limitations and Setpoints Nuclear Instrumentation System
- 3. RF-601 Fuel Handling Accident Instructions
- 4. O-2.3 Draining the Reactor Coolant System to < 84" but > 64"
- 5. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 6. UFSAR 5.1.3.6 Monitoring Reactor Coolant Leakage
- 7. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
- 8. NEI 99-01 CS1





Category:	C – Cold Shutdown / Refueling System Malfunction
Subcategory:	3 – RCS Level
Initiating Condition:	Loss of Reactor Vessel inventory affecting fuel clad integrity with Containment challenged

EAL:

CG3.1 General Emergency

RCS level **cannot** be monitored with core uncovery indicated by **ANY** of the following for \ge 30 min. (Note 4):

- Containment radiation R-29 or R-30 > 1.0E+02 R/hr
- Erratic Source Range Nuclear Instrumentation indication
- Unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage

AND

Any Containment Challenge Indication, Table C-3

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

Table C-3 Containment Challenge Indications

- Containment closure **not** established
- Hydrogen concentration in Containment $\geq 4\%$
- Unplanned rise in Containment pressure

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel



Basis:

<u>Generic</u>

This EAL represents the inability to restore and maintain RCS level to above the top of active fuel with containment challenged. Fuel damage is probable if RCS level cannot be restored, as available decay heat will cause boiling, further reducing the RCS level. With the Containment breached or challenged then the potential for unmonitored fission product release to the environment is high. This represents a direct path for radioactive inventory to be released to the environment. This is consistent with the definition of a GE. The GE is declared on the occurrence of the loss or imminent loss of function of <u>all three</u> barriers.

A number of variables can have a significant impact on heat removal capability challenging the fuel clad barrier. Examples include: mid-loop, reduced level/flange level, head in place, cavity flooded, RCS venting strategy, decay heat removal system design, vortexing pre-disposition, steam generator U-tube draining

Analysis indicates that core damage may occur within an hour following continued core uncovery therefore, 30 minutes was conservatively chosen.

If Containment Closure is re-established prior to exceeding the 30 minute core uncovery time limit then escalation to General Emergency would not occur.

Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

As water level in the RCS lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in site specific monitor indication and possible alarm.

Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

Plant-Specific

In Refuel or Cold Shutdown mode, normal RCS level indication may be unavailable but alternate means of level indication are normally installed (including visual observation) to assure that the ability to monitor level will not be interrupted. If all means of level monitoring are not available, however, the Reactor Vessel inventory loss may be detected by the following indirect methods:

 As water level in the Reactor Vessel lowers, the dose rate above the core will rise. Containment radiation is indicated on R-29 and R-30. The dose rate due to this core shine should result in on-scale Containment radiation monitor indication and possible alarm. Assuming total draindown of the upper cavity, line-of-sight dose

rates from a fully exposed upper internal package would be approximately 300 R/hr. The containment radiation monitors high alarm is set at 1.0E+02 R/hr (ref 1). The 1.0E+02 R/hr setpoint has been selected to be operationally significant and above that expected under normal plant conditions while in the Refuel mode.

- Post-TMI studies indicated that the installed nuclear instrumentation will operate erratically when the core is uncovered and that source range monitors such as Source Range Nuclear Instrumentation N-31 and N-32 can be used as a tool for making such determinations (ref 2). Figure C-1 shows the response of the source range monitor during the first few hours of the TMI-2 accident. The instrument reported an increasing signal about 30 minutes into the accident. At this time, the reactor coolant pumps were running and the core was adequately cooled as indicated by the core outlet thermocouples. Hence, the increasing signal was the result of an increasing two-phase void fraction in the reactor core and vessel downcomer and the reduced shielding that the two-phase mixture provides to the source range monitor.
- If water level indication is unavailable, Reactor Vessel inventory loss must be detected by Containment Sumps, Auxiliary Building Sump or RCDT level changes (ref. 3, 4, 5, 6, 7). Sump and tank level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of RCS leakage.

Three indications are associated with Containment challenges:

 Containment Closure is the action or condition that ensures Containment and its associated systems, structures or components, as listed in O-2.3.1A "Containment Closure Capability Within Two Hours During RCS Reduced Inventory Operation", provide a functional barrier to fission product release (ref 8). Containment closure is initiated by the Shift Manager if plant conditions change that could raise the risk of a fission product release as a result of a loss of decay heat removal. Containment closure requires that, upon a loss of decay heat removal, any open penetration must be closed or capable of being closed prior to RCS bulk boiling.

- In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gases in Containment. However, Containment monitoring (CH-EPIP-CVH2) and/or sampling should be performed to verify this assumption. A combustible mixture can be
 - formed when hydrogen gas concentration in the Containment atmosphere is greater than 4.1% (rounded to 4%) by volume (ref. 9).
 - Unplanned Containment pressure increases are not expected during Cold Shutdown or Refuel mode. The threshold is indicative of conditions challenging containment closure.

Definitions:

Containment Closure

The site-specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to Ginna, Containment Closure is the action or condition that ensures Containment and its associated systems, structures or components (SSC), as listed in O-2.3.1A, provide a functional barrier to fission product release.

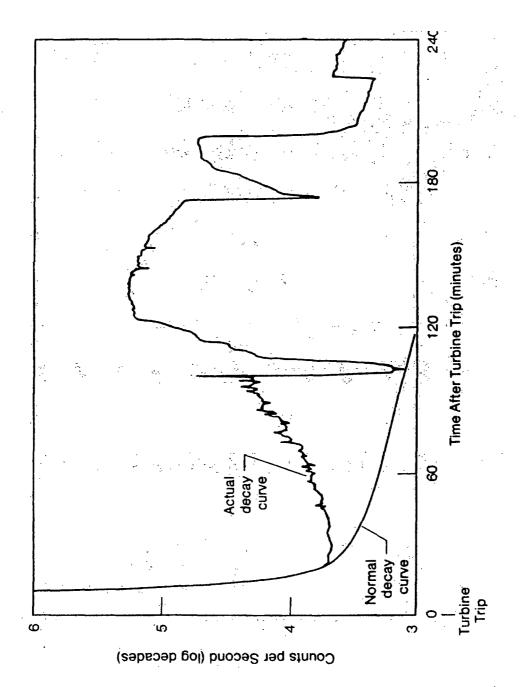
Unplanned

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A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

- 1. P-9 Radiation Monitoring System
- 2. P-6 Precautions, Limitations and Setpoints Nuclear Instrumentation System
- 3. RF-601 Fuel Handling Accident Instructions
- 4. O-2.3 Draining the Reactor Coolant System to < 84" but > 64"
- 5. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 6. UFSAR 5.1.3.6 Monitoring Reactor Coolant Leakage
- 7. UFSAR 5.2.5 Detection of Leakage Through Reactor Coolant Pressure Boundary
- 8. O-2.3.1A Containment Closure Capability Within Two Hours During RCS Reduced Inventory Operation
- 9. SACRG-1 Severe Accident Control Room Guideline Initial Response
- 10. NEI 99-01 CG1

Figure C-1: Response of the TMI-2 Source Range Measurement During the First Six Hours of the Accident





Category:	C – Cold Shutdown / Refueling System Malfunction
Subcategory:	4 – RCS Temperature
Initiating Condition:	Unplanned loss of decay heat removal capability

EAL:

CU4.1 Unusual Event

Unplanned event results in RCS temperature > 200°F

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

Generic

This EAL is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RCS will normally be maintained above the Reactor Vessel flange. Refueling evolutions that decrease water level below the Reactor Vessel flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the Refuel mode. Redundant means of RCS level indication are therefore procedurally installed to assure that the ability to monitor level will not be interrupted. Escalation to Alert would be via EAL CA3.1 based on an inventory loss or EAL CA4.1 based on exceeding its temperature duration or pressure criteria.

Plant-Specific

Several instruments are capable of providing indication of RCS temperature with respect to

the Technical Specification cold shutdown temperature limit (200°F) (ref. 1). These include

(ref. 2):

 The average of T0409A (T_{HOT}) and T0410B (T_{COLD}) for forced circulation with A RCP pump running

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- The average T0410B (T_{COLD}) AND either T0410A OR incore thermocouples for T_{HOT} for forced circulation with B RCP pump running
- T0630 Residual Heat Removal Pump Discharge Header
- Incore Temperatures

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

- 1. Technical Specifications Table 1.1-1
- 2. O-2.2 Plant Shutdown from Hot Shutdown to Cold Conditions
- 3. NEI 99-01 CU4



Category:C – Cold Shutdown / Refueling System MalfunctionSubcategory:4 – RCS TemperatureInitiating Condition:Unplanned loss of decay heat removal capability

EAL:

CU4.2 Unusual Event

Loss of all RCS temperature and RCS level indication for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

This EAL is a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. In cold shutdown the ability to remove decay heat relies primarily on forced cooling flow. Operation of the systems that provide this forced cooling may be jeopardized due to the unlikely loss of electrical power or RCS inventory. Since the RCS usually remains intact in the cold shutdown mode a large inventory of water is available to keep the core covered.

During refueling the level in the RCS will normally be maintained above the Reactor Vessel flange. Refueling evolutions that decrease water level below the Reactor Vessel flange are carefully planned and procedurally controlled. Loss of forced decay heat removal at reduced inventory may result in more rapid increases in RCS temperatures depending on the time since shutdown.

Normal means of core temperature indication and RCS level indication may not be available in the Refuel mode. Redundant means of RCS 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 or Refuel modes, this EAL would result in declaration of a UE if both temperature and level indication cannot be restored within 15 minutes from the loss of both means of indication. Escalation to Alert would be via EAL CA3.1 based on an inventory loss or EAL CA4.1 based on exceeding its temperature criteria.

Plant-Specific

In Cold Shutdown mode, the RCS will normally be intact and standard RCS inventory and level monitoring means are available. In the Refuel mode, the RCS is not intact and Reactor Vessel level and inventory are monitored by different means. In the Refuel mode, normal means of core temperature indication and RCS level indication may not be

available. Redundant means of Reactor Vessel 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. Reactor Vessel water level is normally monitored in Refuel mode using the following instruments (ref. 1,5,6):

- Loop A Level Indicator LIT-432A
- Loop B Level Indicator LIT-432B
- Loop B Sightglass
- Cavity Water Level

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F) (ref. 2). These include (ref. 3):

- The average of T0409A (T_{HOT}) and T0410B (T_{COLD}) for forced circulation with A RCP pump running
- The average of T0410B (T_{COLD}) AND either T0410A OR incore thermocouples for T_{HOT} for forced circulation with B RCP pump running
- T0630 Residual Heat Removal Pump Discharge Header
- Incore Temperatures

- 1. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 2. Technical Specifications Table 1.1-1
- 3. O-2.2 Plant Shutdown from Hot Shutdown to Cold Conditions
- 4. NEI 99-01 CU4
- 5. O-15.1 Administrative Requirement Checklist for Entry to Mode 6 and Refueling Conditions
- 6. O-6.13 Daily Surveillance Log

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Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 4 – RCS Temperature

Initiating Condition: Inability to maintain plant in cold shutdown

EAL:

CA4.1 Alert

An unplanned event results in EITHER:

RCS temperature > 200°F for > Table C-4 duration

OR

RCS pressure increase > 10 psi due to an unplanned loss of decay heat removal capability (this condition is **not** applicable in solid plant conditions)

Table C-4 RCS Reheat Duration Thresholds		
RCS Status	Containment Closure Status	Duration
Intact AND not reduced inventory	N/A	60 min.*
Not intact OR	Established	20 min.*
reduced inventory	Not established	0 min.

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

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

The RCS Reheat Duration Thresholds table addresses complete loss of functions required for core cooling for greater than 60 minutes during refuel and cold shutdown modes when RCS integrity is established. The 60 minute time frame should allow sufficient time to restore cooling without there being a substantial degradation in plant safety.

The RCS Reheat Duration Thresholds table also addresses the complete loss of functions required for core cooling for greater than 20 minutes during refuel and cold shutdown modes when Containment Closure is established but RCS integrity is not established or RCS inventory is reduced. The allowed 20 minute time frame was included to allow operator action to restore the heat removal function, if possible.

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Finally, complete loss of functions required for core cooling during refuel and cold shutdown modes when neither Containment Closure nor RCS integrity are established is addressed. No delay time is allowed because the evaporated reactor coolant that may be released into the Containment during this heatup condition could also be directly released to the environment.

The note (*) indicates that this EAL is not applicable if actions are successful in restoring an RCS heat removal system to operation and RCS temperature is being reduced within the specified time frame.

The 10 psig pressure increase addresses situations where, due to high decay heat loads, the time provided to restore temperature control should be less than 60 minutes. The RCS pressure setpoint was chosen because it is the lowest pressure that the site can read on installed Control Board instrumentation that is equal to or greater than 10 psig.

Escalation to Site Area Emergency would be via EAL CS3.1 should boiling result in significant Reactor Vessel level loss leading to core uncovery.

A loss of Technical Specification components alone is not intended to constitute an Alert. The same is true of a momentary unplanned excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available.

The Emergency Director must remain alert to events or conditions that lead to the conclusion that exceeding the EAL is imminent. If, in the judgment of the Emergency Director, an imminent situation is at hand, the classification should be made as if the threshold has been exceeded.

Plant-Specific

Several instruments are capable of providing indication of RCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F) (ref. 1). These include (ref. 2):

- The average of T0409A (T_{HOT}) and T0410B (T_{COLD}) for forced circulation with A RCP pump running
- The average of T0410B (T_{COLD}) AND either T0410A OR incore thermocouples for T_{HOT} for forced circulation with B RCP pump running
- T0630 Residual Heat Removal Pump Discharge Header

Containment Closure is the action or condition that ensures Containment and its associated systems, structures or components, as listed in O-2.3.1A "Containment Closure Capability Within Two Hours During RCS Reduced Inventory Operation" (ref. 3), provide a functional barrier to fission product release. Containment closure is initiated by the Shift Manager if plant conditions change that could raise the risk of a fission product release as

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a result of a loss of decay heat removal. Containment closure requires, upon a loss of decay heat removal, any open penetration must be closed or capable of being closed prior to RCS boiling.

Reduced Inventory (administrative) is defined as RCS level less than 64 in. on the RCS Loop indicators (ref. 4).

The pressure rise of greater than 10 psig implies an RCS temperature in excess of the Technical Specification cold shutdown limit (200°F) for which this EAL would otherwise permit up to sixty minutes to restore RCS cooling before declaration of an Alert (RCS intact). This EAL therefore covers situations in which it is determined that, due to high decay heat loads, the time provided to reestablish temperature control should be less than sixty minutes (as indicated by significant RCS re-pressurization).

Pressure indicator PI-420 Rx Clnt Loop Lo Rng Press is capable of measuring pressure changes of 10 psig. This represents the visual resolution of the device, with the smallest scale increment of 10 psig (Basis: Walkdown). Escalation to a Site Area Emergency would be under EAL CS2.1 should boiling result in significant Reactor Vessel level loss leading to core uncovery.

Definitions:

Containment Closure

The site-specific procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under existing plant conditions. As applied to Ginna, Containment Closure is the action or condition that ensures Containment and its associated systems, structures or components (SSC), as listed in O-2.3.1A, provide a functional barrier to fission product release.

RCS Intact

The RCS should be considered intact when the RCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams).

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

- 1. Technical Specifications Table 1.1-1
- 2. O-2.2 Plant Shutdown from Hot Shutdown to Cold Conditions
- 3. O-2.3.1A Containment Closure Capability Within Two Hours During RCS Reduced Inventory Operation
- 4. O-2.3.1 Draining and Operation at Reduced Inventory of the Reactor Coolant System
- 5. NEI 99-01 CA4

Category:	C – Cold Shutdown / Refueling System Malfunction
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Subcategory: 5 – Communications

Initiating Condition: Loss of all onsite or offsite communications capabilities

EAL:

CU5.1 Unusual Event

Loss of **all** Table C-5 onsite (internal) communication methods affecting the ability to perform routine operations

OR

Loss of **all** Table C-5 offsite (external) communication methods affecting the ability to perform offsite notifications

Table C-5 Communications Systems		
System	Onsite (internal)	Offsite (external)
Commercial phone system	X	X
Direct Dial POTS Lines (Blue Phones)	x	x
Plant Page Party system	x	
Radios/Walkie Talkies	x	
FTS 2001 telephone system (ENS, HPN)		x
Control Room Hard Wired Satellite Phone		x
Control Room Emergency Cell Phone		x

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel, D - Defueled

Basis:

<u>Generic</u>

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities. The loss of off-site communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The availability of one method of ordinary off-site communications is sufficient to inform federal, state, and local authorities of plant issues. This EAL is intended to be used only when extraordinary means (e.g., relaying of information from radio transmissions, individuals being sent to off-site locations, etc.) are being utilized to make communications possible.

Plant-Specific

Onsite/offsite communications systems are listed in Table C-2 (ref. 1, 2).

This EAL is the cold condition equivalent of the hot condition EAL SU6.1.

- 1. A-56 Communication Systems at Ginna Station
- 2. ER-COMM.1 Loss of Communications
- 3. NEI 99-01 CU6



Category: C – Cold Shutdown / Refueling System Malfunction

 $\mathcal{A}^{(1)} = \{ e_i \}_{i \in I}$

Subcategory: 6 – Inadvertent Criticality

Initiating Condition: Inadvertent criticality

EAL:

CU6.1 Unusual Event

An unplanned sustained positive startup rate observed on nuclear instrumentation

Mode Applicability:

5 - Cold Shutdown, 6 - Refuel

Basis:

<u>Generic</u>

This EAL addresses criticality events that occur in Cold Shutdown or Refuel modes such as fuel mis-loading events and inadvertent dilution events. This EAL indicates a potential degradation of the level of safety of the plant, warranting a UE classification.

Escalation would be by Emergency Director judgment.

Plant-Specific

The term "sustained" is used to allow exclusion of expected short-term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short-term positive startup rates are the result of the rise in neutron population due to subcritical multiplication. Short-term positive startup rates can also be due to welding activities.

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

Ginna Basis Reference(s):

1. NEI 99-01 CU8

Category H – Hazards and Other Conditions Affecting Plant Safety

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

Hazards are non-plant system-related events that can directly or indirectly affect plant operation, reactor plant safety or personnel safety.

The events of this category pertain to the following subcategories:

1. Natural or Destructive Phenomena

Natural events include hurricanes, earthquakes or tornadoes that have potential to cause plant structure or equipment damage of sufficient magnitude to threaten personnel or plant safety. Non-naturally occurring events that can cause damage to plant facilities include aircraft crashes, missile impacts, etc.

2. Fire or Explosion

Fires can pose significant hazards to personnel and reactor safety. Appropriate for classification are fires within the site Protected Area or which may affect operability of equipment needed for safe shutdown

3. Hazardous Gas

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

4. Security

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

5. Control Room Evacuation

Events that are indicative of loss of Control Room habitability. If the Control Room must be evacuated, additional support for monitoring and controlling plant functions is necessary through the emergency response facilities.

6. Judgment

The EALs defined in other categories specify the predetermined symptoms or events that are indicative of emergency or potential emergency conditions and thus warrant classification. While these EALs have been developed to address the full spectrum of possible emergency conditions which may warrant classification and subsequent implementation of the Emergency Plan, a provision for classification of emergencies based on operator/management experience and judgment is still necessary. The EALs of this category provide the Emergency Director the latitude to classify emergency conditions consistent with the established classification criteria based upon Emergency Director judgment.

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Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.1 Unusual Event

Seismic event identified by ANY two of the following:

- Red LED event indicator on Kinemetrics ETNA Digital Recorder indicates seismic event detected
- Earthquake felt onsite
- National Earthquake Information Center (Note 6)

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate.

As defined in the EPRI-sponsored Guidelines for Nuclear Plant Response to an Earthquake, dated October 1989, a "felt earthquake" is: An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic switches of the plant are activated.

The National Earthquake Center can confirm if an earthquake has occurred in the area of the plant.

Plant-Specific

A strong motion accelerograph is installed in the subbasement of the intermediate building at elevation 237 ft (ref. 1).

Note 6: The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude.

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Ginna seismic instrumentation actuates upon sensing any ground motion greater than 0.01g. Registration of a tremor > 0.01g is indicated by a red light on the event indicator at the bottom of the accelerograph case (ref. 2, 3, 4).

The National Earthquake Information Center (NEIC) can confirm seismic activity in the vicinity of Ginna. The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of R. E. Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude (ref. 5).

- 1. UFSAR Section 3.7.4 Seismic Instrumentation
- 2. ER-SC.4 Earthquake Emergency Plan
- 3. CPI-ACCELEROGRAPH-51 Functional Check of Kinemetrics Strong Motion Accelerograph
- 4. VTD-K3356-4104 Kinematics, ETNA Strong Motion Accelerograph Schematics
- 5. USAR Section 2.1.1 Site Location and Description
- 6. NEI 99-01 HU1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting the Protected Area
EAL:	

HU1.2 Unusual Event

Tornado striking within Protected Area boundary

OR

Sustained high winds > 75 mph

Mode Applicability:

All

Basis:

Generic

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL is based on a tornado striking (touching down) or high winds within the Protected Area.

Escalation of this emergency classification level, if appropriate, would be based on visible damage, or by other in plant conditions, via EAL HA1.2.

Plant-Specific

All Class 1 structures are designed for a wind velocity of 75 mph assuming FSAR "severe

environmental loading" conditions (ref. 1).

Wind speed can be measured up to 100 mph on the 250' and 150' wind speed recorder 'A'

(ref. 2). Sustained winds are the five-minute average wind speed.

The Protected Area Boundary is depicted in Drawing 33013-2722 (ref. 3)

Definitions:

Protected Area

The site specific area which normally encompasses all controlled areas within the security Protected Area fence.

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Ginna Basis Reference(s):

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- 1. UFSAR Section 3.3.2.1.4 Wind and Tornado Loadings Input Load Criteria
- 2. CPI-MET-250 Calibration of Ginna Station Meteorological Wind Speed and Wind Direction Translator Cards
- 3. Drawing 33013-2722 Residential AC Power Distribution Circuit Site Layout
- 4. ER-SC.1 Adverse Weather Plan
- 5. NEI 99-01 HU1

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Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.3 Unusual Event

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Internal flooding that has the potential to affect **ANY** safety-related structure, system, or component required by Technical Specifications for the current operating mode in **ANY** Table H-1 area

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
٠	Auxiliary Building
٠	Control Building
٠	Intermediate Building
٠	Emergency Diesel Building(s)
٠	SAFW Building
٠	Screenhouse
٠	Cable Tunnel
٠	Battery Rooms

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps.

Escalation of this emergency classification level, if appropriate, would be based visible damage via EAL HA1.3, or by other plant conditions.

Plant-Specific

This threshold addresses the effect of flooding caused by internal events such as component failures, Circulating, Component Cooling or Service Water line ruptures, equipment misalignment, fire suppression system actuation, and outage activity mishaps.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of its removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

This threshold addresses events that may have resulted in a Safe Shutdown Area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems. Safe Shutdown Areas are areas that house equipment the operation of which may be needed to ensure the reactor safely reaches and is maintained in cold shutdown. Safe Shutdown Areas include structures that contain the equipment of concern (ref. 1, 2).

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HU1

Category:H – Hazards and Other Conditions Affecting Plant SafetySubcategory:1 – Natural or Destructive PhenomenaInitiating Condition:Natural or destructive phenomena affecting the Protected Area

EAL:

HU1.4 Unusual Event

Turbine failure resulting in casing penetration or damage to turbine or generator seals

Mode Applicability:

All

Basis:

<u>Generic</u>

These EALs are categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Generator seal damage observed after generator purge does not meet the intent of this EAL because it did not impact normal operation of the plant.

Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual FIRES and flammable gas build up are appropriately classified via EAL HU2.1 and EAL HU3.1.

This EAL is consistent with the definition of a UE while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

Escalation of this emergency classification level, if appropriate, would be to EAL HA1.4 based on damage done by PROJECTILES generated by the failure or in conjunction with a steam generator tube rupture. These latter events would be classified by the Category R EALs or Category F EALs.

Plant-Specific

The turbine generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine generator parts is insufficient, external projectiles will be released. These ejected projectiles may impact various plant structures, including those housing safety related equipment.

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Failure of turbine or generator seals may be indicated by a loss of seal oil pressure or loss of condenser vacuum (ref. 1).

Ginna Basis Reference(s):

- 1. ER-SC.8 Turbine Blade Failure and Missile Emergency Plan
- 2. NEI 99-01 HU1

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting the Protected Area
EAL:	

HU1.5 Unusual Event

Deer Creek flooding over entrance road bridge hand rail OR Lake level > 252 ft OR Screen House Suction Bay water level < 17 ft or < 15.5 ft by manual level measurement

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL is categorized on the basis of the occurrence of an event of sufficient magnitude to be of concern to plant operators.

This EAL addresses other site specific phenomena that can also be precursors of more serious events.

Plant-Specific

This threshold addresses high and low lake water level conditions that could be a precursor of more serious events.

Ginna plant grade is generally at 270 ft mean sea level (msl) except the area between the lake and Turbine Building which is at grade 253 ft msl. Lake water level > 253.28 ft msl corresponds to plant design levels (ref. 1). A lake level of 252 ft has been selected for this threshold to be anticipatory of exceeding design flood levels and is the level at which flood control actions are procedurally taken (ref. 2).

Flooding in Deer Creek above the plant entrance handrails will ultimately result in water accumulation in the Turbine Building and Screenhouse (ref. 2). This may preclude emergency response personnel access and egress.

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High lake level may be determined using markers attached to a metal pole mounted on the discharge canal bridge upstream of the submarine net. The high level markers are at lake levels of 252 ft and 253 ft (ref. 2).

The Screenhouse Lo-Lo level alarm actuates at 19' indicated (ref. 3). When Screenhouse Suction Bay water level drops to 17.0 ft indicated (this corresponds to a level of 15.5' measured manually) increased Control Room monitoring is initiated. This level has been selected for this threshold to be anticipatory of a potential loss of service water system pump suction at 16.0 ft (ref. 4).

- 1. UFSAR Section 3.4.1 Flood Protection
- 2. ER-SC.2 High Water (Flood) Plan
- 3. AR-I-9 Screen House Lo-Lo Level 19'
- 4. ER-SC.3 Low Screenhouse Water Level
- 5. NEI 99-01 HU1

Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas
EAL:	

HA1.1 Alert

EITHER:

Confirmation of an earthquake of an intensity > 0.08 g per ER-SC.4 Earthquake Emergency Plan

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component

AND

Earthquake confirmed by EITHER:

Earthquake felt in onsite

OR

National Earthquake Information Center (Note 6)

Note 6: The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude.

Mode Applicability:

All

Basis:

<u>Generic</u>

These EALs escalate from HU1.1 in that the occurrence of the event has resulted in VISIBLE DAMAGE to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

Seismic events of this magnitude can result in a vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

The National Earthquake Information Center can confirm if an earthquake has occurred in the area of the plant.

Plant-Specific

This EAL is based on the UFSAR design basis operating earthquake of 0.08 g acceleration (ref. 1). Seismic events of this magnitude can cause damage to plant safety functions.

Ginna seismic instrumentation actuates upon sensing any seismic activity (ref. 2, 3, 4).

The method of detection of an earthquake greater than OBE intensity relies on either:

 analysis of the Ginna strong motion accelerograph located in the Intermediate Building by plant I&C and plant Engineering (ref. 3)

OR

• by actual indications of degraded safe shutdown system performance

confirmed by either shift operators on duty in the Control Room determining that ground motion was felt, or corroborated by the NEIC.

The National Earthquake Information Center (NEIC) can confirm seismic activity in the vicinity of Ginna. The NEIC can be contacted by calling **(303) 273-8500**. Select **option #1** and inform the analyst you wish to confirm recent seismic activity in the vicinity of R. E. Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: **43°**

16.7' north latitude, 77° 18.7' west longitude (ref. 5).

Definitions:

Safety-Related Structures, Systems and Components (as defined in 10CFR50.2)

- Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:
 - (1) The integrity of the reactor coolant pressure boundary;
 - (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
 - (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

- 1. UFSAR Section 3.7.1.3 Design Response Spectra
- 2. ER-SC.4 Earthquake Emergency Plan
- 3. CPI-ACCELEROGRAPH-51 Functional Check of Kinemetrics Strong Motion Accelerograph
- 4. VTD-K3356-4104 ETNA Strong Motion Accelerograph Schematics
- 5. USAR Section 2.1.1 Site Location and Description
- 6. NEI 99-01 HA1



Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.2 Alert

Tornado striking or sustained high winds > 75 mph resulting in **EITHER**:

Visible damage to **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
•	Auxiliary Building
•	Control Building
•	Intermediate Building
•	Emergency Diesel Building(s)
•	SAFW Building
•	Screenhouse
•	Cable Tunnel
•	Battery Rooms

Mode Applicability:

All

Basis:

Generic

This EAL escalates from HU1.2 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL is based on a tornado striking (touching down) or high winds that have caused visible damage to structures containing functions or systems required for safe shutdown of the plant.

Plant-Specific

All Class 1 structures are designed for a wind velocity of 75 mph assuming FSAR "severe environmental loading" conditions (ref. 1). This EAL is based on the structural design basis of 75 mph or impact by tornado. Wind loads of this magnitude can cause damage to safety functions.

Wind speed can be measured up to 100 mph on the 250' and 150' wind speed recorder 'A' (ref. 2). Sustained winds are the five-minute average wind speed.

The Protected Area Boundary is depicted in Drawing 33013-2722 (ref. 3).

This threshold addresses events that may have resulted in a Safe Shutdown Area being subjected to forces beyond design limits and thus damage may be assumed to have occurred to plant safety systems. Safe Shutdown Areas are areas that house equipment the operation of which may be needed to ensure the reactor safely reaches and is maintained in cold shutdown. Safe Shutdown Areas include structures that contain the equipment of concern. The Alert classification is appropriate if relevant plant parameters indicate that the performance of safety systems in the affected Safe Shutdown Areas has been degraded. No attempt should be made to fully inventory the actual magnitude of the damage or quantify the degradation of safety system performance prior to declaration of an Alert under this threshold.

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containingClass 1 equipment and systems needed for safe shutdown (ref. 4, 5).

Definitions:

Visible Damage

Damage to equipment or structure that is readily observable without measurements, testing, or analysis. Damage is sufficient to cause concern regarding the continued operability or reliability of affected safety structure, system, or component. Example damage includes: deformation due to heat or impact, denting, penetration, rupture,

cracking, paint blistering. Surface blemishes (e.g., paint chipping, scratches) should not be included.

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

- 1. UFSAR Section 3.3.2.1.4 Wind and Tornado Loadings Input Load Criteria
- 2. CPI-MET-250 Calibration of Ginna Station Meteorological Wind Speed and Wind Direction Translator Cards
- 3. Drawing 33013-2722 Residential AC Power Distribution Circuit Site Layout
- 4. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 5. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 6. ER-SC.1 Adverse Weather Plan
- 7. NEI 99-01 HA1

Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas
EAL:	

HA1.3 Alert

Internal flooding in ANY Table H-1 area resulting in EITHER:

An electrical shock hazard that precludes access to operate or monitor **ANY** safetyrelated structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
٠	Auxiliary Building
٠	Control Building
٠	Intermediate Building
٠	Emergency Diesel Building(s)
٠	SAFW Building
٠	Screenhouse
•	Cable Tunnel
•	Battery Rooms

Mode Applicability:

All

Basis:

Generic

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses the effect of internal flooding caused by events such as component failures, equipment misalignment, or outage activity mishaps. It is based on the degraded performance of systems, or has created industrial safety hazards (e.g., electrical shock) that preclude necessary access to operate or monitor safety equipment. The inability to access, operate or monitor safety equipment represents an actual or substantial potential degradation of the level of safety of the plant.

Flooding as used in this EAL describes a condition where water is entering the room faster than installed equipment is capable of removal, resulting in a rise of water level within the room. Classification of this EAL should not be delayed while corrective actions are being taken to isolate the water source.

Plant-Specific

This threshold addresses the effect of flooding caused by internal events such as component failures such as Circulating, Component Cooling or Service Water line ruptures, equipment misalignment, fire suppression system actuation, steam leaks or outage activity mishaps.

Safe Shutdown Areas are areas that house equipment the operation of which may be needed to ensure the reactor safely reaches and is maintained in cold shutdown. Safe Shutdown Areas include structures that contain the equipment of concern (ref. 1, 2).

Uncontrolled internal flooding that has degraded safety shutdown equipment or created a safety hazard precluding access necessary for the safe operation or monitoring of safety equipment warrants declaration of an Alert.

Definitions:

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HA1

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.4 Alert

Turbine failure-generated projectiles resulting in EITHER:

Visible damage to or penetration of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

Table H-1 Safe Shutdown Areas

- Reactor Containment Building
- Auxiliary Building
- Control Building
- Intermediate Building
- Emergency Diesel Building(s)
- SAFW Building
- Screenhouse
- Cable Tunnel
- Battery Rooms

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL escalates from HU1.4 in that the occurrence of the event has resulted in visible damage to plant structures or areas containing equipment necessary for a safe shutdown, or has caused damage to the safety systems in those structures evidenced by control room indications of degraded system response or performance. The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a

particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses the threat to safety related equipment imposed by projectiles generated by main turbine rotating component failures. Therefore, this EAL is consistent with the definition of an Alert in that the potential exists for actual or substantial potential degradation of the level of safety of the plant.

Plant-Specific

The turbine generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine generator parts is insufficient, external projectiles will be released. These ejected projectiles may impact various plant structures, including those housing safety related equipment.

Failure of turbine or generator seals may be indicated by a loss of seal oil pressure or loss of condenser vacuum (ref. 1).

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containingClass 1 equipment and systems needed for safe shutdown (ref. 2, 3).

Definitions:

Projectile

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

Visible Damage

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

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Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

Ginna Basis Reference(s):

- 1. ER.SC-8 Turbine Blade Failure and Missile Emergency Plan
- 2. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 3. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 4. NEI 99-01 HA1

Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	1 – Natural or Destructive Phenomena
Initiating Condition:	Natural or destructive phenomena affecting Vital Areas
EAL:	

HA1.5 Alert Lake level > 253 ft OR Screen House Suction Bay water level < 16 ft or < 14.5 ft by manual level measurement

Mode Applicability:

All

Basis:

Generic

This EAL addresses other site specific phenomena that result in visible damage to vital areas or results in indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant that can also be precursors of more serious events.

Plant-Specific

This threshold covers high and low water level conditions that may have resulted in a plant safe shutdown area being subjected to levels beyond design limits, and thus damage may be assumed to have occurred to plant safety systems.

Ginna plant grade is generally at 270 ft mean sea level (msl) except the area between the lake and Turbine Building which is at grade 253 ft msl. Lake water level > 253.28 ft msl corresponds to plant design levels (ref. 1). A lake level of 253 ft has been selected for this threshold to be indicative of exceeding design flood levels (ref. 2).

High lake level may be determined using markers attached to a metal pole mounted on the discharge canal bridge upstream of the submarine net. The high level markers are at lake levels of 252 ft and 253 ft (ref. 2).

The Screenhouse Lo-Lo level alarm actuates at 19' indicated (ref. 3). If indicated service water pump bay level drops below 16 ft (this corresponds to a lake level of 14.5' measured

manually) the service water pumps are declared inoperable. This level has been selected for this threshold to be indicative of a loss of service water system pump suction (ref. 4).

Ginna Basis Reference(s):

- 1. UFSAR Section 3.4.1 Flood Protection
- 2. ER-SC.2 High Water (Flood) Plan
- 3. AR-I-9 Screen House Lo-Lo Level 19'
- 4. ER-SC.3 Low Screenhouse Water Level
- 5. NEI 99-01 HA1

Category:H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 1 – Natural or Destructive Phenomena

Initiating Condition: Natural or destructive phenomena affecting Vital Areas

EAL:

HA1.6 Alert

Vehicle crash resulting in EITHER:

Visible damage to **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

	Table H-1 Safe Shutdown Areas
. •	Reactor Containment Building
•	Auxiliary Building
•	Control Building
•	Intermediate Building
•	Emergency Diesel Building(s)
•	SAFW Building
٠	Screenhouse
٠	Cable Tunnel
٠	Battery Rooms

Mode Applicability:

All

Basis:

Generic

The occurrence of visible damage and/or degraded system response is intended to discriminate against lesser events. The initial report should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in this EAL to assess the actual magnitude of the damage. The significance here is not that a particular system or structure was damaged, but rather, that the event was of sufficient magnitude to cause this degradation.

Escalation of this emergency classification level, if appropriate, would be based on System Malfunction EALs.

This EAL addresses vehicle crashes within the Protected Area that results in visible damage to vital areas or indication of damage to safety structures, systems, or components containing functions and systems required for safe shutdown of the plant.

Plant-Specific

This EAL 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. Vehicle types include automobiles, aircraft, trucks, cranes, forklifts, waterborne craft, etc.

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing

Class 1 equipment and systems needed for safe shutdown (ref. 1, 2).

Definitions:

Visible Damage

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

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HA1



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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	2 – Fire or Explosion
Initiating Condition:	Fire within the Protected Area not extinguished within 15 min. of detection or explosion within the Protected Area

EAL:

HU2.1 Unusual Event

Fire **not** extinguished within 15 min. of Control Room notification or verification of a Control Room fire alarm in **ANY** Table H-1 area or Turbine Building (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
•	Auxiliary Building
	Control Building
•	Intermediate Building
•	Emergency Diesel Building(s)
. •	SAFW Building
•	Screenhouse
•	Cable Tunnel
•	Battery Rooms

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL addresses the magnitude and extent of fires that may be potentially significant precursors of damage to safety systems. It addresses the FIRE, and not the degradation in performance of affected systems that may result.

As used here, detection is visual observation and report by plant personnel or sensor alarm indication.

The purpose of this threshold is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems.

As used here, notification is visual observation and report by plant personnel or sensor alarm indication.

The 15-minute period to extinguish the fire begins with a credible notification that a fire is occurring or indication of a valid fire detection system alarm.

Determination of a valid fire detection system alarm includes actions that can be taken within the Control Room or at nearby Fire Panels to determine that the alarm is not spurious. These actions include the use of direct or indirect indications such as redundant alarms or instrumentation readings associated with the area to ensure the alarm is not spurious and is an indication of a fire. An alarm verified in this manner is assumed to be an indication of a fire unless personnel dispatched to the scene disprove the alarm within the 15-minute period. The report, however, shall not be required to verify the alarm. If the alarm cannot be verified by redundant Control Room or nearby Fire Panel indications, notification from the field that a fire exists would be required to start the 15-minute classification and fire extinguishment clocks.

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).

Plant-Specific

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing Class 1 equipment and systems needed for safe shutdown (ref. 1, 2). The Turbine Building is included because it is immediately adjacent to one or more Table H-1 areas and a fire within the Turbine Building may potentially impact safe shutdown equipment should the fire not be controlled.

Definitions:

Fire

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

Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HU2

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Category:	H – Hazards and Other Conditions Affecting	Plant Safety
Subcategory:	bry: 2 – Fire or Explosion	
Initiating Condition:	: Fire within the Protected Area not extinguished within 15 min. of detection or explosion within the Protected Area	

EAL:

HU2.2 Unusual Event

Explosion within the Protected Area

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL addresses the magnitude and extent of explosions that may be potentially significant precursors of damage to safety systems. It addresses the explosion, and not the degradation in performance of affected systems that may result.

This EAL addresses only those explosions of sufficient force to damage permanent structures or equipment within the Protected Area.

No attempt is made to assess the actual magnitude of the damage. The occurrence of the explosion is sufficient for declaration.

The Emergency Director also needs to consider any security aspects of the explosion, if applicable.

Escalation of this emergency classification level, if appropriate, would be based on EAL HA2.1.

Plant-Specific

While some explosions may also result in fires that exceed EAL HU2.1, no fire is

necessary to declare an emergency in the event of an explosion. If a fire also occurs as a result or with an explosion, declare the Unusual Event based on the explosion and monitor the progress of the fire for potential escalation due to fire damage.

Definitions:

Explosion

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

Protected Area

The site specific area which normally encompasses all controlled areas within the security Protected Area fence.

Ginna Basis Reference(s):

1. Drawing 33013-2722 Residential AC Power Distribution Circuit - Site Layout

2. NEI 99-01 HU2

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	2 – Fire or Explosion
Initiating Condition:	Fire or explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown

EAL:

HA2.1 Alert

Fire or explosion resulting in EITHER:

Visible damage to **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

OR

Control Room indication of degraded performance of **ANY** safety-related structure, system, or component within **ANY** Table H-1 area

	Table H-1 Safe Shutdown Areas	
•	Reactor Containment Building	
٠	Auxiliary Building	
٠	Control Building	
٠	Intermediate Building	
٠	Emergency Diesel Building(s)	
٠	SAFW Building	
٠	Screenhouse	
٠	Cable Tunnel	
٠	Battery Rooms	

Mode Applicability:

All

Basis:

Generic

Visible damage is used to identify the magnitude of the fire or explosion and to discriminate against minor fires and explosions.

The reference to structures containing safety systems or components is included to discriminate against fires or explosions in areas having a low probability of affecting safe operation. The significance here is not that a safety system was degraded but the fact that the fire or explosion was large enough to cause damage to these systems.

The use of visible damage should not be interpreted as mandating a lengthy damage assessment prior to classification. The declaration of an Alert and the activation of the Technical Support Center will provide the Emergency with the resources needed to perform detailed damage assessments.

The Emergency Director also needs to consider any security aspects of the explosion.

Escalation of this emergency classification level, if appropriate, will be based on EALs in Category S, Category F or Category R.

Plant-Specific

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing

Class 1 equipment and systems needed for safe shutdown (ref. 1, 2).

Definitions:

Explosion

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

Fire

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

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

Visible Damage

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

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Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HA2

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	3 – Hazardous Gas
Initiating Condition:	Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

EAL:

HU3.1 Unusual Event

Release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations

Mode Applicability:

All

Basis:

Generic

This EAL is based on the release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations.

The fact that SCBA may be worn does not eliminate the need to declare the event.

This EAL is not intended to require significant assessment or quantification. It assumes an uncontrolled process that has the potential to affect plant operations. This would preclude small or incidental releases, or releases that do not impact structures needed for plant operation.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

Escalation of this emergency classification level, if appropriate, would be based on EAL HA3.1.

Plant-Specific

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

Definitions:



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Normal Plant Operations

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

Ginna Basis Reference(s):

1. NEI 99-01 HU3

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	3 – Hazardous Gas
Initiating Condition:	Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations

EAL:

HU3.2 Unusual Event

Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event

Mode Applicability:

All

Basis:

Generic

Escalation of this emergency classification level, if appropriate, would be based on EAL HA3.1.

Plant-Specific

None

Ginna Basis Reference(s):

1. NEI 99-01 HU3

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Category:	H – Hazards and Other Conditions Affecting	Plant Safety
Subcategory:	3 – Hazardous Gas	
Initiating Condition:	 Access to a Vital Area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor 	
EAL	·	

EAL:

HA3.1 Alert

Access to **ANY** Table H-1 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of ANY safety-related structure, system, or component (Note 5)

Note 5: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then EAL HA3.1 should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
•	Auxiliary Building
•	Control Building
٠	Intermediate Building
٠	Emergency Diesel Building(s)
٠	SAFW Building
٠	Screenhouse
•	Cable Tunnel
•	Battery Rooms

Mode Applicability:

All

Basis:

Generic

Gases in a Vital Area can affect the ability to safely operate or safely shutdown the reactor.

The fact that SCBA may be worn does not eliminate the need to declare the event.

Declaration should not be delayed for confirmation from atmospheric testing if the atmosphere poses an immediate threat to life and health or an immediate threat of severe exposure to gases.

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This could be based upon documented analysis, indication of personal ill effects from exposure, or operating experience with the hazards.

If access is not required at the time the unsafe concentrations exist in the affected area or if the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

An asphyxiant is a gas capable of reducing the level of oxygen in the body to dangerous levels. Most commonly, asphyxiants work by merely displacing air in an enclosed environment. This reduces the concentration of oxygen below the normal level of around 19%, which can lead to breathing difficulties, unconsciousness or even death.

An uncontrolled release of flammable gasses within a facility structure has the potential to affect safe operation of the plant by limiting either operator or equipment operations due to the potential for ignition and resulting equipment damage/personnel injury. Flammable gasses, such as hydrogen and acetylene, are routinely used to maintain plant systems (hydrogen) or to repair equipment/components (acetylene - used in welding). This EAL assumes concentrations of flammable gasses which can ignite/support combustion.

Escalation of this emergency classification level, if appropriate, will be based on EALs in Category S, Category F or Category R.

Plant-Specific

Table H-1 Safe Shutdown Areas include all Class 1 Structures and structures containing

Class 1 equipment and systems needed for safe shutdown (ref. 1, 2).

If hazardous gas concentration in a Table H-1 area restricts access but the equipment is

not required to be operable or will not be required to operate before access can be

reestablished (e.g., fans are ventilating the area), this EAL should not be declared.

Definitions:

Safety-Related Structures, Systems and Components (as defined in 10 CFR 50.2)

Those structures, systems and components that are relied upon to remain functional during and following design basis events to assure:

- (1) The integrity of the reactor coolant pressure boundary;
- (2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;
- (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

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Ginna Basis Reference(s):

- 1. UFSAR Table 3.2-1 Classification of Structures, Systems and Components
- 2. Ginna Station Fire Protection Program Volume I Part III Section 7.0 Fire Area/Fire Zone Analysis
- 3. NEI 99-01 HA3

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	4 – Security
Initiating Condition:	Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant

EAL:

HU4.1 Unusual Event

A security condition that does **not** involve a hostile action as reported by Security Shift Supervision

OR

A credible site-specific security threat notification

OR

A validated notification from NRC providing information of an aircraft threat

Mode Applicability:

All

Basis:

<u>Generic</u>

Note: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as hostile actions are classifiable under EAL HA4.1, EAL HS4.1 and EAL HG4.1.

A higher initial classification could be made based upon the nature and timing of the security threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification level in accordance with the Ginna Safeguards Contingency Plan.

First Condition

Reference is made to security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Security and Safeguards Contingency Plan.

This threshold is based on the Ginna Safeguards Contingency Plan. The Ginna Safeguards Contingency Plan is based on guidance provided by NEI 03-12.

Second Condition

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Unusual Event.

The determination of "credible" is made through use of information found in the Ginna Safeguards Contingency Plan .

Third Condition

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that Offsite Response Organizations and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level via EAL HA4.1 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Plant-Specific

If the Security Shift Supervisor determines that a threat notification is credible, the Security Shift Supervisor will notify the Operations Shift Manager that a "Credible Threat" condition exists for Ginna. Generally, Ginna Security procedures address standard practices for determining credibility. The three main criteria for determining credibility are: technical feasibility, operational feasibility, and resolve. For Ginna, a validated notification delivered by the FBI, NRC or similar agency is treated as credible.

Definitions:

Airliner/Large Aircraft

Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Security Condition

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

Ginna Basis Reference(s):

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- 1. Ginna Safeguards Contingency Plan
- 2. ER-SEC.1 Response to Change in Security Threat Level
- 3. ER-SEC.2 Response to Intrusion by Adversary
- 4. ER-SEC.3 Response to Airborne Threat
- 5. NEI 99-01 HU4

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

Category:	H – Hazards and Other Conditions Affecting Plant Safety		
Subcategory:	4 – Security		
Initiating Condition:	Hostile action within the Owner Controlled Area or airborne attack threat		
EAL:	n kan berekan beran beran beran beran kan beran ber Berang par sementer beranden of genan beranden of standa beran betal beran beran beran beran beran beran beran b Berang par sementer beranden of standarden of standa beran		
HA4.1 Alert	n na ar an		
A hostile action is occu	urring or has occurred within the Owner Controlled Area as reported		
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A validated notification from NRC of an airliner attack threat within 30 min. of the site

Mode Applicability:

All

Basis:

Generic

Note: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements. The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

First Condition

This condition addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Owner Controlled Area. Those events are adequately addressed by other EALs.

Note that this condition is applicable for any hostile action occurring, or that has occurred, in the Owner Controlled Area.

Second Condition

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This condition addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time. and the second

The intent of this condition is to ensure that notifications for the airliner attack threat are made in a timely manner and that Offsite Response Organizations (OROs) and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This condition is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert. The the campacity of sectors and the participation of the sectors of . .

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Plant-Specific

Definitions:

Airliner/Large Aircraft

Any size or type of aircraft with the potential for causing significant damage to the plant (refer to the Security Plan for a more detailed definition).

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

- Ginna Basis Reference(s):
 1. Ginna Safeguards Contingency Plan
 2. NEI 99-01 HA4

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Category: H – Hazards and Other Conditions Affecting Plant Safety Subcategory: 4 – Security Initiating Condition: Hostile action within the Protected Area EAL:

HS4.1 Site Area Emergency A hostile action is occurring or has occurred within the Protected Area as reported by Security Shift Supervision

Mode Applicability:

All

Basis:

Generic

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This condition represents an escalated threat to plant safety above that contained in the Alert in that a hostile force has progressed from the Owner Controlled Area to the Protected Area.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires Offsite Response Organization (ORO) readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a hostile action. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the Protected Area. Those events are adequately addressed by other EALs.

Escalation of this emergency classification level, if appropriate, would be based on actual plant status after impact or progression of attack.

Plant-Specific

None

Definitions:

Hostile Action

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Protected Area

The site specific area which normally encompasses all controlled areas within the security Protected Area fence.

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Ginna Basis Reference(s):

- 1. Ginna Safeguards Contingency Plan
- 2. NEI 99-01 HS4

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EMERGENCY ACTION LEVEL

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Category:	H – Hazards and Other Conditions Affecting Plant Safety		
Subcategory:	4 – Security		
Initiating Condition:	Hostile action resulting in loss of physical control of the facility		
EAL:			

HG4.1 General Emergency

A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions

Mode Applicability:

All

Basis:

Generic

This EAL encompasses conditions under which a hostile action has resulted in a loss of physical control of Vital Areas (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

Plant-Specific

Safety functions include:

- Reactivity control
- RCS Inventory
- Secondary Heat Removal

Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

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如果, "你想到你,我就是我们的问题?""你说,你不知道你的,我们不是你的吗?""我不 Ginna Basis Reference(s): Margara and 1. NEI 99-01 HG1 (see suggestion of the second : and the second . and the and the second seco Contraction and the second second orden de la servicie La servicie de la serv 小结核 调查 经资产公司公司 · . .

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Category:	H – Hazards and Other Conditions Affecting Plant Safety
Subcategory:	4 – Security
	Hostile action resulting in loss of physical control of the facility
EAL:	

HG4.2	General Emergency	·		
A hostile act	ion has caused failure of Spent Fuel C	ooling systems	2.A. B.	i di sti
			e di secondo de 21. Nome de la composición de 19.000 de 19.000 de 19.000 de 19.000 de 19.000 de 19.000 de 19.00	
	el damage is likely		e dan e stand 1995 - Standard I. 1995 - Status I.	an An an An

Mode Applicability:

All	
Basis:	North Street

Generic This EAL addresses failure of spent fuel cooling systems as a result of hostile action if imminent fuel damage is likely.

Plant-Specific

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Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Nonterrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Imminent

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

Ginna Basis Reference(s):

1. NEI 99-01 HG1

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Category: Subcategory: Initiating Condition:	 H – Hazards and Other Conditions Affecting Plant Safety 5 – Control Room Evacuation Control Room evacuation has been initiated 				
EAL:	· · · ·	<i>.</i>			• ** • · ·
HA5.1 Alert Control Room evacuati	ion has been initiated				
Mode Applicability:		· .		1631-15 1	• • • •
All Basis: <u>Generic</u>				Maria Santa Maria	
Technical Support Cente	acuated, additional support r and/or other emergency r	esponse facilities	may be neo	cessary.	
	t control from outside the c	•		event to a	Site
<u>Plant-Specific</u>					

AP-CR.1 Control Room Inaccessibility provides specific instructions for evacuating the

Control Room and establishing plant control in alternate locations (ref. 1).

Ginna Basis Reference(s):

- 1. AP-CR 1 Control Room Inaccessibility
- NEI 99-01 HA5
 NEI 99-0

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 EMERGENCY ACTION LEVEL

 TECHNICAL BASES DOCUMENT
 Revision [Draft H] Page 159 of 278 Category: H – Hazards and Other Conditions Affecting Plant Safety Subcategory: and 5 - Control Room Evacuation Initiating Condition: Control Room evacuation has been initiated and plant control cannot be established EAL: en mana en la la case d'amp seconda en la companya case en la case da case da case da case en la case HS5.1 Site Area Emergency Control Room evacuation has been initiated AND en reaction a state fragmente de la seconda de la secon Control of the plant cannot be established within 30 min.

Mode Applicability:

All

Basis:

Generic

The intent of this EAL is to capture those events where control of the plant cannot be reestablished in a timely manner. In this case, expeditious transfer of control of safety systems has not occurred (although fission product barrier damage may not yet be indicated).

The intent of the EAL is to establish control of important plant equipment and knowledge of important plant parameters in a timely manner. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions. Typically, these safety functions are reactivity control (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).

The determination of whether or not control is established at the remote shutdown panel is based on Emergency Director (ED) judgment. The Emergency Director is expected to make a reasonable, informed judgment within the site specific time for transfer that the licensee has control of the plant from the remote shutdown panel.

Escalation of this emergency classification level, if appropriate, would be by EALs in Category F or Category R.

Plant-Specific

AP-CR.1 Control Room Inaccessibility provides specific instructions for evacuating the

Control Room and establishing plant control in alternate locations (ref. 1).

An analysis was performed as part of the Fire Protection Program (ref. 2) to determine how

quickly control must be re-established at Ginna without core uncovery or damage. There

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are 5 time-critical actions which must be accomplished to enable established performance goals to be met. In evaluating a reasonable timeline for completion of tasks required in the ER-FIRE procedures to restore charging, it was estimated that restoration should be completed in less than 30 minutes. This is consistent with information obtained during operator walk-throughs of the ER-FIRE procedures which consistently indicated restoration in 17 to 24 minutes.

Ginna Basis Reference(s):

- 1. AP-CR.1 Control Room Inaccessibility
- 2. Fire Protection Program, Section 3.2.2.12 Time Criteria for Achieving Hot Shutdown
- 3. NEI 99-01 HS2

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H - Hazards and Other Conditions Affecting	Plant Safety
6 – Judgment	ى مەركەت بىرى ئەردىر ئۆچۈچە تەركى
Other conditions existing that in the judgment	
Event	en e
which in the judgment of the Emergency Director have occurred which indicate a potential de a indicate a security threat to facility protection we material requiring offsite response or mon on of safety systems occurs	egradation of the level n has been initiated itoring are expected
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ticipated conditions not addressed explicitly elsev new because conditions exist which are believed b DE emergency classification level. The believe gather is the state of the state of the state of the believe is the state of the state of the believe of the believe is the state of the believe of the believe of the believe	ey the Emergency data and non-searchtrase 2≜ Baari Lastos en in maas about
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	TECHNICAL BASES DOCUMENT H – Hazards and Other Conditions Affecting 6 – Judgment Other conditions existing that in the judgment Director warrant declaration of a UE Event thich in the judgment of the Emergency Director or have occurred which indicate a potential de Indicate a security threat to facility protection ve material requiring offsite response or mon on of safety systems occurs. ticipated conditions not addressed explicitly elsevents by because conditions exist which are believed b DE emergency classification level. e(s):

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· · · · · · · · EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] TECHNICAL BASES DOCUMENT Page 162 of 278 H – Hazards and Other Conditions Affecting Plant Safety Category: a the state of the second s Subcategory: 6 – Judgment Initiating Condition: Other conditions exist that in the judgment of the Emergency Director warrant declaration of an Alert 1 EAL: and the second second HA6.1 Alert Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel OR damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) Mode Applicability: 1.75 All **Basis:** in a second second second second second the second the second second second second second second second second Generic state the second state was a second state of the second st This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency classification level. Sector de la sector **Plant-Specific** 8 14 **Definitions: Hostile Action** An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This

equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Ginna Basis Reference(s):

1. NEI 99-01 HA6

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Electron and Stephen	TECHNICAL BASES DOCUMENT	Page 163 of 278	
Category:	H – Hazards and Other Conditions Affecting Plant Safety		
Subcategory:	6 – Judgment		
Initiating Condition:	Other conditions existing that in the judgment of the Emergency Director warrant declaration of a Site Area Emergency		
		•	

EAL:

HS6.1 Site Area Emergency

Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public **OR** hostile action that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of, or: (2) that prevent effective access to, equipment needed for the protection of the public. **Any** releases are **not** expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) beyond the site boundary

Mode Applicability:

All

Basis:

<u>Generic</u>

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

Plant-Specific

Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Site Boundary

The Site Boundary is approximately a 0.3-mile radius around the reactor.

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 Category:
 H – Hazards and Other Conditions Affecting Plant Safety

 Subcategory:
 6 – Judgment

 Initiating Condition:
 Other conditions exist that in the judgment of the Emergency Director warrant declaration of a General Emergency

EAL:

HG6.1 General Emergency

Other 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 for loss of containment integrity **OR** hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) offsite for more than the immediate site area

Mode Applicability:

All

Basis:

Generic

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergency.

Plant-Specific

Definitions:

Hostile Action

An act toward Ginna or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on Ginna. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

Imminent

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

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Ginna Basis Reference(s): 1. NEI 99-01 HG2

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Category Si- System Malfunction 2004 of Monthly Decast As the Auto active Monthly Monthly EAL Group: Hot Conditions (RCS temperature > 200°F); $M^{2} \rightarrow M$ EALs in this category are applicable only in one or more hot operating modes. 植物的神经治理 医结核 是实现的 医结核性病 人名斯尔林 电强力分离 Numerous system-related equipment failure events that warrant emergency classification have been identified in this category. They may pose actual or potential threats to plant safety. The events of this category pertain to the following subcategories: en Calendaria de La Alexandra de Calendaria de Calendaria de Santa Calendaria de Calendaria de Calendaria da 1. Loss of AC Power, and contract with the accuration of the state of the first Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of onsite and offsite power sources for the 480V safeguard buses. en Mandala, es el aport sues los participas de el transfixe or, forda a branca o el portente el 2. Loss of DC Power Loss of emergency plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of power to the 125 VDC buses. na sananang palanta baga na kalan na kalay subserver betweet to believel, a definition betweet where where the output tended and the second of the 3. Criticality & RPS Failure and assustant we will added it. Thy works it terms that no h Inadvertent criticalities pose potential personnel safety hazards as well as being indicative of losses of reactivity control on abadiance man. If any intervention additional Events related to failure of the Reactor Protection System (RPS) to initiate and complete automatic reactor trips. In the plant licensing basis, postulated failures of the RPS to complete a reactor trip comprise a specific set of analyzed events referred to as Anticipated Transient Without Scram (ATWS) events. For EAL classification however, ATWS is intended to mean any automatic trip failure event that does not achieve reactor shutdown. If RPS actuation fails to assure reactor shutdown, positive control of

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reactivity is at risk and could cause a threat to fuel clad, RCS and Containment and the integrity.

4. Inability to Reach or Maintain Shutdown Conditions

System malfunctions may lead to failure of the plant to be brought to the required plant operating condition required by Technical Specifications if a limiting condition for operation (LCO) is not met.

5. Instrumentation

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

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6. Communications

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

7. Fuel Clad Degradation

During normal operation, reactor coolant fission product activity is very low. Small concentrations of fission products in the coolant are primarily from the fission of tramp uranium in the fuel clad or minor perforations in the clad itself. Any significant increase from these base-line levels (2% - 5% clad failures) is indicative of fuel failures and is covered under Category F, Fission Product Barrier Degradation. However, lesser amounts of clad damage may result in coolant activity exceeding Technical Specification limits. These fission products will be circulated with the reactor coolant and can be detected by coolant sampling and/or the Letdown radiation monitor.

-.8. RCS Leakage (Lead to the plane of the radiation of the second representation of the restriction of t

The Reactor Vessel provides a volume for the coolant that covers the reactor core. The Reactor Vessel and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel clad

integrity fail.

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Excessive RCS leakage greater than Technical Specification limits indicates potential pipe cracks that may propagate to an extent threatening fuel clad, RCS and the second Containment integrity of device the constant of the States and the States and the States and المترج المناجع المناجع والمتحد والمتحد المتعاقف والمتعاقف والمتعاقف والمتعاقف والمتعاقف والمتحد والمتحد والمتح الأبيان الجمية الجمية أرواح التراك المراجع We say that of short have a new street from a second character of the have been p 4 · · · 化化物 化合理机合理性 化合理性 化试验 化过敏试验 法保证 化甲基酚酸 化合量 网络黄色花 机合成 化分子分子分子分子 in experience to the constraint data to determine the second second second second second second second second s y for the form of the second Complete Contraction of the complete · · بالمتعمون والاراب ومروا ماليا المتعاوية 5 and the second , · and an address of the set of the set the state of the second state of the second . * .

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Category:	S – System Malfunction	
Subcategory:	. 1- Loss of AC Power attack and a structure we	
Initiating Condition:	Loss of all offsite AC power to 480V safeguar min.	ds buses for ≥ 15

EAL:

SU1.1 Unusual Event

Loss of all offsite AC power, Table S-1, to 480V safeguards buses for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Table S-1 AC Power Sources			
Onsite	EDG 1A (Bus 14)EDG 1B (Bus 16)		
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established) 		

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

Prolonged loss of off-site AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power to emergency busses.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses of off-site power.

Plant-Specific

Two Class 1E independent trains provide the necessary redundancy on the 480V

safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B

consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered

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safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features required for hot shutdown and hot standby modes will be operable.

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV
- Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and an Unusual Event must be declared.

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The fifteen-minute interval was selected as a threshold to exclude transient power losses.

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Ginna Basis Reference(s):

- 1 UESAR Section 8 and Figure 8.1.1 Electrical Distribution System
- UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System
 NEI 99-01 SU1

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ித்தும் பிரிய மற்றுகிற பயில்க இண்டிய விடிய அறில் இசுவில் இசுவில் இருவில் இது திரையில் விடுவில் பிருவில் பிரைய வ பிரிய கியில் மற்று சுதிச்சில விசுத்தும் பிரியும் சிசியத்தில் பிசிய பிருவில் இருவில் பிரியில் பிசிய பிருவில் பிர பிரிய சுடியில் இச்சில விசுதி சிய சிய மிசிய விசிய பிசியல் பிசியல் பிருவில் இருவில் பிசிய சிறியில் பிசிய பிருவில் குசுவிரைய பிருவில் இல்லில் பிரும் சிரிய பிரிய பிசிய பிசிய பிசிய பிருவில் கிலிய விசியில் பிசிய சிய பிருவில் பிர சுடிய இருவில் இடியில் பிரும் சிரிய பிரிய பிசிய பிசிய பிசிய பிசிய பிருவில் கிலிய சிறிய பிசிய சிறியில் பிசிய சி சுடிய பிருவில் இடியில் பிரும் சிரிய பிசிய பிசிய பிசிய பிசிய பிசிய திரையில் கிலியில் கிலியில் பிசிய பிசிய பிசிய சுடிய பிருகிய இடியில் கிலிய பிசிய பிசிய பிசிய பிசிய பிசிய பிசிய விசிய கிலையில் பிசிய சிறிய பி கிசுவிய பிசிய சில பிரிக்கு கிலி சியிய பிசிய பிசிய பிசிய இன்றுக்கும் பிரும் கிலியில் பிசிய பிசிய பிசிய

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EMERGENCY ACTION LEVEL **TECHNICAL BASES DOCUMENT**

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Category:	S – System Malfunction and addition of the spectrum states of the second
Subcategory:	and - Loss of AC Power and the subtract of the
Initiating Condition:	AC power capability to 480V safeguards buses reduced to a single power source for ≥15 min. such that ANY additional single failure would result in a complete loss of all 480V safeguards bus power
EAL:	$(1,1) = \left\{ \left\{ \left\{ 1, \dots, n \right\} : \left\{ \left\{ 1, \dots, n \right\} : \left\{ 1, \dots, n $
	0 480V safeguards buses reduced to a single power source,

Table S-1, for \geq 15 min. (Note 4)

Any additional single power source failure will result in a complete loss of all 480V safeguards bus power an an an an tha the second state

The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is Note 4: determined that the condition has exceeded, or will likely exceed, the applicable time.

		Table S-1 AC Power Sources	ngersverse Galeria i Station Maria i Barria i Stationa
•	Onsite	• EDG 1A (Bus 14) • EDG 1B (Bus 16)	a a the second and the second s
	Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established) 	uar e Report 1919 - Spice Book (1919) 1920 - Spice Parlance 1921 - Spice Spice
Mada Applicabi	1:4.0	· · · · · · · · · · · · · · · · · · ·	

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

The condition indicated by this EAL is the degradation of the off-site and on-site AC power systems such that any additional single failure would result in a complete loss of 480V vital bus AC power . This condition could occur due to a loss of off-site power with a concurrent failure of all but one emergency generator to supply power to its emergency busses. Another related condition could be the loss of all off-site power and loss of on-site emergency generators with only one train of 480V vital busses being backfed from the unit main generator, or the loss of on-site emergency

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generators with only one train of 480V vital busses being backfed from off-site power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with EAL SS1.1. • • • • and the second Fifteen minutes was selected as a threshold to exclude transient or momentary losses of power. en de la companya de Plant-Specific 1.11

Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features required for hot shutdown and hot standby modes will be operable.

There are three offsite power sources available to these buses (ref. 1):

- Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204) via CKT 7T)
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via • CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV • Main Transformer with the Main Generator bus disconnects (links) removed.

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and an Unusual Event must be declared.

There are two onsite emergency AC power sources available in the hot modes:

- EDG 1A
- EDG 1B

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

The fifteen-minute interval was selected as a threshold to exclude transient power losses. If multiple sources fail to be capable of supplying one or more safety-related buses within 15 minutes, an Unusual Event is declared under this EAL. The subsequent loss of the single remaining power source escalates the event to a Site Area Emergency under EAL SS1.1.

Ginna Basis Reference(s):
1. UFSAR Section 8 and Figure 8.1-1 Electrical Distribution System
2. NEI 99-01 SA5

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EMERGENCY ACTION LEVEL **TECHNICAL BASES DOCUMENT**

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Subcateg		·•.
Initiating	Condition: Loss of all offsite and all onsite AC power to 480V safeguards buses for \ge 15 min.	
CAL:	n an	
SS1.1	A Site Area Emergency and an available provided and a second structure	;]
Loss of a	offsite and all onsite AC power, Table S-1, to 480V safeguards buses	•

for \geq 15 min. (Note 4)

The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is Note 4: . . • • determined that the condition has exceeded, or will likely exceed, the applicable time.

	Table S-1 AC Power Sources	
standarda Lana ang	• EDG 1A (Bus 14) • EDG 1B (Bus 16)	ad half a can diff. Ta ann an t-Frain
an she she she An she she she An she she she	Station Auxiliary Transformer 12A	19月期,19月1日。 19月1日 - 秋天 医病毒病性
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Mode Applicability: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

しはしているとは、からががかって、とうないというが、からかられたがなかかからもようとう!!! **Basis:**

Generic

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Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to 480V vital busses will lead to loss of Fuel Clad, RCS, and Containment, thus this event can escalate to a General Emergency.

e paga tan Book and the analysis and a figure t e en la seconda de la compagneta en Fifteen minutes was selected as a threshold to exclude transient or momentary losses of off-site 化化学学校 经济利益 化合物 化合物 医小疗的 化分子子 power.

Escalation to General Emergency is via EALs in Category F or EAL SG1.1.

Plant-Specific

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Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features required for hot shutdown and hot standby modes will be operable.

There are three offsite power sources available to these buses in the cold modes (ref. 1):

- and the second Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T) and the state of the state of the state of the
- Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6.
- Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed. 计分词通知 网络小麦花 网络小麦花花

Based on operational experience, if the Unit Auxiliary Transformer backfeed from the Main Transformer is not already aligned, it cannot be considered available/capable of supplying the safeguards buses due to the time it will take to align it. In any case, if this cannot be accomplished within 15 minutes, it is not considered available and Alert must be declared.

There are two onsite emergency AC power sources available in the cold modes:

EDG 1A

· · · ·

EDG 1B

The fifteen-minute interval was selected as a threshold to exclude transient power losses. If all sources fail to be capable of supplying all safety-related buses within 15 minutes, a "你们的过去时我们,你没有这些你的,你不是你的。" Site Area Emergency is declared under this EAL.

17件,我们曾有你的爱爱超的教育的情绪,你们还是我就是这些人。"

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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ಿಗೆ ಸಂಭಾನಿಕ ಕಾರದಲ್ಲಿದೆ. ಇದು ಬಂಗಿಕೊಂಡಿಗೆ ಸಂಗಿದ್ದಿ ಕೇಂಬ್ ಸಾಗಿದ್ದ ಕೇಂಬ್ ಸಾಧ್ಯ ಸಿದ್ದಾರೆ ಹಾಗೆ ಕೇಂಬ್ ಸಿನಿಸ್ ಸಿನಿಸ್ ಸ ಆಗಿ ಹೇಳ ಪ್ರಾಥ್ಯಕ್ಷಣೆಗೆ ಗೇರ್ಗರ್ ಕಾರ್ಯಕ್ಷೆ ಕೊಡಲಾಗಿದ್ದರೆ ಬೆಗೆ ಕೋರ್ಗಾಟ್ ಸಾಧಿಸಿದರೆ. ನಗಡು ಕೊಬ್ಬಗಳ ಸಿದ್ದಿಯಿಂಗ ಬೇಕ ಸಿನಿ ಆಗಿ ಮುಂಗ್ರಾಹ್ ಬಂಗಳಿಯಗೂ ಸಿಗಿದ್ದ ಪ್ರಾಗಿಸಿದ್ದರೆ. ಸಂಗಿತ್ತ ಸಂಧಾನ್ಯ ನತ್ತರಿಗೆ ಹೊಸಿಗೆ ಸಿನ್ನಾಗಿ ಸಿನಿಮಿಗೆ ಮಾಡಿದೆ ಮಾಡಿದೆ ಸ ನಂತಹಗೆ ಗಡಿಗಡಿಗೆ ಕೇಂಬ್ರೆ ಗಡುಗಿತ್ತು ಬೇಕಿಗೆ



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S –System Malfunction	and the second
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Prolonged loss of all offsite and safeguards buses	all onsite AC power to 480V
<u></u>	
Emergency	and the second
all onsite AC power. Table S-1, to	o 480V safeguards buses
	1 – Loss of AC Power Prolonged loss of all offsite and safeguards buses Emergency

Restoration of at least one 480V safeguards bus within 4 hours is **not** likely **OR**

ORANGE or RED path condition exists F-0.2 Core Cooling

	Table S-1 AC Power Sources			
Onsite	 EDG 1A (Bus 14) EDG 1B (Bus 16) 			
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established) 			

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

Loss of all AC power to emergency busses compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power to emergency busses will lead to loss of fuel clad, RCS, and containment, thus warranting declaration of a General Emergency.

This EAL is specified to assure that in the unlikely event of a prolonged loss of all AC power to 480V safeguards buses, 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.

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The likelihood of restoring at least one safeguards bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions. In addition, under these conditions, fission product barrier monitoring capability may be degraded. on and a state water was not a state of the Plant-Specific and the work of the second state of the second state of Two Class 1E independent trains provide the necessary redundancy on the 480V safeguards system. Train A consists of 480V safeguards buses 14 and 18, while train B consists of safeguards buses 16 and 17. Buses 14 and 16 provide power to engineered safety features that are essential in response to the analyzed events and design basis accidents (e.g., SI pumps, RHR pumps, containment fans, etc.). Buses 17 and 18 provide power to the four service water pumps and are not listed in Table S-1 because the availability of power to Buses 17 and 18 alone does not ensure engineered safety features Section 1 유민이는 영화 이 같이 있는 것이 같이 많다. required for hot shutdown and hot standby modes will be operable. 白鳍毛属 医口腔 化试验器 化二乙基丙酮 网络拉丁西美国第三百姓姓 医拉尔氏 经公司公司 计分词 法法公司 网络马克马拉 There are three offsite power sources available to these buses in the cold modes (ref. 1): Station Auxiliary Transformer 12A fed from one 34.5 kV transmission line (STA 204 via CKT 7T) where a second Station Auxiliary Transformer 12B fed from the 115 kV switchyard (STA 13A via CKT 767) via the 34.5 kV Transformer #6. Active the second state of the second state o Unit Auxiliary Transformer 11 backfed from the 115 kV switchyard via the 19 kV Main Transformer with the Main Generator bus disconnects (links) removed. . ~ There are two onsite emergency AC power sources available in the cold modes: 化化合物化合物 医静脉的 经保险 化化化化物 建糖 医肥白的 化过分分析 化实验分析 计分析 化分子子 EDG 1A ne en ser a la regel den de la compañía de la compañía de la compañía de la compañía de compañía de compañía d • , · · EDG-18-- Gentelan) Chemisteric - Scheller Cleaner - Leaner - Hall Stars above Scheler Consideration should be given to operable loads necessary to remove decay heat or provide Reactor Vessel makeup capability when evaluating loss of all AC power to any and safeguards buses. The last the strength buse theory of the state of th NE CAMPAGE AND MENDER STATES AND A STATES

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Ginna is licensed for a four hour Station Black Out (SBO) coping category (ref. 2). The ability of the plant to cope with a four hour SBO duration was based on an assessment of condensate inventory required for decay heat removal, Class 1E battery capacity, compressed air availability or manual operation of certain valves, effects of loss of ventilation, containment isolation valve operability, and reactor coolant inventory loss. A plant-specific analysis indicates that the expected rates of reactor coolant inventory loss under SBO conditions do not result in core uncovery in a SBO for four hours. Therefore, ••••••• makeup systems in addition to those currently available under SBO conditions are not required to maintain core cooling under natural circulation. Thus, conditions in which restoration of AC power within four hours is not likely are included in the EAL. 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 ED a reasonable idea of how guickly to declare a General $(a,b) \in \mathcal{A}$ Emergency based on two major considerations: 1. 1911年1月1日日 - 1847年1月1日日

- 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 ED judgment as it relates to imminent loss or potential loss of fission product barriers and degraded ability to monitor fission product barriers. Indication of continuing core cooling degradation is manifested by the existence of conditions to Critical Safety Function Status Tree Core Cooling-ORANGE or RED paths (ref. 3).

Ginna Basis Reference(s): 14 Construction and a study of the state of

- 1. UFSAR Section 8 Electrical Power and Figure 8.1-1 Electrical Distribution System
- 2. Ginna Station Blackout Program Section 3.7
- 3. CSFST for F-0.2 Core Cooling

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S – System Malfunction
2 – Loss of DC Power
Loss of all vital DC power for \geq 15 min.

SS2.1 Site Area Emergency

< 108 VDC on **both** 125 VDC buses 1A and 1B for \geq 15 min. (Note 4)

Note 4: The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

<u>Generic</u>

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Escalation to a General Emergency would occur by EALs in Category R and Category F.

Plant-Specific

The 125 VDC vital system is divided into two independent and isolated channels. Each channel consists of one battery, two battery chargers, one DC bus and one inverter. Each inverter has an associated vital AC distribution panel board. Power to the DC bus, DC unit control panels, and inverters is supplied by the station batteries and/or the battery chargers. Each battery charger is fully rated and can recharge a discharged battery while at the same time supplying the steady state power requirements of the system.

A separate TSC Battery system is designed with an intertie to each of the two main (A and B) distribution panels for use during maintenance and abnormal conditions.

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The safety-related station batteries have been sized to carry their expected shutdown loads following a plant trip and loss of offsite power or following a station blackout without battery terminal voltage falling below 108.6 volts for a period of 4 hours (ref. 1).

The fifteen-minute interval was selected as a threshold to exclude transient or momentary power losses.

The loss of the TSC Battery does not constitute an entry condition for this EAL.

 This EAL is the hot condition equivalent of the cold condition loss of DC power design of the EAL CU2.1.
 Second condition loss of DC power design of the cold condition loss of the condition lo

Ginna Basis Reference(s):

- 1. UFSAR Section 8.3.2 Direct Current Power Systems
- NEI 99-01: SS3 (and reacting to the block of block of state responding the second state block of the second state respondence of the state respondence of the

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Category: S – System Malfunction Media Contraction Median Contraction Contraction Subcategory: A second 3 – Criticality & RPS Failure in some and the second seco Initiating Condition: Inadvertent criticality descentions and a second second second second second second second EAL: and the second second 网络流行性 使无疑的现在分词使无责任 网络拉克拉尔人名布拉尔 正正

SU3.1 Unusual Event

An unplanned sustained positive startup rate observed on nuclear instrumentation

Mode Applicability: The second second and the second s . 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

This EAL addresses inadvertent criticality events. While the primary concern of this EAL is criticality This EAL addresses inadvertent criticality events. This EAL indicates a potential degradation of the level of safety of the plant, warranting a UE classification. This EAL excludes inadvertent criticalities that occur during planned reactivity changes associated with reactor startups (e.g., criticality earlier than estimated).

Escalation would be by EALs in Category F, as appropriate to the operating mode at the time of the event.

Plant-Specific

The term "sustained" is used to allow exclusion of expected short-term positive startup rates from planned fuel bundle or control rod movements during core alteration. These short-term positive startup rates are the result of the rise in neutron population due to subcritical multiplication. Short-term positive startup rates can also be due to welding activities.

Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient.

Ginna Basis Reference(s):

1. NEI 99-01 SU8

EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

Category: S-	- System Malfunction
Subcategory: 3 -	-Criticality & RPS Failure and Netherland and a state of the definition of the
ac sh	tomatic trip failed to shut down the reactor and the manual tions taken from the reactor control console are successful in utting down the reactor
EAL.	and a start of the second s A start second
SA3.1AlertAn automatic trip failed toAND	na se
indicated by reactor power	
Mode Applicability:	n se skérel manne a line este mage par agé ar és a messari de litere.
1 - Power Operation	na an an 1912 an an an airte an
Basis:	n. Na series de la companya de la comp
Ĝeneric	an being an
The reactor should be consid heat load for which the safety Manual trip actions taken at operator(s) which causes or	lered shutdown when it producing less heat than the maximum decay y systems are designed (5% power). he reactor control console are any set of actions by the reactor should cause control rods to be rapidly inserted into the core and
is more than a potential degr system did not function in res because design limits of the conditions may exist that lea	e of the automatic protection system to trip the reactor. This condition adation of a safety system in that a front line automatic protection sponse to a trip signal. Thus the plant safety has been compromised fuel may have been exceeded. An Alert is indicated because d to potential loss of fuel clad barrier or RCS barrier and because of tection System to automatically shut down the plant.
escalate to a Site Area Emer	e reactor control console fail to shut down the reactor, the event would gency. The sole states are been were reacted as the sole of the s
	Illy initiated by the Reactor Protection System (RPS) when
•	ored parameters exceed predetermined setpoints. The
symptoms matrequire an	automatic reactor trip are defined in procedure P-1(ref. 4):

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Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power drops into the source range (ref. 2).

The operator ensures that the reactor has tripped by (ref. 1):

- Verifying that at least one train of reactor trip breakers are open
- Checking that all control rod position rod bottom lights are on
- Observing neutron flux is decreasing

If these responses cannot be verified, operators perform contingency actions that manually insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room to actuate reactor trip switches or deenergize 480 V buses 13 and 15 (ref. 1, 2).

In the event that the operator identifies a reactor trip is imminent and successfully initiates a manual reactor trip before the automatic trip setpoint is reached, no declaration is required. The successful manual trip of the reactor before it reaches its automatic trip setpoint or reactor trip signals caused by instrumentation channel failures do not lead to a potential fission product barrier loss. If manual reactor trip actions in the Control Room fail to reduce reactor power below 5% (ref. 3), the event escalates to the Site Area Emergency under EAL SS2.1. u an 1997) Na tri Carlan A. Saith an Carlanaga C

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Ginna Basis Reference(s):	n dra del a de para del se	
1. E-0 Reactor Trip or Safety Injection		g at a the fact of the
 FR-S.1 Response to Reactor Restart/A CSFST for F-0.1 Subcriticality P-1 Reactor Control and Protection Sy 	n wo Contar test all chemistra Ingel chier interaction Istem	anna ann an tha an tairt
5. NEI 99-01 SA2		· · · ·
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Category:	S – System Malfunction
Subcategory:	3 – Criticality & RPS Failure
Initiating Condition:	Automatic trip and manual actions taken from the reactor control console failed to shut down the reactor
EAL:	eries and second se I Second secon

SS3.1 Site Area Emergency

An automatic trip failed to shut down the reactor as indicated by reactor power > 5%

AND

Manual actions taken at the reactor control console failed to shut down the reactor as indicated by reactor power > 5%

Mode Applicability:

1 - Power Operation

Basis:

<u>Generic</u>

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. A Site Area Emergency is warranted because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS.

The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (5% power).

Manual scram (trip) actions taken at the reactor control console are any set of actions by the reactor operator(s) which causes or should cause control rods to be rapidly inserted into the core and shuts down the reactor.

Manual trip actions are not considered successful if action away from the reactor control console is required to trip the reactor. This EAL is still applicable even if actions taken away from the reactor control console are successful in shutting the reactor down because the design limits of the fuel may have been exceeded or because of the gross failure of the Reactor Protection System to shutdown the plant.

Escalation of this event to a General Emergency would be due to a prolonged condition leading to an extreme challenge to either core-cooling or heat removal.

Plant-Specific

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A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined setpoints. The symptoms that require an automatic reactor trip are defined in procedure P-1 (ref. 4): Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power drops into the source range (ref. 2).

The operator ensures that the reactor has tripped by (ref. 1):

- Verifying that at least one train of reactor trip breakers are open
- Checking that all control rod position rod bottom lights are on
- Observing neutron flux is decreasing

If these responses cannot be verified, operators perform contingency actions that manually insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room to actuate reactor trip switches or deenergize 480V buses 13 and 15 (ref. 1, 2).

If reactor power is above 5%, the reactor is producing more heat than the maximum decay heat load safety systems are designed to remove (ref. 3). Emergency boration is thus required and there is an actual major failure of a system intended for protection of the public. The combination of failure of both front line and backup protection systems to function in response to a plant transient, along with the continued production of heat poses

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	ergency.									
Ginı	na Basis Re	ferenc	e(s):	· · · ·	۰. «۱۰۰)		• • •		2 4	ta si a
1. E	E-0 Reactor	Trip or	Safety Inj	ection	• • • •	: . · ·				· · · · ·
2. F	R-S.1 Resp	onse to	Reactor	Restart/A	TWS 🐁	9. 1				:
3. C	CSFST for F	-0.1 Su	bcriticality	/		т	•.	< *11		.• ·
4. F	Procedure P NEI 99-01 S	-1 Read	tor Contr	ol and Pro	otection S	ystem		ه و موجود ا	1	• • • •
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Category:	S System Malfunction (Manager and Amazer and Amaz Amazer and Amazer and Ama Amazer and Amazer and Am Amazer and Amazer and Amaz
Subcategory:	
	Automatic trip and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists
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SG3.1	General Emergency
An automati	c trip failed to shut down the reactor as indicated by reactor power > 5%
AND	क्षण प्रायं सम्प्रकृत्व रहे जिल्हा प्रायं के प्रायं
All manual a	actions fail to shut down the reactor as indicated by reactor power > 5%
AND EIT	HER of the following exist or have occurred with the second states of th
0	path condition exists F-0.2 Core Cooling
RED	path condition exists F-0.3 Heat Sink

Mode Applicability: 2010 College College Sectores College Matter College Applicability and the College Sectores
Basis: Videa Totera de el coasa da a gran Merecidate castro sacro sera coso el garo concellaro, controvo co
- <u>Generic</u> III to Alba Assent Mütte water the bulk as not the state parts of call a consister. An easter

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed and efforts to bring the reactor subcritical are unsuccessful. The reactor should be considered shutdown when it producing less heat than the maximum decay heat load for which the safety systems are designed (5% power). In the event either of these challenges exists at a time that the reactor has not been brought below the power associated with the safety system design a core melt sequence exists. In this situation, core degradation can occur rapidly. For this reason, the General Emergency declaration is intended to be anticipatory of the fission product barrier table declaration to permit maximum off-site intervention time.

Plant-Specific

A reactor trip is automatically initiated by the Reactor Protection System (RPS) when certain continuously monitored parameters exceed predetermined setpoints. The symptoms that require an automatic reactor trip are defined in procedure P-1 (ref. 6). Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a few percent of the original power level and then decays to a

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level some 8 decades less at a startup rate of about -1/3 DPM. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a negative startup rate as nuclear power drops into the source range (ref. 2).

The operator ensures that the reactor has tripped by (ref. 1):

- Verifying that at least one train of reactor trip breakers are open
- Checking that all control rod position rod bottom lights are on
- Observing neutron flux is decreasing

If these responses cannot be verified, operators perform contingency actions that manually insert control rods, open the reactor trip breakers, and tripping the Rod Drive MG sets. Local opening of these breakers requires actions outside of the Control Room; rapid control rod insertion by these methods is therefore not considered a "successful" manual reactor trip. For purposes of emergency classification, a "successful" manual reactor trip, therefore, includes only those immediate actions taken by the reactor operator in the Control Room to actuate reactor trip switches or deenergize 480V buses 13 and 15 (ref. 1;

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If reactor power is above 5%, the reactor is producing more heat than the maximum decay heat load safety systems are designed to remove (ref. 3). Emergency boration is thus required and there is an actual major failure of a system intended for protection of the public. The combination of failure of both front line and backup protection systems to function in response to a plant transient, along with the continued production of heat poses a direct threat to the Fuel Clad and RCS barriers.

CSFST Core Cooling RED path condition represents a severe challenge to the core cooling function (ref. 4). Core Exit Thermocouples (CETs) are an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. RCS temperatures > 1200 °F or > 700 °F with reactor vessel water level below the top of active fuel signals the transition from a subcooled to a superheated regime. In a

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superheated regime, heat transfer mechanics are not as efficient as the subcooled and the condition and could lead to film boiling and a rapid rise in clad temperatures. This condition is considered a Fuel Clad barrier loss condition because the possible rapid rise in clad the set temperatures may lead to clad failure.

CSFST Heat Sink RED path condition represents a severe challenge to the heat removal function (ref. 5). Inability to remove heat from the RCS to the ultimate heat sink (lake or atmosphere) is a loss of function required for hot shutdown with the reactor at pressure and temperature and thus represents potential loss of the Fuel Clad and RCS barriers. Heat Sink RED path conditions are based on a combination of inadequate S/G level (< 5%) and inadequate feedwater flow (< 200 gpm total S/G feedwater flow).

The combination of these conditions (reactor power greater than 5% with loss of core cooling or inability to remove heat from the RCS) indicates the ultimate heat sink function is under extreme challenge, a core melt sequence may exist and rapid degradation of the fuel clad could begin. To permit maximum offsite intervention time, the General Emergency declaration is appropriate in anticipation of an inevitable General Emergency declaration due to loss and potential loss of fission product barriers. The data was been also grade und eta Nagre Millia eta la contra en este en la apresa en la dirempe para en pera en de para directe e contra Ginna Basis Reference(s) the second second to reach the second to the second second to the second second second 1. E-0 Reactor Trip or Safety Injection 2. FR-S.1 Response to Reactor Restart/ATWS 3. CSFST for F-0.1 Subcriticality

- CSFST for F-0.2 Core Cooling
- 5. CSFST for F-0.3 Heat Sink
- 6. P-1 Reactor Control and Protection System
- 7. NEI 99-01 SG2

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Category:	S – System Malfunction	n ^{on tradition} and the state of the second data and the second state of the second st
Subcategory:	4 – Inability to Reach o	r Maintain Shutdown Conditions
Initiating Condition:	Inability to reach requir limits	ed shutdown within Technical Specification
EAL:	ana <u>ni a</u> n <u>ni an</u> a	na ann an 1911 an 1911 ann an 1917 ann
SU4:1 Unusua	l Event, and the state	and the second se
		e within Technical Specifications LCO
Mode Applicability:	a da anti anti anti di anti	and the second second second second
1 - Power Operation, 2	2 - Startup, 3 - Hot Shutd	own, 4 - Hot Standby
Basis:		n al na subtra ang sa malamangka
		na posti de l'apaca de proposta na service

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required operating 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 four 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 required action completion time in the Technical Specifications. An immediate UE is required when the plant is not brought to the required operating mode within the allowable required action completion time in the Technical Specifications. Declaration of a UE is based on the time at which the LCO-specified required action completion time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.

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Ginna Basis Reference(s):

- 1. Technical Specifications 3.0, Limiting Conditions for Operations (LCO) Applicability
- 2. NEI 99-01 SU2

Plant-Specific

None

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 Category:
 S - System Malfunction
 State of the st

Initiating Condition: Unplanned loss of safety system annunciation or indication in the Control Room for \geq 15 min. EAL:

SU5.1 Unusual Event

Unplanned loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications for \geq 15 min. (Note 4)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Table S-2 Vital Control Room Panels					
A	AA	ВС	D	E	F C TO G

Mode Applicability:

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1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:	
Generic	· · · · · · · · · · · · · · · · · · ·
This EAL is intended to recognize the difficulty associated with conditions without the use of a major portion of the annunciation	monitoring changing plant

Recognition of the availability of computer based indication equipment is considered.

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

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions.

It is further recognized that plant design provides redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical

1.7.2

Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the UE is based on EAL SU4.1.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures and in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.).

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This UE will be escalated to an Alert based on a concurrent loss of compensatory indications or if a significant transient is in progress during the loss of annunciation or indication. . .

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Plant-Specific

Control Room Panels A through G, Table S-2, provide safety-related indications and annunciation in the Main Control Room (ref. 1, 2). . $\mathcal{M}_{1} = \{ \mathbf{y}_{1}, \dots, \mathbf{y}_{n} \}$

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A 75% loss of annunciators is defined as loss of 6 of 8 annunciator panels listed on Table S-2. Loss of 75% of MCB indications is loss of 75% of the indications on the center and left sections of the main control board indications.

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(4) 《公共》: 如果不知道: 如果是我们的问题: "你不知道。" Definitions:

Unplanned

A parameter change or an event, the reasons for which may be known or unknown, that is not the result of an intended evolution or expected plant response to a transient. 化十分化学 化化学学 化化合物 医小子 建筑性的 人名法尔尔 医血管炎 机合成合金 化分子子

Ginna Basis Reference(s):

- 1. UFSAR Sections 7.5 Safety-Related Display Instrumentation
- 2. ER-INST 2 Loss of Annunciators
 3. NEI 99-01 SU3 UTISUS Sectors de la constante La constante de . . and the product of the

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Category:		randille in Artenistica a Can toné di Cantoni. Artenistica di Artenistica di Artenistica di Artenistica di Artenistica di Artenistica di Artenistica di Artenis
Subcategory:	5 – Instrumentation	and distants and the termination of the second s The second sec
Initiating Condition:	Control Room with either (system annunciation or indication in the (1) a significant transient in progress, or
EAL: Base Databas	Sector and the sector	
SA5.1 Alert	an an ann a' Goldana an Chronadh Martanachtar an Stairte	Table S-2, or >75% of MCB indications
	nsientais in progress, liable (constant suggesties of suggestief)	n efterske fonding utereportenel for om jondere og stæd mog S-3 genetigen der og som en tereformer er en som en efter for tolster er en som efter og som er en som en er en som er (PPCS) ^{terense der er en som er}
	enstrum of a color state applied	 b) \$7 (a) state of and the spectral second state of an analytic state of an an

Note 4:3 The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

	ter fan ter ster ster ster ster ster ster ster	Table	S-2 Vital Con	trol Roon	n Panels	•*	1 at	Mar 1921an
Α	AA	B	C	D	E	;- i, ,	F	enta G ara
	an Harris and	un ních taat.	anta anta an					
÷		Table	e S-3 Signifi	cant Trans	sients	•		
		Automatic f	turbine runba id rejection >	ck > 25%	thermal pow	wer		en i a si

ь , Ф .	Electric load rejection > 25% full electrical load	1999 - TA 1999 - 201
•	Reactor trip	いけん かいり 小田田

Safety Injection activation

••• 7

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby States and Mathematical States Basis:

<u>Generic</u>

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EMERGENCY ACTION LEVEL **TECHNICAL BASES DOCUMENT**

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This EAL is intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a significant transient.

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

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation. the state of the s

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the UE is based on EAL SU4.1.

Annunciators or indicators for this EAL include those identified in the Abnormal Operating Procedures and in the Emergency Operating Procedures, and in other EALs (e.g., area, process, and/or effluent rad monitors, etc.). . <u>8</u>.8

"Compensatory indications" in this context includes computer based information such as Plant Process Computer System. 美国的 网络特性的现在分词 化合金合金 经资本

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress due to a concurrent loss of compensatory indications with a significant transient in progress during the loss of annunciation or indication. den o

Plant-Specific

at the strategies of the

Control Room Panels A through G, Table S-2, provide safety-related indications and

annunciation in the Main Control Room (ref. 1, 2).

PPCS is considered compensatory indication.

Significant transients are listed in Table S-3.

Definitions:

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EMERGENCY ACTION LEVEL **TECHNICAL BASES DOCUMENT**

Unplann	$(x,y) \in \mathcal{F}(X,Y)$ is the set of $(x,y) \in \mathcal{F}(Y)$. The set of $(x,y) \in \mathcal{F}(Y)$
A parame that is no	r change or an event, the reasons for which may be known or unknown, ne result of an intended evolution or expected plant response to a transient.
Ginna Basis	Reference(s):
1. UFSAR S	ctions 7.5 Safety-Related Display Instrumentation
2. ER-INST 3. NEI 99-0	Loss of Annunciators the constant state of a second state of a sec
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	e 1949 de la sectoria y matrica destructura (m. 1979). El 2019 (m. 1979). El sectoria de la sec
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Category: S – System Malfunction Subcategory: Initiating Condition: Inability to monitor a significant transient in progress

EAL:

Site Area Emergency and the set of the set o SS5.1 Unplanned loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications for \geq 15 min. (Note 4)

AND

A significant transient is in progress, Table S-3

AND

Compensatory indications are unavailable (PPCS)

Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time

Table S-2 Vital Control Room Panels							
A	AA	В	С	D	E	F	G

Table S-3 Significant Transients

- Automatic turbine runback > 25% thermal power
- Electric load rejection > 25% full electrical load
- Reactor trip
- Safety Injection activation

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

This EAL is intended to recognize the threat to plant safety associated with the complete loss of capability of the control room staff to monitor plant response to a significant transient.

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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"Planned" and "unplanned" actions are not differentiated since the loss of instrumentation of this magnitude is of such significance during a transient that the cause of the loss is not an ameliorating factor.

 $F(r_{1},r_{2},\ldots,r_{n}) = \{1,\dots,n\}$

Quantification is arbitrary, however, it is estimated that if approximately 75% of the safety system annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected. It is not intended that plant personnel perform a detailed count of the instrumentation lost but use the value as a judgment threshold for determining the severity of the plant conditions. It is also not intended that the Shift Manager be tasked with making a judgment decision as to whether additional personnel are required to provide increased monitoring of system operation.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10 CFR 50.72. If the shutdown is not in compliance with the Technical Specification action, the NOUE is based on EAL SU4.1

A Site Area Emergency is considered to exist if the control room staff cannot monitor safety functions needed for protection of the public while a significant transient is in progress.

Annunciators for this EAL are limited to include those identified in the Abnormal Operating Procedures and in the Emergency Operating Procedures, and in other EALs (e. g., area, process, and/or effluent rad monitors, etc.)]

Indications needed to monitor safety functions necessary for protection of the public include control room indications, computer generated indications and dedicated annunciation capability.

"Compensatory indications" in this context includes computer based information such as Plant Process Computer System.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Plant-Specific

Control Room Panels A through G, Table S-2, provide safety-related indications and

annunciation in the Main Control Room (ref. 1, 2).

PPCS is considered compensatory indication.

Significant transients are listed in Table S-3.



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Ginna Basis Reference(s): 1. UFSAR Sections 7.5 Safety-Related Display Instrumentation

2. ER-INST.2 Loss of Annunciators

3. NEI 99-01 SS6 References and the second References and the second References and the second References and the second References and the second References and the second References and the second second

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Category: Communication Star System Malfunction and Communication 6 – Communications Subcategory: Initiating Condition: Loss of all onsite or offsite communications capabilities त्रिक स्थान के स्थलन प्रति प्रदेश से प्रति के प्रति के प्रति के स्थल के स्थल त्या स्थल के साम प्रति के स्थल प् त्रि प्रति त्या के साथ प्रति के साथ के स्थल के प्रति के स्थल प्रति के प्रति के साथ के स्थल प्रति के स्थल के प्रत वित्र के त्या के साथ के साथ के साथ के स्थल के प्रति के स्थल प्रति के प्रति के साथ के स्थल के साथ के स्थल के साथ EAL: entrale in an tea parties care a four de l'hare gravita ser a le la constant d'al de la service de la constant

SU6.1 Unusual Event

Loss of all Table S-4 onsite (internal) communication methods affecting the ability to the second second perform routine operations

OR the Part of Concerns while under a productory as a standard Loss of all Table S-4 offsite (external) communication methods affecting the ability to

perform offsite notifications ÷.

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Table S-4 Communications		 	
System	Onsite (internal)	Offsite (external)	•
Commercial phone system	X	X	
Direct Dial POTS Lines (Blue Phones)	x	x	
Plant Page Party system	x		
Radios/Walkie Talkies	x		
FTS 2001 telephone system (ENS, HPN)		X	-
Control Room Hard Wired Satellite Phone		x	
Control Room Emergency Cell Phone		x	

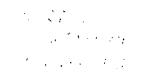
Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate issues with off-site authorities.



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The loss of off-site cor the condition addresse		expected to be significantly more comprehensive than
state, and local author extraordinary means (rities of plant problems. e.g., relaying of informa	-site communications is sufficient to inform federal, This EAL is intended to be used only when ation from non-routine radio transmissions, individuals g used to make communications possible.
Plant-Specific		tatu na alian kata tatu na tatu na tatu a
Onsite/offsite comm	unications systems ar	re listed in Table S-4 (ref. 1, 2).
	•	of the cold condition EAL CU5.1.
Ginna Basis Refere	ence(s):	्रम् । २०११ हो तथा हो देवेंद्र समय हो दिये हो तथा हो हुए हो तथा है। हे स्वर्थन हो साम हो हो से राज्य हो से स्वर्थन से स्वर्थन हो साम हो साम हो से स्वर्थन हो से स्वर्थन हो से स्वर्
	ation Systems at Ginn ss of Communications	
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EMERGENCY ACTION LEVEL **TECHNICAL BASES DOCUMENT**

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Category:	S – System Malfunction	
Subcategory:	7 – Fuel Clad Degradation	
Initiating Condition:	Fuel clad degradation	n
EAL .	the effect of the state of the	and the second

EAL:

SU7.1 Unusual Event ----ويستجود والارتجار والسباري RCS specific activity > 60 µCi/gm dose equivalent I-131 A CONTRACT OF HELLS a three books on and the constraints will be a first the second second second second second second second second Mode Applicability: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby **Basis:** entre construction of the second of the seco Generic 20200 This EAL is included because it is a precursor of more serious conditions and, as result, is a second secon considered to be a potential degradation of the level of safety of the plant. a state in the second state of the 1 per la segura de Mañas de Services Escalation of this EAL to the Alert level is via the EALs in Category F. This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits. an an in a community of the second statement of the second statement of the second statement of the second stat Plant-Specific This EAL addresses reactor coolant samples exceeding Technical Specification 3.4.16 which is applicable in Modes 1, 2 and in Mode 3 with RCS average temperature $(T_{avg}) \ge 1$ 500 °F. Though the referenced Technical Specification limits are mode dependent, it is appropriate that the EAL be applicable in all hot modes, as it indicates a potential degradation in the level of safety of the plant. The Technical Specification limits accommodate an iodine spike phenomenon that may occur following changes in thermal power and during reactor startup and shutdown. The Technical Specification LCO limits are established to minimize the offsite radioactivity dose consequences in the event of a steam generator tube rupture (SGTR) accident (ref. 1). and have a sense of the production of the contract of the sense of the sense of the sense of the sense of the

Ginna Basis Reference(s):

met i prafec 1. Technical Specification 3.4.16 Reactor Coolant System - RCS Specific Activity

2. NEI 99-01 SU4

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Category:	S - System Malfunc	tion - Marca Albana	· , <u>i</u>	es estadores d
Subcategory:	7 - Fuel Clad Degra	dation		the states of
Initiating Condition:	Fuel clad degradatio	n		
EAL:				· · · · · · · · · · · · · · · · · · ·
SU7.2 Unusual Valid Letdown Monitor	Event (R-9) reading ≥ 4800		····	
Mode Applicability:	e ta ang ang ang ang ang ang ang ang ang an	Start get Relayed	te de Transferie	
1 - Power Operation, 2	- Startup, 3 - Hot Shu	itdown, 4 - Hot Star	ndby	
Basis:				
Generic	en trationen neter eta.	port de Barrier de Sile	and the second second	i
This EAL is included beca considered to be a potent	use it is a precursor of	more serious conditi	ons and, as re	sult, is
Escalation of this EAL to	he Alert level is via the	EALs in Category F.		$\{e_{i}\}_{i=1}^{n} \rightarrow e^{i t}$
This threshold addresses clad integrity.	radiation monitor readi	ngs that provide indic	cation of a deg	radation of fuel
Plant-Specific	with the part of the			ang panganan
This EAL addresses inc	lication of gross faile	d fuel that may be ir	n excess of T	echnical
Specification (ref. 1) co	olant activity limits.%			an an Araba
The Letdown Line Mon in a sample drawn from Room if a predetermine ensures timely detectio	the RCS (NaOH tan d activity level is read	k room) and actuate ched. The high alari	es an alarm in m setting of 2	n the Control 200 mRad/hr
The 4800 mR/hr value	or R-9 is based on to	tal RCS activity cor	responding to	o 60 µCi/gm I-
131 equivalent and 1%	failed fuel (100 / \overline{E}).	A shielding calculat	tion was perfe	ormed to
obtain this value (ref. 5)	e men george) e	11月19日,10月1日(1月)	in in an an an an Ar anns Airte Frai	



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Definitions:

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1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	10	

Valid

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

Giı	nna Basis	Reference(s):					
1	Technical	Specification 3	1 16	Reactor C	oolant	Svetom	

- 1. Technical Specification 3.4.16 Reactor Coolant System RCS Specific Activity
- 2. AP-RCS.3 High Reactor Coolant Activity
- 3. AR-RMS-9 R9 Letdown Line Monitor 1.001 4. P-9 Radiation Monitoring System
- 5. CALC-2011-0019, "R9 Letdown Line Radiation Monitor NEI 99-01 Rev. 5 Evaluation" and
- 6. NEI 99-01 SU4

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	EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT	EPAD-XX Revision [Draft H] Page 208 of 278
Category:	S – System Malfunction	
Subcategory:	8 – RCS Leakage	•••
21	RCS leakage (1,5), consistent of the statement of the sta	
	Event	
Unidentified or pressur	e boundary leakage > 10 gpm for \ge 15 min. (No	ote 4)
OR	· .?	agaa - Eisa a gitagatta
Identified leakage > 25	gpm for ≥ 15 min. (Note 4)	en ander an der eine ste
	wait until the applicable time has elapsed, but should declare condition has exceeded, or will likely exceed, the applicable t	the event as soon as it is

Mode Applicability: The second s

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

<u>Generic</u>

This EAL is included as a UE because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified or pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances).

Relief valve normal operation should be excluded from this EAL. However, a relief valve that operates and fails to close per design should be considered applicable to this EAL if the relief valve cannot be isolated. 15 minutes allows time to evaluate the source and take corrective actions to isolate the leak.

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. In either case, escalation of this EAL to the Alert level is via EALs in Category F.

Plant-Specific

Technical Specifications Section 3.4.13 RCS Operational Leakage prescribes RCS

leakage limits for pressure boundary (none allowed), unidentified (1 gpm) and identified

(10 gpm) leakage (ref. 1). AP-RCS.1 Reactor Coolant Leak provide direction for

determining RCS leakage for off normal events and for operations troubleshooting (ref. 2).

이 제공이 된 같은 아주씨는 고등 25세^가 25일 전 2111 - 1661년

EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Ginna Basis Reference(s):

- 1. Technical Specifications 3.4.13, RCS Operational Leakage Compared with
- 2. AP-RCS.1 Reactor Coolant Leak
- 3. NEI 99-01 SU5

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Category F – Fission Product Barrier Degradation EAL Group: Hot Conditions (RCS temperature > 200°F); EALs in this category are applicable only in one or more hot operating modes.

EALs in this category represent threats to the defense in depth design concept that precludes the release of highly radioactive fission products to the environment. This concept relies on multiple physical barriers any one of which, if maintained intact, precludes the release of significant amounts of radioactive fission products to the environment. The primary fission product barriers are:

- A. <u>Reactor Fuel Clad (FC)</u>: The Fuel Clad barrier consists of the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.
- B. <u>Reactor Coolant System (RCS)</u>: The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.
- C. <u>Containment (CNMT)</u>: The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

The EALs in this category require evaluation of the loss and potential loss thresholds listed in the fission product barrier matrix of Table F-1 (Attachment 2). "Loss" and "Potential Loss" signify the relative damage and threat of damage to the barrier. "Loss" means the barrier no longer assures containment of radioactive materials. "Potential Loss" means integrity of the barrier is threatened and could be lost if conditions continue to degrade. The number of barriers that are lost or potentially lost and the following criteria determine the appropriate emergency classification level:

<u>Unusual Event:</u> **ANY** loss or **ANY** potential loss of Containment <u>Alert:</u>

,

EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

ANY loss or ANY potential loss of either Fuel Clad or RCS	5 (1),	T in the
<u>Site Area Emergency:</u>	S. C.	Seatter State
Loss or potential loss of ANY two barriers	1927 - S. 1973	seedad opening the first
<u>General Emergency:</u> Loss of ANY two barriers and loss or potential loss of the	third barrier	1.18.18 1.18.18
The logic used for Category F EALs reflects the following cor	siderations:	na sa
 The Fuel Clad Barrier and the RCS Barrier are weighted 	d more heavil	
Containment Barrier. UE EALs associated with RCS and addressed under Category S.	nd Fuel Clad E http://www.arcost	Barriers are
 At the Site Area Emergency level, there must be some 	ability to dyna	amically assess
how far present conditions are from the threshold for a	General Eme	rgency. For
example, if Fuel Clad and RCS Barrier "Loss" threshold	ds existed, tha	it, in addition to
off-site dose assessments, would require continual ass	sessments of r	adioactive
inventory and containment integrity. Alternatively, if bo	th Fuel:Clad a	nd RCS Barrier
"Potential Loss" thresholds existed, the ED would have	more assura	nce that there
was no immediate need to escalate to a General Emer	gency.	a di Europa Materi
The ability to escalate to higher emergency classification	on levels as ar	n event
deteriorates must be maintained. For example, RCS le	akage steadily	/ increasing
would represent an increasing risk to public health and	safety.	an an an 160 an
The Containment Barrier should not be declared lost of	r potentially lo	st based on
exceeding Technical Specification action statement cri		
in progress requiring mitigation by the Containment ba	rrier.	
	$(2^{+}, 2^{+}) \in \mathbb{R}^{+}$	1
	, ,	

Category:	Fission Product Barrier Degradation	
Subcategory:	N/A	2014年,教育1943年末代。
Initiating Condition:	ANY loss or ANY potential loss of Co	ontainment
EAL:	17、20月,19月1日,19月1日,19月1日,19月1日 17月2日 - 19月1日 - 19月1日 - 19月1日 - 19月1日 - 19月1日	a da anti-arrente da anti-arrente da anti- arrente da anti-arrente da anti-arrente da anti-arrente da anti-arrente da anti-arrente da anti-arrente da anti- arrente da arrente da anti-arrente da arrente

 FU1.1
 Unusual Event

 ANY loss or ANY potential loss of Containment (Table F-1)

in lest

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shu	tdown, 4 - Hot Standby
Basis:	
Generic	ere Mehred growe possible Mean and Barr
None	$(1,2^{N})_{1,2} = (2,2^{N})_{1,2} + (2,2^{N})_{2} + (2,2^{N}$
	an a la hanna la farair a she
Plant-Specific	en e

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

Fuel Clad and RCS barriers are weighted more heavily than the Containment barrier. Unlike the Fuel Clad and RCS barriers, the loss of either of which results in an Alert (EAL FA1.1), loss of the Containment barrier in and of itself does not result in the relocation of radioactive materials or the potential for degradation of core cooling capability. However, loss or potential loss of the Containment barrier in combination with the loss or potential loss of either the Fuel Clad or RCS barrier results in declaration of a Site Area Emergency under EAL FS1.1.

Ginna Basis Reference(s):

1. NEI 99-01 FU1

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

Category: Subcategory: Initiating Condition: EAL:	Fission Product Barrier Degradation (1999) N/A ANY loss or ANY potential loss of either Fuel Cla	d or RCS
FA1.1 Alert ANY loss or ANY pote	ntial loss of either Fuel Clad or RCS (Table F-1)	ngang sa
Mode Applicability: 1 - Power Operation, 2 Basis: <u>Generic</u>	- Startup, 3 - Hot Shutdown, 4 - Hot Standby	and an
None		
Plant-Specific		
	ontainment comprise the fission product barriers. T e fission product barrier thresholds, bases and refe	
than the Containment I either the Fuel Clad or degradation of core co barrier in combination (on level, Fuel Clad and RCS barriers are weighted barrier. Unlike the Containment barrier, loss or pote RCS barrier may result in the relocation of radioac oling capability. Note that the loss or potential loss with loss or potential loss of either Fuel Clad or RC Area Emergency under EAL ES1.1	ential loss of second tive materials or of Containment
the second s	Area Emergency under EAL FS1.1.	

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Category:	Fission Product Barrier Degradation		•* ·
Subcategor	y: N/A		
Initiating Co	ondition: Loss or potential loss of ANY two barriers		2000
EAL:			
FQ4 4		<u></u>	

Loss or potential loss of ANY two barriers (Table F-1)	на 1997 —	
Mode Applicability:		
1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby		
Basis:		• • • •
Generic		
None		n vi vige

None

Plant-Specific

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the Site Area Emergency classification level, each barrier is weighted equally. A Site Area Emergency is therefore appropriate for any combination of the following conditions:

- One barrier loss and a second barrier loss (i.e.; loss loss)
- One barrier loss and a second barrier potential loss (i.e., loss potential loss)
- One barrier potential loss and a second barrier potential loss (i.e., potential loss potential loss)

At the Site Area Emergency classification level, the ability to dynamically assess the proximity of present conditions with respect to the threshold for a General Emergency is important. For example, the existence of Fuel Clad and RCS Barrier loss thresholds in addition to offsite dose assessments would require continual assessments of radioactive inventory and Containment integrity in anticipation of reaching a General Emergency classification. Alternatively, if both Fuel Clad and RCS potential loss thresholds existed, the Emergency Director would have greater assurance that escalation to a General Emergency is less imminent.

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Ginna Basis Reference(s):			
1. NEI:99-01 FS1-01-64-001-8	an an dùthanach thagath a chuidean Mùthan An	12 42 12 12 12 13 139 14672	
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(i) Further States and the second states are a second states and the second states of the second states are as a second state are as a second state of



Category:	Fission Product Barrier Degradation	
Subcategory:	N/A	化特殊物理 网络大学学生
Initiating Condition:	Loss of ANY two barriers and loss or barrier	potential loss of the third

EAL:

FG1.1 General Emergency

Loss of ANY two barriers

AND

Loss or potential loss of the third barrier (Table F-1)

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby

Basis:

Generic

None

Plant-Specific

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the General Emergency classification level each barrier is weighted equally. A General Emergency is therefore appropriate for any combination of the following conditions:

- Loss of Fuel Clad, RCS and Containment barriers
- Loss of Fuel Clad and RCS barriers with potential loss of Containment barrier
- Loss of RCS and Containment barriers with potential loss of Fuel Clad barrier
- Loss of Fuel Clad and Containment barriers with potential loss of RCS barrier

Ginna Basis Reference(s):

1. NEI 99-01 FG1

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ATTACHMENT 2

FISSION PRODUCT BARRIER

LOSS/POTENTIAL LOSS MATRIX AND BASES

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Introduction

Table F-1 lists the threshold conditions that define the Loss and Potential Loss of the three fission product barriers (Fuel Clad, Reactor Coolant System, and Containment). The table is structured so that the three barriers occupy adjacent columns. Each fission product barrier column is further divided into two columns; one for Loss thresholds and one for Potential Loss thresholds.

The first column of the table (to the left of the Fuel Clad Loss column) lists the categories (types) of fission product barrier thresholds. The fission product barrier categories are:

- A. CSFSTs
- B. Core Exit TCs
- C. Inventory

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- D. Radiation / Coolant Activity
- E. Isolation Status
- F. Judgment

Each category occupies a row in Table F-1 thus forming a matrix defined by the category rows and the Loss/Potential Loss columns. The intersection of each category row with each Loss/Potential Loss column forms a cell in which one or more fission product barrier thresholds appear. If NEI 99-01 does not define a threshold for a barrier Loss/Potential Loss, the word "None" is entered in the cell.

Thresholds are assigned sequential numbers within each Loss and Potential Loss column beginning with number one. In this manner, a threshold can be identified by its category title and number. For example, the first Fuel Clad barrier Loss in Category A is "FC Loss A.1," the third Containment barrier Potential Loss is "CNMT P-Loss B.3," etc.

If a cell in Table F-1 contains more than one numbered threshold, each of the numbered thresholds, if exceeded, signifies a Loss or Potential Loss of the barrier. It is not necessary to exceed all of the thresholds in a category before declaring a barrier Loss/Potential Loss.

Subdivision of Table F-1 by category facilitates association of plant conditions to the applicable fission product barrier Loss and Potential Loss thresholds. This structure promotes a systematic approach to assessing the classification status of the fission product barriers.

When equipped with knowledge of plant conditions related to the fission product barriers, the EAL-user first scans down the category column of Table F-1, locates the likely category and then reads across the row of fission product barrier Loss and Potential Loss thresholds in that category to determine if any threshold has been exceeded. If a threshold has not been exceeded in that category row, the EAL-user proceeds to the next likely category and continues review of the row of thresholds in the new category

The EAL-user must examine each of the three fission product barriers to determine if other barrier thresholds in the category are lost or potentially lost. For example, if Containment radiation is sufficiently high (i.e., greater than 1.0E+03 R/hr), a Loss of the Fuel Clad and RCS barriers and a Potential Loss of the Containment barrier exist. Barrier Losses and Potential Losses are then applied to the algorithms given in EALs FG1.1, FS1.1, FA1.1 and FU1.1 to determine the appropriate emergency classification.

In the remainder of this Attachment, the Fuel Clad barrier threshold bases appear first, followed by the RCS barrier and finally the Containment barrier threshold bases. In each barrier, the bases are given according category Loss followed by category Potential Loss beginning with Category A, then B...E.

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• • • • • •	Table F-1 Fission Product Barrier Matrix						
Fuel Clad Barrier			Reactor Coolant System Barrier		Containment Barrier		
Category	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss	
A CSFST	1. RED path condition exists F-0.2 Core Cooling	ORANGE path condition exists F-0.2 Core Cooling RED path condition exists F-0.3 Heat Sink and heat sink is required	None	RED path condition exists F-0.4 Integrity RED path condition exists F-0.3 Heat Sink and heat sink is required	Nonè	1. RED path condition exists -F-0.5 Containment	
B Core Exit TCs	2. Core Exit TCs ≥ 1,200°F	3. Core Exit TCs <u>></u> 700°F	None	None	None	 Core Exit TCs cannot be restored < 1,200°F within 15 min. Core Exit TCs ≥ 700°F AND RVLIS level cannot be restored > 52% [> 55% adverse CNMT] within no RCPs running within 15 min. 	
C Inventory	None	 RVLIS level ≤ 52% [≤ 55% adverse CNMT] OR At least one RCP running RVLIS fluid fraction ≤ 66% 	 RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (< EOP Fig. MIN SUBCOOLING) Ruptured S/G results in an ECCS (SI) actuation 	 RCS leak rate > 50 gpm with letdown isolated 	 A containment pressure rise followed by a rapid unexplained drop in containment pressure Containment pressure or sump level response not consistent with LOCA conditions Ruptured S/G is also faulted outside of containment Primary-to-secondary leakrate > 10 gpm AND Unisolable prolonged steam release from affected S/G to the environment 	 Containment pressure ≥ 60 psig and rising Containment hydrogen concentration ≥ 4% Containment pressure ≥ 28 psig and < two CRFC units and one CS pump operating per design 	
D Radiation / Coolant Activity	 Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr Valid Letdown Monitor (R-9) reading ≥ 24,000 mR/hr Coolant activity >300 µCi/gm dose equivalent I-131 	None	3. Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr	None	None	 Containment radiation monitor R-29/R-30 reading > 1.0E+03 R/hr 	
E Isolation Status	None	None	None	None	 Failure of all valves in ANY one line to close AND Direct downstream pathway to the environment exists after containment isolation signal 	None	



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Fuel Clad Barrier		Reactor Coolant System Barrier		Containment Barrier			
Category	Loss		•••	Potential Loss	Loss	Potential Loss	
F Judgment	6. ANY condition in the opinion the Emergency Director that indicates loss of the fuel clac barrier	of 5. ANY condition in the opinion of the Emergency Director that	4. ANY condition in the opinion the Emergency Director the indicates loss of the RCS t	on of 4. ANY condition in the opinion of the Emergency Director that indicates	6: ANY condition in the opinion of the Emergency Director that indicates loss of the containment barrier	ANY condition in the opinion of the Emergency Director that indicates potential loss of the containment barrier	
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1. RED path condition	exists F-0.2 Cor	e Cooling () of the company	meen of the second s
Threshold:			a tha for a second s
Degradation Threat:	Loss	a strategy and the strategy and	the state of the second second second
Category:	A. Critical Safety	y Function Status	$\mathcal{M} := \sum_{i=1}^{n} e_{i} e_{i} e_{i}$
Barrier:	Fuel Clad		

Basis:

Generic

naesi Visios

Core Cooling - RED indicates significant superheating and core uncovery and is considered to a prior indicate loss of the Fuel Clad Barrier.

Plant-Specific Plant-Specific Critical Safety Function Status Tree (CSFST) Core Cooling-RED path is given in F=0.2 and indicates significant core exit superheating and core uncovery (ref. 1). Plant-Specific RED path conditions exist if either: Second Plant Core (Plant Core) Plant Plant Core)

- Core Exit TCs are ≥ 1200°F TC all and the second states of the second states exit. T
- Core Exit TCs are > 700°F with RVLIS < 52% [< 55% adverse CNMT] with no RCPs running

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 2):

- Containment pressure > 4 psig, or the containing the second statement of the second se
- Containment radiation > 10⁵ R/hr 20 de la contende de la contendada de
- Ginna Basis Reference(s):
- 1. CSFST for F-0.2 Core Cooling
- 2. FR-C.1 Response to Inadequate Core Cooling

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Barrier:	Fuel Clad	$\sim 10^{-10}$ s $^{-10}$ s $^{-10}$	
Category:	A. Critical Safety Function	n Status	
Degradation Threat:	Potential Loss		
Threshold:			
1. ORANGE path conc	lition exists F-0.2 Core Co	oling: The Constant of Real Sector	· Philip
Basis:			$\sum_{i=1}^{n} \sum_{j=1}^{n} e_{ij} \frac{C_{ij}^{a}}{c_{ij}}$
<u>Generic</u>			
Core Cooling - ORANGE occur.	indicates subcooling has be	en lost and that some clad dar	nage may
Plant-Specific			and a second
Critical Safety Function	n Status Tree (CSFST) Co	re Cooling-ORANGE path is	given in
F-0.2 and indicates sub	cooling has been lost and	that some fuel clad damage	e may
potentially occur (ref. 1).		and the second second
ORANGE path Core C	ooling conditions exist if, w	vith RCS subcooling < requir	ements of
EOP Fig. MIN SUBCO	OLING, either:		· · · · · · ·
 with no RCPs rule 	inning Core Exit TCs are <u>≥</u>	700° F or RVLIS level $\leq 52^{\circ}$	6 [55%
adverse CNMT]	at a start of a factor	 Construction and the second state of the second state	
OR	n han gereiten ander der h	2 (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (1997) (199	
 with at least one 	RCP running RVLIS fluid	fraction $\leq 66\%$	
Adverse containment p	arameters determine whe	n a harsh environment begir	ns to affect
instrumentation located	inside Containment. The	following indications identify	that the
adverse containment v	alues should be used in th	e EOPs (ref. 2):	
Containment pre	essure >4 psig, or	and the second	
Containment rac	diation > 10 ⁵ R/hr	te teach a chine that	
Ginna Basis Reference	:e(s):		
1. CSFST for F-0.2 Co			

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Barrier: La service and Euclided Clade La service and the service service service of the service

2.	RED path condition exists F-0.3 Heat Sink and heat sink is	requi	ed	'	:	·	• • • •	•
		· · · ·		÷ -	ţ١			f

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Basis:

<u>Generic</u>

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

Plant-Specific

Indication that heat removal is extremely challenged is manifested by entry to CSFST Heat Sink-RED path in F-0.3 (ref. 1). The phrase "and heat sink required" precludes the need for classification for conditions in which RCS pressure is less than SG pressure or Heat Sink-RED path entry was created through operator action directed by an EOP. Procedure FR-H.1, Response to Loss of Secondary Heat Sink, indicates heat sink is required when RCS pressure is greater than any non-faulted SG pressure and RCS cold leg temperature is greater than 350°F (ref. 2).

RED path Heat Sink conditions exist if both of the following:

• Narrow Range level in both S/Gs is ≤ 7% [< 25% adverse CNMT]

AND

• Total feedwater flow to SGs is < 200 gpm

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 3):

- Containment pressure > 4 psig, or
- Containment radiation > 10⁵ R/hr

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The combination of these conditions indicates the ultimate heat sink function is under extreme challenge. This threshold addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus a potential loss of the Fuel Clad barrier. This is also a potential loss of the RCS barrier and therefore results in at least a Site Area Emergency.

Ginna Basis Reference(s):

- 1. CSFST for F-0.3 Heat Sink
- 2. FR-H.1 Response to Loss of Secondary Heat Sink
- 2. FR-C.2 Response to Degraded Core Cooling

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A Children and Andreas -

Barrier:	Fuel Clad		
Category:	B. Core Exit TCs		
Degradation Threat:	Loss		NA E MARKEN CART
Threshold:			
2. Core Exit TCs ≥ 1,	200°F	······································	

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Basis:

Generic

The 1,200°F reading corresponds to significant superheating of the coolant.

.

Plant-Specific

Core Exit Thermocouples (TCs) reading at or in excess of 1200°F corresponds to the CSFST Core Cooling RED path entry condition (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). Although clad rupture due to high temperature is not expected for CET readings less than the threshold, temperatures of this magnitude signal significant superheating of the reactor coolant and core uncovery. Events that result in Core Exit TC readings above the loss threshold are classified severe accidents and lead to entry into Severe Accident Management Guidelines (ref. 3).

- 2. EPIP-2-16 Core Damage Estimation
 3. Ginna Severe Accident Management Guidelines
 4. FR-C.1 Response To Inadequate Core Cooling
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Barrier:	Fuel Clad			
Category:	B. Core Exit TCs	and the second second	i is the	
Degradation Threat: Potential Loss			化离化的 化分离子 化磷酸酸钙	
Threshold:				
3 Core Exit TCs ≥ 70)0°F	100 A.S		

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	······································	
Basis:		and the
Generic		
Core Exit TC readings ≥ 700°F correspond to loss of subcooling.	Mangaran Malandaran (• ,• •

Plant-Specific

Core Exit Thermocouples (TCs) reading at or in excess of 700°F corresponds to the CSFST Core Cooling ORANGE path entry criteria (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). RCS superheat, as indicated by Core Exit TCs reading at or in excess of 700°F, signals the transition from a subcooled to a superheated regime. In a superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to a rapid rise in clad temperatures. Valid indication of superheat is a potential Fuel Clad barrier loss condition because the possible rapid rise in clad temperatures may lead to clad failure.

Ginna Basis Reference(s):

- 1. CSFST for F-0.2 Core Cooling
- 2. EPIP-2-16 Core Damage Estimation
- 3. FR-C.1 Response To Inadequate Core Cooling

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Barrier:	Fuel Clad		
Category:	C. Inventory	(1,2,2,3,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5	
Degradation Threat:	Loss		
Threshold:			

Threshold:

None	《清秋》》: · · · · · · · · · · · · · · · · · ·
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Barrier:	Fuel Clad		NA CONTRACTOR
Category:	C. Inventory	$\gamma_{i} = \{i_{i}, j_{i} \in \mathcal{J}\}$	
Degradation Threat:	Potential Loss	9	an is the second
Threshold:			, · · · ·
	<u>, , , , , , , , , , , , , , , , , , , </u>		

4. RVLIS ≤ 52% [≤ 55% adverse CNMT]

OR

At least one RCP running RVLIS fluid fraction ≤ 66%

Basis:

Generic

There is no Loss threshold associated with this item.

The site specific value for the Potential Loss threshold corresponds to the top of the active fuel.

Plant-Specific

The Reactor Vessel water level threshold is used in the EOPs to signal core uncovery and is, therefore, indication of inadequate coolant inventory. If the RVLIS indication drops to 52% [$\leq 55\%$ adverse CNMT] **OR** with at least one RCP running RVLIS fluid fraction \leq 66%, a core covered condition cannot be confirmed. According to the Core Cooling-ORANGE path, this water level indicates subcooling has been lost and that some fuel clad damage may occur. (ref. 1, 2)

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 2):

- Containment pressure > 4 psig, or
- Containment radiation > 10⁵ R/hr

Ginna Basis Reference(s):

- 1. CSFST for F-0.2 Core Cooling
- 2. FR-C.2 Response to Degraded Core Cooling

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Barrier:	Fuel Clad		the state of the s
Category:	D. Radiation / Coolant Activity	Martine .	
Degradation Threat:	Loss	$\mathcal{D}^{(1)}$. A	an a
Threshold:			مېنې مېږي د تې د مېنې د مېر د مېر د تې د مېر د کې د مې

3. Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr

Basis:

e transfer Standarden en set

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<u>Generic</u>

The 1.0E+02 R/hr containment radiation monitor reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the containment. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations (including iodine spiking) allowed within technical specifications and are therefore indicative of fuel damage.

This value is higher than that specified for RCS barrier Loss threshold #3. Thus, this threshold indicates a loss of both the Fuel Clad barrier and RCS barrier that appropriately escalates the emergency classification level to a Site Area Emergency. There is no Potential Loss threshold associated with this item.

Plant-Specific at the second we wanted a second second state to a second second

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 1.0E+01 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 1.0E+02 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment (ref. 2).

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. EPIP-2-16 Core Damage Estimation

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Barrier: Fuel Clad		$= \left\{ \begin{pmatrix} \mathbf{t}^{*} \\ \mathbf{t} \end{pmatrix} \mid \mathbf{t} \in \mathbf{A}, \ \mathbf{t}^{*} \right\}$	
Category:	D. Radiation / Coolant A	ctivity of the trace of	
Degradation Threat:	Loss	the second second	
Threshold:			nation (Charleson
4. Valid Letdown Line	Monitor (R-9) reading ≥ :	24,000 mR/hr	· · · ·
Basis:	- · · · · ·	··· · ··· · · · · · · ·	• • •
Generic			
the NEI EAL Task Force	indicates that this amount of	o 300 μCi/gm I-131 equivalent. As of coolant activity is well above the	at expected
the NEI EAL Task Force for iodine spikes and corr indicates significant clad	indicates that this amount of responds to less than 5% fu damage and thus the Fuel	of coolant activity is well above the lel clad damage. This amount of i Clad Barrier is considered lost.	at expected radioactivity
the NEI EAL Task Force for iodine spikes and com indicates significant clad There is no Potential Los Plant Specific	indicates that this amount of responds to less than 5% fu damage and thus the Fuel is threshold associated with	of coolant activity is well above the lel clad damage. This amount of i Clad Barrier is considered lost. this item.	at expected radioactivity
the NEI EAL Task Force for iodine spikes and com indicates significant clad There is no Potential Los <u>Plant-Specific</u>	indicates that this amount of responds to less than 5% fu damage and thus the Fuel is threshold associated with	of coolant activity is well above the rel clad damage. This amount of r Clad Barrier is considered lost. this item.	at expected radioactivity
the NEI EAL Task Force for iodine spikes and com indicates significant clad There is no Potential Los <u>Plant-Specific</u> The Letdown Line Mon in a sample drawn from	indicates that this amount of responds to less than 5% fu damage and thus the Fuel is threshold associated with itor (R-9) gross radiation in the RCS (NaOH tank ro	of coolant activity is well above the lel clad damage. This amount of in Clad Barrier is considered lost. this item. channel continuously monitors from) and actuates an alarm in	at expected adioactivity s the activity the Control
the NEI EAL Task Force for iodine spikes and com indicates significant clad There is no Potential Los <u>Plant-Specific</u> The Letdown Line Mon in a sample drawn from	indicates that this amount of responds to less than 5% fu damage and thus the Fuel is threshold associated with itor (R-9) gross radiation in the RCS (NaOH tank ro	of coolant activity is well above the rel clad damage. This amount of r Clad Barrier is considered lost. this item.	at expected adioactivity s the activity the Control
the NEI EAL Task Force for iodine spikes and com indicates significant clad There is no Potential Los <u>Plant-Specific</u> The Letdown Line Mon in a sample drawn from Room if a predetermine	indicates that this amount of responds to less than 5% fu damage and thus the Fuel is threshold associated with itor (R-9) gross radiation in the RCS (NaOH tank ro ed activity level is reached	of coolant activity is well above the lel clad damage. This amount of in Clad Barrier is considered lost. this item. channel continuously monitors from) and actuates an alarm in	at expected radioactivity s the activity the Control ding of

2). Januar (1997) and the state of the second state of the state of th

- 1. P-9 Radiation Monitoring System
- 2. CALC-2011-0019, R9 Letdown Line Radiation Monitor NEI 99-01 Rev. 5 Evaluation.
 - - $a_{\rm eff} = -e^{2\pi i t} a_{\rm eff} + b_{\rm eff} a_{\rm eff} + b_{\rm e$

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5. Coolant activity >3	00 μCi/gm dose equivalent I-13	1	11 ×
Threshold:	· · · ·	· · · · ·	
Degradation Threat:	LOSS		C. Bray Bray St.
Downsdation Throat			And the way of the States of the
Category:	D. Radiation / Coolant Activity	11. 1. 1997 (A)	
Barrier:	Fuel Clad		
			· • •

Basis:

<u>Generic</u>

The site specific value corresponds to 300 μ Ci/gm I-131 dose equivalent. Assessment by the NEI 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.

There is no Potential Loss threshold associated with this item.

Plant-Specific

None

Ginna Basis Reference(s):

1. NEI 99-01 Revision 5, pg 35

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Barrier:	Fuel Clad	· , :.	e la seconda de la compañía de la co	
Category:	D. Radiation / Coolant Activity			
Degradation Threat:	Potential Loss			an a
Threshold:				

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Barrier:	Fuel Clad		
Category:	E. Isolation Status		
Degradation Threat:	Loss	and the second second	ys val ta D
Threshold:		the Contract of the State	an an air agus a sa a'

None

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Barrier:	Fuel Clad		
Category:	E. Isolation Status	···]	. Var - Paulo parts
Degradation Threat:	Potential Loss		
Threshold:	·····	••••••••••••••••••••••••••••••••••••••	
None	····		

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EMERGENCY ACTION LEVEL

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Barrier:	Fuel Clad	i gali (anti)	والمؤاخر وأعشرون
Category:	F. Judgment	1. 出版 12 月 · 1 · 1	17 2 (\$ 1975) a
Degradation Threat:	Loss	distribute data data data data data data data da	an thursday an an the

Threshold:

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6. ANY condition in the opinion of the Emergency Director that indicates loss of the Fuel of Clad barrier

Basis:

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Generic

This threshold addresses any other factors that are to be used by the Emergency Director in the second determining whether the Fuel Clad barrier is lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director judgment that the barrier may be considered lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier:	Fuel Clad	10 J. D.	
Category:	F. Judgment	435 ± 10^{10}	
Degradation Threat:	Potential Loss	$[g^{+}, \dots, c]$	Vitte Constant and an
Threshold:			

5. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier

Basis:

Generic

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This threshold addresses any other factors that are to be used by the Emergency Coordinator in determining whether the Fuel Clad barrier is potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Coordinator judgment that the barrier may be considered potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier:	Reactor Coolant System	11 B. 16 -
Category:	A. Critical Safety Function Status	······································
Degradation Threat:	Loss	an a
Threshold:		·Re Harry F

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Barrier:	Reactor Coolant System	s sing	at the second
Category:	A. Critical Safety Function Status		
Degradation Threat:	Potential Loss		a we have been sport a
Threshold:			1. 《五年4月17日)

1. RED path condition exists F-0.4 Integrity

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Basis:

Generic

RCS Integrity - RED indicates an extreme challenge to the safety function derived from appropriate instrument readings.

There is no Loss threshold associated with this item.

Plant-Specific

Critical Safety Function Status Tree (CSFST) Integrity-RED path is given in F-0.4 and entry is indicative of a direct threat to RCS integrity due to imminent pressurized thermal shock (ref. 1, 2).

RED path Integrity conditions exist if:

• temperature lowers in either RCS cold leg ≥ 100°F/hr

AND

• temperature in either RCS cold leg is ≤ 284°F

Ginna Basis Reference(s):

- 1. FR-P.1 Response to Imminent Pressurized Thermal Shock Condition
- 2. CSFST for F-0.4 Integrity

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Barrier: A. Critical Safety Function Status Degradation Threat: Potential Loss Threshold:

2. RED path condition exists F-0.3 Heat Sink and heat sink is required
Basis:

Generic

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

There is no Loss threshold associated with this item.

Plant-Specific

Indication that heat removal is extremely challenged is manifested by entry to CSFST Heat Sink-RED path in F-0.3 (ref. 1). The phrase "and heat sink required" precludes the need for classification for conditions in which RCS pressure is less than SG pressure or Heat Sink-RED path entry was created through operator action directed by an EOP. Procedure FR-H.1, Response to Loss of Secondary Heat Sink, indicates heat sink is required when RCS pressure is greater than any non-faulted SG pressure and RCS cold leg temperature is greater than 350°F (ref. 2).

RED path Heat Sink conditions exist if both of the following:

Narrow Range level in both S/Gs is ≤ 7% [≤ 25% adverse CNMT]

AND

• Total feedwater flow to SGs is ≤ 200 gpm

Adverse containment parameters determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the adverse containment values should be used in the EOPs (ref. 3):

- Containment pressure > 4 psig, or
- Containment radiation > 10⁵ R/hr

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The combination of these conditions indicates the ultimate heat sink function is under extreme challenge. This threshold addresses loss of functions required for hot shutdown with the reactor at pressure and temperature and thus a potential loss of the RCS barrier. This is also a potential loss of the Fuel Clad barrier and therefore results in at least a Site Area Emergency. Ginna Basis Reference(s): 1. FR-P.1 Response to Imminent Pressurized Thermal Shock Condition 2. FR-H.1 Response to Loss of Secondary Heat Sink 3. CSFST for F-0.4 Integrity n en de la companya d en al la companya de la litera especial de la terra de la companya de la companya de la companya de la companya The second s (c) Free set the set product of the set o 这些事情,也是我们们还能够是我的问题的,我就是你的问题,你就是我们还能能做了,你都是你的问题,你就是我们的。" a har a star a star at a star and the second secon 的复数形式 化硫酸化化钙 医水杨氏 网络海豚植物海豚植物 化分析法 化分析法

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Barrier: Reactor Coolant System	CALCULATER -	
Category: B. Core Exit TCs	the Assessment	• • • • • • • • • • • • • • • • • • •
Degradation Threat: Loss	an an the first of the state of the	
Threshold:		
None		sy S ^{ra}

		Y ACTION LEVEL ASES DOCUMENT	EPAD-XX Revision [Draft H] Page 243 of 278
Barrier:	Reactor Coolant Sy	stem an association and a	
Category:	B. Core Exit TCs	Sec. (1999) - Sec. (1999)	
Degradation Threat:	Potential Loss		人名布尔 网络金属 化有量
Threshold:			
None		2	······

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Barrier:	Reactor Coolant System Complexity		
Category:	C. Inventory	(1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	
Degradation Threat:	Loss	the second states of	e and a sec

Threshold:

1-1-2000

 RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (< EOP Fig. MIN SUBCOOLING)

Basis:

ah per di

<u>Generic</u>

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Plant-Specific

Critical Safety Function Status Trees (CSFST) Core Cooling indicates that if subcooling margin based on core exit TCs is in the Inadequate Subcooling Region of EOP Fig. MIN

SUBCOOLING, a loss of RCS subcooling has occurred (ref. 1, 4). E-0, Reactor Trip or

Safety Injection and AP-RCS.1, Reactor Coolant Leak, provide appropriate actions to

prevent and mitigate the consequences of RCS leakage (ref. 2, 3).

AP-RCS.1 provides a list of conditions that may be observed when excessive RCS of the leakage occurs and provides appropriate actions to prevent and mitigate the leakage (last consequences of RCS leakage (ref. 3).

The loss of subcooling as a result of inability to establish RCS heat transfer to the ultimate heat sink is indicative of potential losses of the Fuel Clad and RCS barriers.

Ginna Basis Reference(s):

- 1. F-0.2 CSFST Core Cooling
- 2. E-0 Reactor Trip or Safety Injection and a second state to the state of the stat
- 3. AP-RCS.1 Reactor Coolant Leak
- 4. EOP Figure MIN SUBCOOLING
- 5. AP-CVCS.1 CVCS leak

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Barrier:	Reactor Coolant System	$e^{i\frac{2\pi}{2}} = e^{i\frac{2\pi}{2}} e^{i\frac{2\pi}{2}$	(1,1,2,2)
Category:	C. Inventory	an the part of the	e de la servici
Degradation Threat:	Loss	: *	
Threshold:			
2. Ruptured S/G resu	Its in an ECCS (SI) actuation	an tha an an Arthur An tha an Arthur An An An An An An An An	and a second

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Basis:

<u>Generic</u>

This threshold addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with containment barrier loss thresholds. It addresses ruptured SG(s) for which the leakage is large enough to cause actuation of ECCS (SI). This is consistent to the RCS leak rate barrier potential loss threshold. By itself, this threshold will result in the declaration of an Alert. However, if the SG is also faulted (i.e., two barriers failed), the declaration escalates to a Site Area Emergency per Containment barrier loss thresholds. There is no potential loss threshold associated with this item. <u>Plant-Specific</u> In conjunction with Containment Loss C.3 and the Fuel Clad barrier thresholds, this

threshold addresses the full spectrum of Steam Generator Tube Rupture (SGTR) events.

A ruptured SG is primary-to-secondary leakage through the steam generator tubes. ECCS

(SI) actuation is caused by (ref. 4): next second address of the array of the metal of the metal

- Containment pressure > 4 psig
- Pressurizer pressure < 1750 psig

• Steam line pressures < 514 psig Indications of a ruptured S/G include (ref. 2):

- Unexpected rise in either S/G narrow range level
- High radiation on Main Steamline Radiation Monitors
- Local indications of increase steamline radiation

Definitions:

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Ruptured

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

and constraints are the second states of

Ginna Basis Reference(s):	
1. E-0 Reactor Trip or Safety Injection	
2. E-3 Steam Generator Tube Rupture	 B. A. ONE ADVENTION METAL AND ADVENTION AND ADVENTION AND ADVENTION ADVENTION AND ADVENTION ADVE ADVENTION ADVENTION ADVENTION ADVENTION ADVENTION ADVENT
3. AP-RCS.1 Reactor Coolant Leak	
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Barrier:	Reactor Coolant System	
Category:	C. Inventory	No an an an Arriente Arrente an an Arrente Arrente Arrente Arrente Arrente Arrente Arrente Arrente Arrente Arr An an an Arrente
Degradation Threat:	Potential Loss	
Threshold:		the state of the state of the state of the
		and a father and the second
3. RCS leak rate > 50) gpm with letdown isolated	 A state of an experimental state of a stat

Basis:

Generic

This threshold is based on the apparent inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

Plant-Specific

The CVCS includes three positive displacement horizontal pumps with a capacity of 46 gpm each (ref. 1). The pressurizer level control program regulates letdown purification subsystem flow by adjusting the letdown flow control valve so that the reactor coolant pump (RCP) controlled leak-off plus the letdown flow matches the input from the operating charging pump. Equilibrium pressurizer level conditions may be disturbed due to RCS temperature changes, power changes, or RCS inventory loss due to leakage. A decrease in pressurizer water level below the programmed level results in a control signal to start one or both standby charging pumps to restore water level. The need for a second or third charging pump to makeup leakage in excess of letdown flow would be indicative of substantial RCS leakage. The single charging pump capacity is rounded up to 50 gpm for this threshold and clearly signals that operation of more than one charging pump is needed (ref. 2).

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Barrier:	Reactor Coolant System	$\mathcal{F}(\mathcal{A}^{(1)}) \to \mathcal{F}_{\mathcal{A}}(\mathcal{A}^{(1)}) \to \mathcal{F}_{\mathcal{A}}(\mathcal{A}^{(1)})$
Category:	•	1、注意的资源。11、11、11、11、11、11、11、11、11、11、11、11、11、
Degradation Threat:		,这些意义是我的时候是可以的是不是的 的 样子。 1

Threshold:

3. Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr

Basis:

<u>Generic</u>

The site specific reading is a value which indicates the release of reactor coolant to the containment.

This reading is less than that specified for Fuel Clad barrier threshold 3. Thus, this threshold would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad barrier threshold, fuel damage would also be indicated.

There is no Potential Loss threshold associated with this item.

Plant-Specific

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 1.0E+01 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 1.0E+02 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment (ref. 2).

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. EPIP-2-16 Core Damage Estimation

EPAD-XX EMERGENCY ACTION LEVEL Revision [Draft H] gi na kana san by an et sleggedt **TECHNICAL BASES DOCUMENT** Page 250 of 278 Barrier: Reactor Coolant System Category: D. Radiation / Coolant Activity Loss and State **Degradation Threat:** Potential Loss and the second of Threshold: فيعرون والمعار الأخري فأخرت فالمراجل

None

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Barrier:	Reactor Coolant Syste	em la la constanta		11.2.2000
Category:	E. Isolation Status	89 - C.	tonak lik	
Degradation Threat:	Loss			
Threshold:				· · · ·
None	· · ·	••••••••••••••••••••••••••••••••••••••		

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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Barrier:	er: Reactor Coolant System		
Category:	E. Isolation Status		212×1 1 3
Degradation Threat:	Potential Loss	et a series of	
Threshold:			tern i terni de statio

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EMERGENCY ACTION LEVEL

		and the second second second	
Barrier:	Reactor Coolant S	ystem	and the second
Category:	F. Judgment		
Degradation Threat:	Loss		م مربع المربح المعرج المراجع
Threshold:	-	··· · • •	·

4. **ANY** condition in the opinion of the Emergency Director that indicates loss of the RCS barrier

Basis:

<u>Generic</u>

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director judgment that the barrier may be considered lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier:	Reactor Coolant System	110 6 2122	
Category:	F. Judgment	Alter Constant	North Constant
Degradation Threat:	Potential Loss		
Threshold:			

4. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier

Basis:

Generic

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the RCS barrier is potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director judgment that the barrier may be considered potentially lost.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the RCS barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

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Barrier:	Containment	人名格里克 经正式公司 新加州市场		
Category:	A. Critical Safety	y Function Status		
Degradation Threat:	Loss		No. Care	
Threshold:				4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 - 4 -

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

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1. RED path condition exists F-0.5 Containment		at the state of the state	n 1997 - San
Threshold:		- ************************************	19 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 - 9 -
Degradation Threat:	Potential Loss	Al Constant Co	an a
Category:	A. Critical Safety Function	Status	a da seria da seria Tente da seria da seri
Barrier:	Containment		

Generic

Basis:

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RED path indicates an extreme challenge to the safety function derived from appropriate instrument readings and/or sampling results, and thus represents a potential loss of containment. Conditions leading to a containment RED path result from RCS barrier and/or Fuel Clad Barrier Loss. Thus, this threshold is primarily a discriminator between Site Area Emergency and General Emergency representing a potential loss of the third barrier.

There is no Loss threshold associated with this item.

States Press and the other of press sign and sign and sign and sign and sign and sign and the sign and sign

Critical Safety Function Status Tree (CSFST) Containment-RED path is given in F-0.5 and is entered if Containment pressure is equal to or greater than 60 psig (ref. 1).

This threshold is indicative of a loss of both RCS and Fuel Clad barriers. This combination of conditions would be expected to require the declaration of a General Emergency.

- CSFST for F-0.5 Containment if A is a subject to a consideration of \$100 sectors of a state of a subject sector of a state of a subject sector of a state of a subject sector of a subject sector
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Barrier:	Containment		
Category:	B. Core Cooling / Heat Rem	oval	
Degradation Threat:	Potential Loss	Maria Information Africa. A	a weather the second
Threshold:			

2. Core Exit TCs cannot be restored < 1,200°F within 15 min.

Basis:

. . .

1.1

<u>Generic</u>

There is no Loss threshold associated with this item.

The conditions in this threshold represents an imminent core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel Clad and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" - path.

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

Plant-Specific

Core Exit Thermocouples (TCs) reading in excess of 1200°F corresponds to the CSFST Core Cooling RED path entry condition (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). Although clad rupture due to high temperature is not expected for CET readings less than the threshold, temperatures of this magnitude signal significant superheating of the reactor coolant and core uncovery. Events that result in Core Exit TC readings above the loss threshold are classified severe accidents and lead to entry into Severe Accident Management Guidelines (ref. 3).

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EMERGENCY ACTION LEVEL

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Events that result in Core Exit TC readings above the Fuel Clad loss threshold are classified severe accidents and lead to entry into Severe Accident Management Guidelines and signify possible core overheating to the point that clad ballooning/collapse may occur and portions of the core may have melted (ref. 3).

It must also be assumed the loss of RCS inventory is a result of a loss of the RCS barrier. These conditions, if not mitigated, can lead to core melt which in turn may result in a loss of containment. Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the Reactor Vessel in a significant fraction of the core damage scenarios, and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. The phrase "cannot be restored <" implies Core Exit TC readings have exceeded the threshold temperature and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful (ref. 4). Whether or not guidance is effective should be apparent within fifteen minutes. The ED should make the declaration as soon as it is determined the guidance has not been or will not be effective in restoring temperature below the threshold.

Ginna Basis Reference(s):
1. CSFST for F-0.2 Core Cooling
2. EPIP-2-16 Core Damage Estimation Associated and the second association of the second a

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 Barrier:
 Containment

 Degradation Threat:
 Potential Loss

 Category:
 B. Core Cooling / Heat Removal

Threshold: A second pression of the second second

Core Exit TCs ≥ 700°F
 AND
 RVLIS level cannot be restored > 52% [> 55% adverse CNMT] with no RCPs running within 15 min.

Basis: Constant of the constant of the second secon

There is no Loss threshold associated with this item.

The conditions in this threshold represent an imminent core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. In conjunction with the Core Cooling and RCS Leakage criteria in the Fuel Clad and RCS barrier columns, this threshold would result in the declaration of a General Emergency -- loss of two barriers and the potential loss of a third. If the function restoration procedures are ineffective, there is no "success" path.

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing.

Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Director should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

Plant-Specific

Core Exit Thermocouples (TCs) reading in excess of 700°F corresponds to the CSFST Core Cooling ORANGE path entry criteria (ref. 1). Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel clad temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation (ref. 2). RCS superheat, as indicated by Core Exit TCs reading in excess of 700°F, signals the transition from a subcooled to a superheated regime. In a

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superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to a rapid rise in clad temperatures. Valid indication of superheat is a potential Fuel Clad barrier loss condition because the possible rapid rise in clad temperatures may lead to clad failure.

This threshold indicates: subcooling has been lost (Core Exit TC readings \geq 700°F), the core is uncovered and some fuel clad damage may be occurring (ineffective functional restoration procedures) (ref. 1, 3). It must be assumed that the loss of RCS inventory is a result of a loss of the RCS barrier.

These conditions, if not mitigated, can lead to core melt which in turn may result in a loss of containment. Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the Reactor Vessel in a significant fraction of the core damage scenarios; and the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. The phrase "cannot be restored <" implies Core Exit TC readings have exceeded the threshold temperature and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful (ref. 3). Whether or not guidance is effective should be apparent within fifteen minutes. The ED should make the declaration as soon as it is determined the guidance has not been or will not be effective in restoring temperature below the threshold.

Ginna Basis Reference(s):

and the second second

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- 1. CSFST for F-0.2 Core Cooling and the second state of the second
- 2. EPIP-2-16 Core Damage Estimation
- 3. FR-C.2 Response to Degraded Core Cooling
- 4. Drawing 03021-0687 Reactor Vessel Level Monitoring System Elevations

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Category:	C. Inventory	计计划分子 机精动物 分析 医肠管炎
		· 我们认过这些事情。"我们还有这个意志的意义。
Degradation Threat:	LUSS	$= \left\{ \left\{ \left\{ x_{1}^{2}, x_{2}^{2}, x_{3}^{2}, x_{3}^{2}$
Threshold:		

"你们,你们不是你的你,你就是你们的你,你不是你的?""你们,你能是你们的你?""你是你不是你。"

1. A containment pressure rise followed by a rapid unexplained drop in containment pressure

Basis:

Generic Server and the server of the

Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase from a primary or secondary high energy line break indicates a loss of containment integrity. Containment pressure should increase as a result of mass and energy release into containment from a LOCA. Thus, pressure not increasing indicates containment bypass and a loss of containment integrity.

This indicator relies on operator recognition of an unexpected response for the condition and therefore does not have a specific value associated with it. The unexpected response is important because it is the indicator for a containment bypass condition.

Plant-Specific

UFSAR Figure 15.6-34 describes containment pressure response for a large break LOCA

(ref. 1). Containment pressure peaks at approximately 45 psig at approximately 25

seconds after event initiation.

Ginna Basis Reference(s):

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and the second second

1. UFSAR Figure 15.6-34 Containment Pressure Used for the R.E. Ginna Best-Estimate Large Break LOCA

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1. "你们还是你们的你的?""你你的你,你们就能够能能是你的你,我就是你的你?""你们不是你?"

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Barrier:	Containment	 Second and the second se	
Category:	C. Inventory	$\Delta = 2 (1 + 1)^2 (1 + 1)^2$	
Degradation Threat:	Loss	Marine States	line alleged
Thurschelds			

Threshold:

2. Containment pressure or sump level response **not** consistent with LOCA conditions

Basis:

Generic

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Containment sump levels should increase as a result of mass and energy release into containment from a LOCA. Thus, sump level not increasing indicates containment bypass and a loss of containment integrity.

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Plant-Specific states and the second states are second states and the second states are se an 163 billion an a' the an an brack that a liter that you have the second the second state of the second second The containment pressure and temperature response and containment sump water temperature response versus time are given in UFSAR Figures 6.2-1 through 6.2-6 for the most severe LOCAs (ref. 1). en a funda en en antico augulo da seg

Ginna Basis Reference(s): 1. UFSAR Figures 6.2-1 through 6.2-6 and the Mathematical Methods and the second secon 化二酚基乙酸乙酯医乙酸乙酯 化乙酰氨基乙酰氨基乙酰氨基乙酯

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Barrier:	Containment		2000 - Roll	
Category:	C. Inventory	I	and the second second	
Degradation Threat:	Loss		179 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200	n de l'active este est fine. Nationale est est est fine
Threshold:				:

3. Ruptured S/G is also faulted outside of containment of the terms of the terms of the second terms of ter

Basis:

<u>Generic</u>

The loss threshold recognizes that SG tube leakage can represent a bypass of the containment barrier as well as a loss of the RCS barrier.

Users should realize that this threshold and containment loss C.4 could be considered redundant. This was recognized during the development process. The inclusion of a threshold that uses Emergency Procedure commonly used terms like "ruptured and faulted" adds to the ease of the classification process and has been included based on this human factor concern.

This threshold results in a UE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

This threshold addresses the condition in which a ruptured steam generator is also faulted. This condition represents a bypass of the RCS and containment barriers and is a subset of the containment loss C.4. In conjunction with RCS leak rate barrier loss threshold, this would always result in the declaration of a Site Area Emergency.

Plant-Specific

A faulted S/G means the existence of secondary side leakage that results in an uncontrolled decrease in steam generator pressure or the steam generator being completely depressurized (ref. 1). A ruptured S/G means the existence of primary-to-secondary leakage of a magnitude sufficient to require or cause a reactor trip and safety injection (ref. 2).

Definitions:

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Faulted

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

Ruptured

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

Gi	nna Basis Reference(s)	1. 4字 亡
1 ,	nna Basis Reference(s): E-2 Faulted Steam Generator Isolation	en en Brander
	E-3 Steam Generator Tube Rupture	

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Barrier:	Containment	
Category:	C. Inventory	n brady i skutnik ne. Nježi konstante
Degradation Threat:		i di sensi di sela se
-		
Threshold:	A gradu tri gama series seria egamenta a agrado de compositiva series.	ante por transforme
4. Primary-to-second	lary leakrate > 10 gpm	
AND		
Unisolable prolon	ged steam release from affected S/G to the env	vironment
Basis:		<u>an an ann an tha an an an</u>

<u>Generic</u>

The loss threshold recognizes that SG tube leakage can represent a bypass of the Containment barrier as well as a loss of the RCS barrier.

Users should realize that the this loss threshold and containment loss C.3 could be considered redundant. This was recognized during the development process. The inclusion of an threshold that uses Emergency Procedure commonly used terms like "ruptured and faulted" adds to the ease of the classification process and has been included based on this human factor concern.

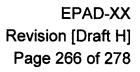
This threshold results in a UE for smaller breaks that; (1) do not exceed the normal charging capacity threshold in RCS leak rate barrier Potential Loss threshold, or (2) do not result in ECCS actuation in RCS SG tube rupture barrier Loss threshold. For larger breaks, RCS barrier threshold criteria would result in an Alert. For SG tube ruptures which may involve multiple steam generators or unisolable secondary line breaks, this threshold would exist in conjunction with RCS barrier thresholds and would result in a Site Area Emergency. Escalation to General Emergency would be based on "Potential Loss" of the Fuel Clad Barrier.

This threshold addresses SG tube leaks that exceed 10 gpm in conjunction with an unisolable release path to the environment from the affected steam generator. The threshold for establishing the unisolable secondary side release is intended to be a prolonged release of radioactivity from the ruptured steam generator directly to the environment. This could be expected to occur when the main condenser is unavailable to accept the contaminated steam (i.e., SG tube rupture with concurrent loss of off-site power and the ruptured steam generator is required for plant cooldown or a stuck open relief valve). If the main condenser is available, there may be releases via air ejectors, gland seal exhausters, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of an unisolable release path to the environment. These minor releases are assessed using EALs in Category R.

Plant-Specific

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT



	solation of the affected S/G per emergency releases. The criterion for prolonged release is
An ARV or Safety valve performing as des	
Definitions:	
Unisolable	No. 169 geographic activity of the
A breach or leak that cannot be prompt	lly isolated from the Main Control Board.
Ginna Basis Reference(s):	
1. ECA-1.2 LOCA Outside Containment	a se kolonie kryste douží od slovenský se se obrazoval
 E-3 Steam Generator Tube Rupture F-0.2 Core Cooling 	
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	Containment and the second department of which have been as the first second
Category:	C. Inventory
Degradation Threat:	
Threshold:	and solution of the second state of the ground the ground the particular second solution as

4. Containment pressure \geq 60 psig and rising

Basis:

<u>Generic</u>

The site specific pressure is based on the containment design pressure.

Plant-Specific

This threshold is the containment design pressure and is in excess of that expected from the design basis loss of coolant accident (LOCA) (ref. 1, 2). Proper actuation and operation of the containment spray system when required should maintain containment pressure well below the design pressure. The peak containment pressure of 45 psig occurs ~ 25 seconds after event initiation for the most limiting design basis LOCA (ref. 3). The pressure-time responses for the spectrum of LOCAs considered in the plant design basis are described in Section 15 of the UFSAR, Accident Analyses. The threshold is therefore indicative of a loss of both RCS and Fuel Clad barriers in that it should not be reached without severe core degradation (metal-water reaction) or failure to scram in combination with RCS breach. This condition would be expected to require the declaration of a General Emergency.

Ginna Basis Reference(s):

- 1. CSFST for F.0.5 Containment
- 2. UFSAR 3.1.2.2.7 General Design Criterion 16 Containment Design
- 3. UFSAR Figure 15.6-34 Containment Pressure Used for the R.E. Ginna Best-Estimate Large Break LOCA

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EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

Barrier:	Containment	ty alterna and the detailed and all
Category:	C. Inventory	n og Herrich predsonade spelle efter en spolen i som en Var Dessammen spole var New en tekeniserier en som
Degradation Th	eat: Potential Loss	·
Threshold:		

5. Containment hydrogen concentration $\geq 4\%$

Basis:

<u>Generic</u>

Existence of an explosive mixture means a hydrogen and oxygen concentration of at least the lower deflagration limit curve exists. The indications of potential loss under this EAL corresponds to some of those leading to containment potential loss threshold A.1.

Plant-Specific

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gases in Containment. However, Containment monitoring (CH-EPIP-CVH2) and/or sampling should be performed to verify this assumption (ref. 1). A combustible mixture can be formed when hydrogen gas concentration in the Containment atmosphere is greater than 4.1% (rounded to 4%) by volume (ref. 2).

After a LOCA, the containment atmosphere is a homogeneous mixture of steam, air, solid and gaseous fission products, hydrogen, and water droplets containing boron and sodium hydroxide. During and following a LOCA, the hydrogen concentration in the Containment results from radiolytic decomposition of water, metal-water reaction, and aluminum/zinc reaction with the spray solution (ref. 2). If hydrogen concentration reaches or exceeds the lower flammability limit (4%) in an oxygen rich environment, a potentially explosive mixture exists. If the combustible mixture ignites inside containment, loss of the Containment barrier could occur. To generate such levels of combustible gas, loss of the Fuel Clad and RCS barriers must also have occurred. Since this threshold is also indicative of loss of both Fuel Clad and RCS barriers with the potential loss of the Containment barrier, it therefore will likely warrant declaration of a General Emergency.

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Ginna Basis Reference(s): 1. SACRG-1 Severe Accident Control Room Guideline Initial Response 2. UFSAR 1.5.10 Development of Containment Hydrogen Recombiner Containment Hydrogen Recombiner Containment Hydrogen Recombiner

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Category:	C. Inventory	el deplacet in configuration presidente de la
Degradation Threat:	Potential Loss	(ajmustreinikaan element
Threshold:		ene in meller mille 200 norther 200 block to a For heige cells 200 norther de le contra a co

Basis:

per design

<u>Generic</u>

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, recirc. fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Plant-Specific

Two means of post accident containment heat removal are provided; Containment Spray System and Containment Recirc Fan Cooler (CRFC) units. At least one train of each of these systems is required to provide sufficient steam-condensing capacity to ensure against containment overstress and to remove residual and chemical heat (ref. 1, 2).

The CRFC system is comprised of four CRFC units, two of which are required in the post accident condition (ref. 3, 4). Each containment aircooling unit consists of cooling coils, accident backdraft damper, accident fan, service water outlet valves, and controls necessary to ensure an operable service water flow path. Following an SI actuation signal, CRFC System fans are designed to start automatically (ref. 4).

Each of two containment spray trains consists of a spray pump, spray header, nozzles, valves, piping, instruments, and controls to ensure an operable flow path capable of taking suction from the RWST upon an actuation signal (ref. 4).

During a steam line break or LOCA, a minimum of two CRFC units and one Containment Spray (CS) pump are required to maintain peak pressure and temperature below design limits (ref. 4).

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The containment hi-hi pressure setpoint (28 psi	g) is the pressure at which th	ne equipment
should actuate and begin performing its function	n (ref. 5),	
Ginna Basis Reference(s):	eno (Baltimani) - primal	an an an an Arthur
 UFSAR Section 6.2.2 Containment Heat Re UFSAR Section 6.2.1.2.3 Secondary System 	•	
 UFSAR Section 6.2.2.1.3 Design Evaluation Technical Specifications B 3.6. Containment 	t Svetome	
5. CSFST for F-0.5 Containment	· · · · · · · · · · · · · · · · · · ·	

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Barrier:	Containment	5	
Category:	D. Radiation / Coolant Activity		
Degradation Threat:	Potential Loss		
Threshold:	•.		الله العن الجيام المعالية المالية. المالية المعالم الم

7. Containment radiation monitor R-29/R-30 reading > 1.0E+03 R/hr

Basis:

<u>Generic</u>

There is no Loss threshold associated with this item.

The site specific reading is a value which indicates significant fuel damage well in excess of the thresholds associated with both loss of Fuel Clad and loss of RCS barriers. A major release of radioactivity requiring off-site protective actions from core damage is not possible unless a major failure of fuel clad 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.

Plant-Specific

Containment radiation is indicated on R-29 and R-30 (ref. 1).

R-29 & R-30 alert alarms at 10 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity). The R-29 & R-30 high alarm setpoint is set at 100 R/hr and is indicative of a significant gap activity release into containment and thus considered a loss of the fuel clad barrier. A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment (ref. 2).

The containment radiation monitor reading is a value that indicates significant fuel damage well in excess of that required for loss of the RCS barrier and the Fuel Clad barrier. NUREG-1228 "Source Term Estimations During Incident Response to Severe Nuclear Power Plant Accidents" states that such readings do not exist when the amount of clad damage is less than 20% (ref. 3). A major release of radioactivity requiring offsite

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protective actions from core damage is not possible unless a major failure into the reactor coolant has occurred. Regardless of whether the Containment barrier itself is challenged, this amount of activity in containment could have severe consequences if released. It is, therefore, prudent to treat this as a potential loss of the Containment barrier.

The reading is higher than that specified for Fuel Clad barrier Loss #3 and RCS barrier Loss #3. Containment radiation readings at or above the Containment barrier potential loss threshold, therefore, signify a loss of two fission product barriers and potential loss of a third, indicating the need to upgrade the emergency classification to a General Emergency.

Ginna Basis Reference(s):

- 1. P-9 Radiation Monitoring System
- 2. EPIP-2-16 Core Damage Assessment Estimation
- 3. NUREG-1228 Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents

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	Containment as the plan class sac	
Category:	E. Isolation Status	$\mathcal{R}^{(N)}$ (2.2) in the second second $\mathcal{R}^{(N)}$ is the
Degradation Threat:	ser og som gen gan en her eligt er bærnet. Loss Her som berekens elitter berekens begrundet på som som	and an
Threehold		•
5. Failure of all valve AND	s in ANY one line to close	entra providencia de la transferio en el Regiona de esta abalidades

Direct downstream pathway to the environment exists after containment isolation signal

Basis:

Generic State and Sta

This threshold addresses incomplete containment isolation that allows direct release to the environment.

The use of the modifier "direct" in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in–line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

Plant-Specific

None

Ginna Basis Reference(s):

- 1. EOP Attachment 27 Attachment Automatic Action Verification
- 2. EOP Attachment 3 Attachment CI/CVI

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Barrier:	Containment	Mar and a second	and the second
Category:	E. Isolation Status	$(\theta_1, \gamma_1, \gamma_2) \in \mathbb{C}^{n+1}$	
Degradation Threat:	Potential Loss	1.1.1.1. 1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	18 - 2 ⁰¹ Ha wadi, 40,5 ⁰
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Category:	F. Judgment	en internet av det som	
Degradation Threat:	Loss	en el transferencia de la companya en el companya e	
Threshold:			Martin Rock

6. **ANY** condition in the opinion of the Emergency Director that indicates loss of the Containment barrier

Basis:

Generic

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director judgment that the barrier may be considered lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to determining if the Containment barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

EMERGENCY ACTION LEVEL TECHNICAL BASES DOCUMENT

Barrier: Containment

Category: F. Judgment

Degradation Threat: Potential Loss

Threshold:

8. **ANY** condition in the opinion of the Emergency Director that indicates potential loss of the Containment barrier

Basis:

Generic

This threshold addresses any other factors that are to be used by the Emergency Director in determining whether the Containment barrier is potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this threshold as a factor in Emergency Director judgment that the barrier may be considered potentially lost.

The Containment barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment barrier status is addressed by Technical Specifications.

Plant-Specific

The Emergency Director judgment threshold addresses any other factors relevant to

determining if the Containment barrier is potentially lost. Such a determination should

include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

Ginna Basis Reference(s):

None

ATTACHMENT (3)

EAL COMPARISON MATRIX



NEI 99-01 Revision 5 to GINNA EAL Comparison Matrix

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Introduction

This document provides a line-by-line comparison of the Initiating Conditions (ICs), Mode Applicability and Emergency Action Levels (EALs) in NEI 99-01 Rev. 5 Final, Methodology for Development of Emergency Action Levels, February 2008 (ADAMS Accession Number ML080450149), and the R.E. Ginna Nuclear Power Plant (Ginna) ICs, Mode Applicability and EALs. This document provides a means of assessing Ginna differences and deviations from the NRC endorsed guidance given in NEI 99-01. Discussion of Ginna EAL bases and lists of source document references are given in the EAL Technical Bases Document. It is, therefore, advisable to reference the EAL Technical Bases Document for background information while using this document.

Comparison Matrix Format

The ICs and EALs discussed in this document are grouped according to NEI 99-01 Recognition Categories. Within each Recognition Category, the ICs and EALs are listed in tabular format according to the order in which they are given in NEI 99-01. Generally, each row of the comparison matrix provides the following information:

- NEI EAL/IC identifier
- NEI EAL/IC wording
- Ginna EAL/IC identifier
- Ginna EAL/IC wording
- Description of any differences or deviations

EAL Wording

In Section 4.2, NEI recommends the following: "The method of [EAL] presentation should be one with which the operations and health physics staff are comfortable. As is the case for emergency procedures, bases for steps should be in a separate (or separable) document suitable for training and for reference by emergency response personnel and offsite agencies. Each nuclear plant should already have presentation and human factors standards as part of its procedure writing guidance. EALs that are consistent with those procedure writing standards (in particular, emergency operating

procedures which most closely correspond to the conditions under which EALs must be used) should be the norm for each utility."

To assist the Emergency Director (ED), the Ginna EALs have been written in a clear and concise style (to the extent that the differences from the NEI EAL wording could be reasonably documented and justified). As a result, unnecessary words have been removed from the Ginna EALs to reduce EAL-user reading burden to the extent practicable.

The wording reduction gained from elimination of a few characters in a given EAL may not appear to be advantageous within the context of one EAL. When applied to the composite set of EALs, however, significant gains are realized and reading efficiency is improved. This supports timely and accurate classification in the tense atmosphere of an emergency event. The EAL differences introduced to reduce reading burden comprise almost all of the differences justified in this document.

EAL Emphasis Techniques

Due to the width of the table columns and table formatting constraints in this document, line breaks and indentation may differ slightly from the appearance of comparable wording in the source documents. NEI 99-01 is the source document for the NEI EALs; the Ginna EAL Technical Bases Document for the Ginna EALs.

Development of the Ginna IC/EAL wording has attempted to minimize inconsistencies and apply sound human factors principles. As a result, differences occur between NEI and Ginna ICs/EALs for these reasons alone. When such difference may imply a technical difference in the associated NEI IC/EAL, the difference is identified and a justification provided.

The print and paragraph formatting conventions summarized below guide presentation of the Ginna EALs in accordance with the EAL writing criteria. Space restrictions in the EAL table of this document sometimes override these criteria in cases when following the criteria would introduce undesirable complications in the EAL layout.

- Upper case print is reserved for system abbreviations, logic terms (and, or, etc. when not used as a conjunction), annunciator window engravings.
- Bold font is used for logic terms, negative terms (not, cannot, etc.), ANY, all.

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- Underscore is avoided as it can interfere with text in narrow line spacing.
- Three or more items in a list are normally introduced with "**ANY** of the following" or "**all** of the following." Items of the list begin with bullets when a priority or sequence is not implied.
- The use of AND/OR logic within the same EAL has been avoided when possible. When such logic cannot be avoided, indentation and separation of subordinate contingent phrases is employed.

Global Differences

The differences listed below generally apply throughout the set of EALs and are not repeated in the Justification sections of this document. The global differences do not decrease the effectiveness of the intent of NEI 99-01.

- The NEI phrase "Notification of Unusual Event" has been changed to "Unusual Event" or abbreviated "UE" to reduce EAL-user reading burden.
- NEI 99-01 IC Example EALs are implemented in separate plant EALs to improve clarity and readability. For example, NEI lists all IC HU1 Example EALs under one IC. The corresponding Ginna EALs appear as unique EALs (e.g., HU1.1 through HU1.5).
- Mode applicability identifiers (numbers/letter) modify the NEI 99-01 mode applicability names as follows: 1 - Power Operation, 2 -Startup, 3 - Hot Shutdown, 4 - Hot Standby, 5 - Cold Shutdown, 6 -Refuel, D - Defueled. NEI 99-01 defines Defueled as follows: "Reactor Vessel contains no irradiated fuel (full core off-load during refueling or extended outage)."
- 4. NEI 99-01 uses the terms greater than, less than, greater than or equal to, for [x] minutes or longer, etc. in the wording of some ICs and example EALs. For consistency and to reduce EAL-user reading burden, Ginna has adopted use of boolean symbols (>, <, ≥, ≤) in place of the NEI 99-01 text modifiers.</p>
- 5. "min." is the standard abbreviation for "minutes" and is used to reduce EAL-user reading burden.
- 6. IC/EAL identification:

- NEI Recognition Category A "Abnormal Radiation Levels/ Radiological Effluents" has been changed to Category R "Abnormal Rad Release / Rad Effluent." The designator "R" is more intuitively associated with radiation (rad) or radiological events. NEI IC designators beginning with "A" have likewise been changed to "R."
- NEI 99-01 defines the thresholds requiring emergency • classification (example EALs) and assigns them to ICs which, in turn, are grouped in "Recognition Categories." The Recognition Categories, however, are so broad and the IC descriptions are so varied that an EAL is difficult to locate in a timely manner when the EAL-user must refer to a set of EALs with the NEI organization and identification scheme. The NEI document clearly states that the EAL/IC/Recognition Category scheme is not intended to be the plant-specific EAL scheme for any plant. and appropriate human factors principles should be applied to development of an EAL scheme that helps the EAL-user make timely and accurate classifications. Ginna endeavors to improve upon the NEI EAL organization and identification scheme to enhance usability of the plant-specific EAL set. To this end, the Ginna IC/EAL scheme includes the following features:
 - a. Division of the NEI EAL set into three groups:
 - EALs applicable under <u>all</u> plant operating modes This group would be reviewed by the EAL-user any time emergency classification is considered.
 - EALs applicable only under <u>hot</u> operating modes This group would only be reviewed by the EAL-user when the plant is in Hot Shutdown, Hot Standby, Startup or Power Operation mode.
 - EALs applicable only under <u>cold</u> operating modes This group would only be reviewed by the EAL-user when the plant is in Cold Shutdown, Refuel or Defueled mode.

The purpose of the groups is to avoid review of hot condition EALs when the plant is in a cold condition and avoid review of cold condition EALs when the plant is in a hot condition. This approach significantly minimizes the 2

total number of EALs that must be reviewed by the EALuser for a given plant condition, reduces EAL-user reading burden and, thereby, speeds identification of the EAL that applies to the emergency.

- Within each of the above three groups, assignment of EALs to categories/subcategories – Category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user.
 Subcategories are used as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The Ginna EAL categories/subcategories and their relationship to NEI Recognition Categories are listed in Table 1.
- c. Unique identification of each EAL Four characters comprise the EAL identifier as illustrated in Figure 1.

Figure 1 – EAL Identifier

EAL Identifier

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Emergency classification (G, S, A, U) -

Category (R, H, E, S, F, C)

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The first character is a letter associated with the category in which the EAL is located. The second character is a letter associated with the emergency classification level. (G for General Emergency, S for Site Area Emergency, A for Alert, and U for Notification of Unusual Event). The third character is a number associated with one or more subcategories within a given category. Subcategories are sequentially numbered beginning with the number "1." If a category does not have a subcategory, this character is assigned the number "1." The fourth character is a number preceded by a period for each EAL within a subcategory. EALs are sequentially numbered within the emergency classification level of a subcategory beginning with the number "1."

L Sequential number within subcategory/classificatio

Subcategory number (1 if no subcategory)

The EAL identifier is designed to fulfill the following objectives:

• Uniqueness – The EAL identifier ensures that there can be no confusion over which EAL is driving the need for emergency classification.

Speed in locating the EAL of concern – When the EALs are displayed in a matrix format, knowledge of the EAL identifier alone can lead the EAL-user to the location of the EAL within the classification matrix. The identifier conveys the category, subcategory and classification level. This assists ERO responders (who may not be in the same facility as the ED) to find the EAL of concern in a timely manner without the need for a word description of the classification threshold.

Possible classification upgrade – The category/subcategory/identifier scheme helps the EAL-user find higher emergency classification EALs that may become active if plant conditions worsen.

Note that the NEI 99-01 identifier only identifies the IC, not the specific example EAL threshold. The NEI scheme, therefore, does not fulfill the above objectives which are desirable in facilitating timely and accurate emergency classification.

Table 2 lists the Ginna ICs and EALs that correspond to the NEI ICs/Example EALs when the above EAL/IC organization and identification scheme is implemented.

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Differences and Deviations

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According to NRC Regulatory Issue Summary (RIS) 2003-18 "Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels" Supplements 1 and 2, a difference is an EAL change in which the basis scheme guidance differs in wording but agrees in meaning and intent, such that classification of an event would be the same, whether using the basis scheme guidance or the Ginna EAL. A deviation is an EAL change in which the basis scheme guidance differs in wording and is altered in

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meaning or intent, such that classification of the event could be different between the basis scheme guidance and the Ginna proposed EAL.

Administrative changes that do not actually change the textual content are neither differences nor deviations. Likewise, any format change that does not alter the wording of the IC or EAL is considered neither a difference nor a deviation.

The following are examples of differences:

- Choosing the applicable EAL based upon plant type (i.e., BWR vs. PWR).
- Using a numbering scheme other than that provided in NEI 99-01 that does not change the intent of the overall scheme.
- Where the NEI 99-01 guidance specifically provides an option to notinclude an EAL if equipment for the EAL does not exist at Ginna (e.g., automatic real-time dose assessment capability).
- Pulling information from the bases section up to the actual EAL that does not change the intent of the EAL.
- Choosing to state ALL Operating Modes are applicable instead of stating N/A, or listing each mode individually under the Abnormal Rad Level/Radiological Effluent and Hazard and Other Conditions Affecting Plant Safety sections.
- Using synonymous wording (e.g., greater than or equal to vs. at or above, less than or equal to vs. at or below, greater than or less than vs. above or below, etc.)
- Adding Ginna equipment/instrument identification and/or noun names to EALs.
- Combining like ICs that are exactly the same but have different operating modes as long as the intent of each IC is maintained and the overall progression of the EAL scheme is not affected.
- Any change to the IC and/or EAL, and/or basis wording, as stated in NEI 99-01, that does not alter the intent of the IC and/or EAL, i.e., the IC and/or EAL continues to:
 - Classify at the correct classification level.
 - Logically integrate with other EALs in the EAL scheme.

• Ensure that the resulting EAL scheme is complete (i.e., classifies all potential emergency conditions).

The following are examples of deviations:

- Use of altered mode applicability.
- Altering key words or time limits.
 - Changing words of physical reference (protected area, safety-related equipment, etc.).
- Eliminating an IC. This includes the removal of an IC from the Fission Product Barrier Degradation category as this impacts the logic of Fission Product Barrier ICs.
- Changing a Fission Product Barrier from a Loss to a Potential Loss or vice-versa.
- Not using NEI 99-01 definitions as the intent is for all NEI 99-01 users to have a standard set of defined terms as defined in NEI 99-01. Differences due to plant types are permissible (BWR or PWR). Verbatim compliance to the wording in NEI 99-01 is not necessary as long as the intent of the defined word is maintained. Use of the wording provided in NEI 99-01 is encouraged since the intent is for all users to have a standard set of defined terms as defined in NEI 99-01.
- Any change to the IC and/or EAL, and/or basis wording as stated in NEI 99-01 that does alter the intent of the IC and/or EAL, i.e., the IC and/or EAL:
 - Does not classify at the classification level consistent with NEI 99-01.
 - Is not logically integrated with other EALs in the EAL scheme.
 - Results in an incomplete EAL scheme (i.e., does not classify all potential emergency conditions).

The "Difference/Deviation Justification" columns in the remaining sections of this document identify each difference between the NEI 99-01 IC/EAL wording and the Ginna IC/EAL wording. An explanation that justifies the reason for each difference is then provided. If the difference is determined to be a deviation, a statement is made to that effect and explanation is given that states why classification may be different from the NEI 99-01 IC/EAL and

EAL Comparison Matrix

the reason for its acceptability. In all cases, however, the differences and deviations do not decrease the effectiveness of the intent of NEI 99-01. A summary list of Ginna EAL deviations from NEI 99-01 is given in Table 3.

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Ginr	Ginna EALs NEI	
Category	Subcategory	Recognition Category
Group: Any Operating Mode:		
R – Abnormal Rad Release/Rad Effluent	1 – Offsite Rad Conditions 2 – Onsite Rad Conditions & Spent Fuel Events 3 – CR/CAS Rad	Abnormal R ad Levels/Radiological Effluent EALs
H – Hazards and Other Conditions Affecting Plant Safety	 1 - Natural or Destructive Phenomena 2 - Fire or Explosion 3 - Hazardous Gas 4 - Security 5 - Control Room Evacuation 6 - Judgment 	Hazards and Other Conditions Affecting Plant Safety EALs
E - ISFSI	None	ISFSI EALs
Group: Hot Conditions:		······································
S – System Malfunction	 Loss of AC Power Loss of DC Power Criticality & RPS Failure Inability to Reach or Maintain Shutdown Conditions Instrumentation Communications Fuel Clad Degradation RCS Leakage 	System Malfunction EALs
F – Fission Product Barrier	None	Fission Product Barrier EALs
Group: Cold Conditions:		
C – Cold Shutdown/Refuel System Malfunction	 Loss of AC Power Loss of DC Power RCS Level RCS Temperature Communications Inadvertent Criticality 	C old Shutdown / Refueling System Malfunction EALs

Table 1 – Ginna EAL Categories/Subcategories

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Table 2 – NEI / Ginna EAL Identification Cross-Reference

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NEI		Ginna	
IC	Example EAL	Category and Subcategory	EAL
AÜ1	1	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RU1.1
AU1	2	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RU1.1
AU1	3	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RU1.2
AU1	4	N/A	N/A
AU1	5	N/A	N/A
AU2	1	R – Abnormal Rad Release / Rad Effluent, 2 – Onsite Rad Conditions & Spent Fuel Events	RU2.1
AU2	2	R – Abnormal Rad Release / Rad Effluent, 2 – Onsite Rad Conditions & Spent Fuel Events	RU2.2
AA1	1	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RA1.1
AA1	2	N/Á	N/A
AÅ1	3	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RA1.2
AA1	4	N/A	N/A
AA1	5	N/A	N/A
AA2	1	R – Abnormal Rad Release / Rad Effluent, 2 – Onsite Rad Conditions & Spent Fuel Events	RA2.2
AA2	2	R – Abnormal Rad Release / Rad Effluent, 2 – Onsite Rad Conditions & Spent Fuel Events	RA2.1

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NEI		Ginna	
IC	IC Example EAL	Category and Subcategory	EAL
AA3	1	R – Abnormal Rad Release / Rad Effluent, 3 – CR/CAS Radiation	RA3.1
AS1	1	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RS1.1
AS1	2	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RS1.2
AS1	3	N/A	N/A
AS1	4	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RS1.3
AG1	1	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RG1.1
AG1	2	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RG1.2
AG1	3	N/A	N/A
AG1	4	R – Abnormal Rad Release / Rad Effluent, 1 – Offsite Rad Conditions	RG1.3
CU1	1, 2	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CU3.1
CU2	1	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CU3.2
CU2	2	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CU3.3
CU3	1	C – Cold SD/ Refuel System Malfunction, 1 – Loss of AC Power	CU1.1
CU4	1	C – Cold SD/ Refuel System Malfunction, 4 – RCS Temperature	CU4.1
CU4	2	C – Cold SD/ Refuel System Malfunction, 4 – RCS Temperature	CU4.2
CU6	1, 2	C – Cold SD/ Refuel System Malfunction, 5 – Communications	CU5.1
CU7	1	C – Cold SD/ Refuel System Malfunction, 2 – Loss of DC Power	CU2.1
CU8	1	N/A	N/A

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NEI		Ginna	
IC	Example EAL	Category and Subcategory	EAL
CU8	2	C – Cold SD/ Refuel System Malfunction, 6 – Inadvertent Criticality	CU6.1
CA1	1, 2	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CA3.1
CA3	· · 1	C – Cold SD/ Refuel System Malfunction, 1 – Loss of AC Power	CA1.1
CA4	1, 2	C – Cold SD/ Refuel System Malfunction, 4 – RCS Temperature	CA4.1
CS1	1	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CS3.1
CS1	Ż	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CS3.2
CS1	· 3	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CS3.3
CG1	1	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CG3.1
CG1	2	C – Cold SD/ Refuel System Malfunction, 3 – RCS Level	CG3.2
D-AU1		N/A	N/A
D-AU2		· · · · · · · · · · · · · · · · · · ·	
D-SU1	•		,
D-HU1	· · ·		•••
D-HU2			
D-HU3			·* · ·
D-AA1			•
D-AA2			. .
D-HA1			
D-HA2	- ·		
E-HU1		N/A	N/A
FU1	1	F – Fission Product Barriers	FU1.1

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	NEI	Ginna	
IC	Example EAL	Category and Subcategory	EAL
FA1	1	F – Fission Product Barriers	FA1.1
FS1	1	F – Fission Product Barriers	FS1.1
FG1	1	F – Fission Product Barriers	FG1.1
HU1	1	H – Hazards, 1 – Natural or Destructive Phenomena	HU1.1
HU1	2	H – Hazards, 1 – Natural or Destructive Phenomena	HU1.2
HU1	3	H – Hazards, 1 – Natural or Destructive Phenomena	HU1.3
HU1	4	H – Hazards, 1 – Natural or Destructive Phenomena	HU1.4
HU1	5	H – Hazards, 1 – Natural or Destructive Phenomena	HU1.5
HU2	1	H – Hazards, 2 – Fire or Explosion	HU2.1
HU2	2	H – Hazards, 2 – Fire or Explosion	HU2.2
HU3	1	H – Hazards, 3 – Hazardous Gas	HU3.1
HU3	2	H – Hazards, 3 – Hazardous Gas	HU3.2
HU4	1, 2, 3	H – Hazards, 4 – Security	HU4.1
HŲ5	1	H – Hazards, 6 – Judgment	HU6.1
HA1	1	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.1
HA1	2	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.2
HA1	3	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.3
HA1	4	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.4

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IC	Example EAL	Category and Subcategory	EAL
HA1	5	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.6
HA1	6	H – Hazards, 1 – Natural or Destructive Phenomena	HA1.5
HA2	1	H – Hazards, 2 – Fire or Explosion	HA2.1
HA3	1	H – Hazards, 3 – Hazardous Gas	HA3.1
HA4	1, 2	H – Hazards, 4 – Security	HA4.1
HA5	1	H – Hazards, 5 – Control Room Evacuation	HA5.1
HA6	1	H – Hazards, 6 – Judgment	HA6.1
HS2	1	H – Hazards, 5 – Control Room Evacuation	HS5.1
HS3	1	H – Hazards, 6 – Judgment	HS6.1
HS4	1	H – Hazards, 4 – Security	HS4.1
HG1	1	H – Hazards, 4 – Security	HG4.1
HG1	2	H – Hazards, 4 – Security	HG4.2
HG2	1	H – Hazards, 6 – Judgment	HG6.1
SU1	1	S – System Malfunction, 1 – Loss of AC Power	SU1.1
SU2	1.	S – System Malfunction, 4 – Inability to Reach or Maintain Shutdown Conditions	SU4.1
SU3	. 1	S – System Malfunction, 5 – Instrumentation / Communications	SU5.1
SU4	1	S – System Malfunction, 7 – Fuel Clad Degradation	SU7.2
SU4	2	S – System Malfunction, 7 – Fuel Clad Degradation	SÚ7.1

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I	NEI	Ginna					
IC	Example EAL	Category and Subcategory	EAL				
SU5	1, 2	S – System Malfunction, 8 – RCS Leakage	SU8.1				
SU6	1, 2	S – System Malfunction, 6 – Instrumentation / Communications	SU6.1				
SU8	1	N/A	N/A				
SU8	2	S – System Malfunction, 3 – Criticality & RPS Failure	SU3.1				
SA2	1	S – System Malfunction, 2 – Criticality & RPS Failure	SA3.1				
SA4	1	S – System Malfunction, 5 – Instrumentation / Communications	SA5.1				
SA5	1	S – System Malfunction, 1 – Loss of AC Power	SA1.1				
SS1	1	S – System Malfunction, 1 – Loss of AC Power	SS1.1				
SS2	1	S – System Malfunction, 3 – Criticality & RPS Failure	SS3.1				
SS3	1	S – System Malfunction, 1 – Loss of DC Power	SS2.1				
SS6	1	S – System Malfunction, 5 – Instrumentation / Communications	SS5.1				
SG1	1	S – System Malfunction, 1 – Loss of AC Power	SG1.1				
SG2	1	S – System Malfunction, 3 – Criticality & RPS Failure	SG3.1				

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Table 3 – Summary of Deviations

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	NEI		NEI Ginna EAL/FPB		Description		
IC	Example EAL	Threshold					
SU5	1, 2	SU8.1	The phrase "for \ge 15 min. (Note 4)" has been added to the Ginna EAL to allow mitigation by operating procedures prior to declaration.				
			This deviation is based on the EAL FAQ #34 dated September 2010 (ML102030330). The current EAL does not provide a threshold time to evaluate or mitigate the event such as the EAL for loss of off-site power or the fire EAL. Providing time to isolate a leak using plant procedures would eliminate unnecessary classifications and notifications to off-site organizations. Off-site response organizations have provided feedback during the EAL upgrade process to eliminate unnecessary classifications that can be easily addressed by plant staff. There should be time for the Control Room Operators to use procedures to attempt identification and isolate of the leakage prior to classification. The EAL would then be based upon the inability to maintain RCS inventory. This is a deviation from NEI 99-01 Revision 5.				
HU2	1	HU2.1	The third paragraph of the NEI basis has been edited to clarify the significance of the 15-minute duration. If the alarm cannot be verified by redundant Control Room or nearby Fire Panel indications, notification from the field that a fire exists starts the concurrent 15-minute classification and fire suppression clocks. This change is consistent with the manner in which the Control Room and Fire Brigade leaders verify fires. This change is necessary to avoid declaring Unusual Event emergencies for spurious alarms that, due to the sensor location, cannot be verified within 15 minutes of receipt of the alarm.				
			This deviation is based on the EAL FAQ #22 dated September 2010 (ML102030330). This change is necessary to avoid declaring Unusual Event emergencies for spurious alarms that, due to the sensor location, cannot be verified within 15 minutes of receipt of the alarm. This change would eliminate classification due to one indication, a malfunctioning sensor, by requiring additional indications of the existence of a fire. Off-site response organizations have provided feedback during the EAL upgrade process to eliminate				

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	NEI	Ginna	
IC	IC Example EAL Threshold		Description
<u> </u>			unnecessary classifications that can be easily addressed by plant staff. This change will align the EAL with the rest of the EALs with entry criteria that is based on a number of indications of an event.
			This is a deviation from NEI 99-01 Revision 5.

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Category R Abnormal Rad Release / Radiological Effluent

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NEI IC#	NEI IC Wording and Mode Applicability	Ginna IC#(s)	Ginna IC Wording and Mode Applicability	Difference/Deviation Justification
AU1	Any release of gaseous or liquid radioactivity to the environment greater than 2 times the Radiological Effluent Technical Specifications/ODCM for 60 minutes or longer. MODE: All	RU1	ANY release of gaseous or liquid radioactivity to the environment greater than 2 times the ODCM for 60 minutes or longer MODE: All	The Ginna ODCM limits provide the site-specific Radiological Effluent Technical Specifications.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	VALID reading on ANY of the following radiation monitors greater than the reading shown for 60 minutes or longer: (site specific monitor list and threshold values) Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	RU1.1	ANY gaseous or liquid monitor reading > Table R-1 column "UE" for ≥ 60 min. (Note 2) Note 2: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	Example EALs 1 and 2 have been combined into a single EAL referencing Table R-1. The NEI phrase "VALID reading on ANY " has been changed to " ANY reading." All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. The NEI phrase "of the following radiation monitors greater than the reading shown(site specific monitor list and threshold values)" has been replaced with "Gaseous or liquid monitors > Table R-1 column "UE"" UE, Alert, SAE and GE thresholds for all Ginna continuously monitored gaseous and liquid release pathways are listed in Table R-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL user. The values shown in Table R-1 column "UE," consistent with the NEI bases, represent two times the ODCM release limits for both liquid and gaseous release. Reference to the NEI note is included in the EAL wording "(Note 2)." Numbering the note facilitates referencing in the EAL matrix.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
2	VALID reading on any effluent monitor reading greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.	RU1.1	See RU1.1 above.	Example EALs 1 and 2 have been combined into a single EAL referencing Table R-1.
	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.			
3	Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates greater than 2 times (site specific RETS values) for 60 minutes or longer. Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that	RU1.2	Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates $> 2 \times$ P-9 limits for ≥ 60 min. (Note 2) Note 2: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	The Ginna ODCM is the site-specific Radiological Effluent Technical Specifications. The Ginna ODCM limits are specified in Technical Procedure P-9. The NEI phrase "2 times" has been replaced with phrase "2 x" to reduce EAL-user reading burden. The phrases have th same meaning. Reference to the NEI note is included in the EAL wording "(Note 2)." Numbering the note facilitates referencing in the EAL matrix.

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
	the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.			:
4	VALID reading on perimeter radiation monitoring system reading greater than 0.10 mR/hr above normal* background for 60 minutes or longer. [for sites having telemetered perimeter monitors]	N/A	N/A	Deleted NEI Example EAL #4 because the plant is not equipped with a perimeter radiation monitoring system. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.
5	VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 60 minutes or longer. [for sites having such capability]	N/A	N/A	Deleted NEI Example EAL #5 because the plant is not equipped with real-time dose assessment. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.

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EAL Comparison Matrix

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Monitor GE SAE Alert UE Gaseous CNMT Veni Noble Gas N/A N/A N/A N/A N/A (R-12) CNMT Veni Noble Gas Hi Range 1.8E+2 µC/cc 1.8E+1 µC/cc 1.8E+0 µC/cc N/A (R-12) CNMT Veni Noble Gas N/A N/A N/A N/A N/A Plant Veni Noble Gas N/A N/A N/A N/A N/A 6.0E+5 cpm (R-14) Plant Veni Noble Gas N/A N/A N/A N/A 6.3E+5 cpm (R-15) Art Ejector Noble Gas N/A N/A N/A N/A 6.3E+5 cpm (R-15) Art Ejector Noble Gas Hi Range 5.7E+2 µC/cc 5.7E+1 µC/cc 5.7E+0 µC/cc N/A (R-48) 5.0E+3 mR/hr 5.0E+2 mR/hr 2.3E+1 mR/hr 8.0E+0 mR/hr 3.7E+0 mR/hr 1 Safety 2.3E+3 mR/hr 5.0E+2 mR/hr 2.3E+1 mR/hr 3.7E+0 mR/hr N/A 3 Safety 5.7E+2 mR/hr 7.7E+0 mR/hr 1.1E+1 mR/hr N/A N/A 4 Safe	• • • •	Table R	-1 Effluent Mo	nitor Classifica	tion Thresholds			
CNMT Vent Noble GasN/AN/AN/AN/A7.4E+6 cpm w/ 1 fan 5.1E+6 cpm w/ 2 fansCNMT Vent Noble Gas Hi Range (R-12A - 7/9)1.8E+2 µC/cc1.8E+1 µC/cc1.8E+0 µC/ccN/APlant Vent Noble GasN/AN/AN/AN/A6.0E+5 cpm(R-14)Plant Vent Noble GasN/AN/AN/A6.0E+5 cpmPlant Vent Noble GasN/AN/AN/AN/A6.3E+5 cpm(R-14)Plant Vent Noble GasN/AN/AN/A6.3E+5 cpmAir Ejector Noble GasN/AN/AN/A6.3E+5 cpm(R-15)Air Ejector Noble Gas Hi Range (R-48)5.7E+2 µC/cc5.7E+1 µC/cc5.7E+0 µC/ccN/AMain Steam Line 	· · · ·			a com to dem	the second s		· ·	
(R-12A - 7/9) Plant Vent Noble Gas (R-14)N/AN/AN/AN/APlant Vent Noble Gas Hi Range (R-14A - 7/9)2.1E+1 µC/cc2.1E+0 µC/cc2.1E-1 µC/ccN/AAir Ejector Noble Gas (R-14A - 7/9)N/AN/AN/AN/A6.3E+5 cpmAir Ejector Noble Gas Hi Range (R-14A - 7/9)N/AN/AN/A6.3E+5 cpmAir Ejector Noble Gas Hi Range (R-48)5.7E+2 µC/cc5.7E+1 µC/cc5.7E+0 µC/ccN/A(R-48)5.7E+2 µC/cc5.7E+1 µC/cc5.7E+0 µC/ccN/AMain Steam Line (R-31/R-32)5.0E+3 mR/hr5.0E+2 mR/hr2.3E+2 mR/hr3.7E+0 mR/hr1 Safety2.3E+3 mR/hr1.1E+2 mR/hr3.7E+0 mR/hr3.7E+0 mR/hr3 Safety7.7E+2 mR/hr7.7E+1 mR/hr1.1E+1 mR/hrN/A3 Safety5.7E+2 mR/hr5.7E+1 mR/hrN/AN/A4 Safety5.7E+2 mR/hr5.7E+1 mR/hrN/A(R-18) SFP HX Effluent (R-20A)N/AN/AN/A3.6E+5 cpm(R-20B) Turbine Bidg FIr DrainsN/AN/AN/A3.2E+3 cpm		CNMT Vent Noble Gas (R-12)				5.1E+6 cpm w/ 2 fans	•	~
Plant Vent Noble GasN/AN/AN/AN/A6.0E+5 cpm(R-14)Plant Vent Noble Gas Hi Range2.1E+1 µC/cc2.1E+0 µC/cc2.1E-1 µC/ccN/A(R-14A - 7/9)Air Ejector Noble GasN/AN/AN/A6.3E+5 cpmAir Ejector Noble Gas Hi RangeN/AN/AN/A6.3E+5 cpm(R-15)5.7E+2 µC/cc5.7E+1 µC/cc5.7E+0 µC/ccN/AMain Steam Line5.7E+2 µC/cc5.7E+1 µC/cc5.7E+0 µC/ccN/A(R-31/R-32)111.1E+3 mR/hr5.0E+2 mR/hr5.0E+1 mR/hr1 Safety2.3E+3 mR/hr2.3E+2 mR/hr2.3E+1 mR/hr3.7E+0 mR/hr2 Safety1.1E+3 mR/hr1.1E+2 mR/hr1.1E+1 mR/hrN/A4 Safety5.7E+2 µC/rc5.7E+1 mR/hr3.6E+5 cpm(R-18)5.7E+2 mR/hr7.7E+2 mR/hr3.6E+5 cpm(R-208)N/AN/AN/AN/AK-180N/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+5 cpm(R-208)N/AN/AN/A3.6E+3 cpm(R-208)N/AN/AN/A3.6E+3 cpm(R-208)<		ů,	1.8E+2 µC/cc	1.8E+1 µC/cc	1.8E+0 µC/cc	N/A		-
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NEI IC#	NEI IC Wording and Mode Applicability	Ginna IC#(s)	Ginna IC Wording and Mode Applicability	Difference/Deviation Justification
AU2	UNPLANNED rise in plant radiation levels MODE: All	RU2	Unplanned rise in plant radiation levels MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 a. UNPLANNED water level drop in a reactor refueling pathway as indicated by (site specific level or indication). AND b. VALID Area Radiation Monitor reading rise on (site specific list). 	RU2.1	Unplanned water level drop in a reactor refueling pathway as indicated by inability to restore and maintain level > SFP low water level alarm setpoint (Note 3) AND Area radiation monitor reading rise on EITHER: R-2 Containment OR R-5 Spent Fuel Pool Note 3: If loss of water level in the refueling pathway occurs while in Mode 5, 6 or D, consider classification under EALs CU3.1, CU3.2 or CU3.3	The site specific level or indication of an unplanned water level drop that may result in increased area radiation is the inability to restore and maintain SFP water level > SFP low level alarm setpoint. The NEI term "VALID" has been deleted. All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. The site specific list of area radiation monitors are monitor R-2 and R-5. Note 3 has been added to the plant EAL wording to ensure subcategory C.3 EALs are reviewed when loss of water shielding above spent fuel adversely affects area radiation levels.
2	UNPLANNED VALID Area Radiation Monitor readings or survey results indicate a rise by a factor of 1000 over normal* levels. *Normal can be considered as the highest reading in the past twenty-four hours excluding the	RU2.2	Unplanned area radiation reading increases by a factor of 1,000 over normal levels	The NEI term "monitor" has been deleted to clarify that radiation readings obtained by portable survey instruments are an acceptable source for assessing this EAL. The NEI term "VALID" has been deleted. All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. Deleted the asterisk phrase and added the defined phrase to

EAL Comparison Matrix

	current peak value.	·	the EAL Technical Bases: "Normal Levels – As applied to radiological IC/EALs, the highest reading in the past twenty- four hours excluding the current peak value." This change implements EAL FAQ #5.
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NEI IC#	NEI IC Wording	GINNA IC#(s)	Ginna IC Wording	Difference/Deviation Justification
AA1	Any release of gaseous or liquid radioactivity to the environment greater than 200 times the Radiological Effluent Technical Specifications/ODCM for 15 minutes or longer. MODE: All	RA1	Any release of gaseous or liquid radioactivity to the environment greater than 200 times the ODCM for 15 minutes or longer MODE: All	The Ginna ODCM limits provide the site-specific Radiological Effluent Technical Specifications.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	VALID reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:	RA1.1	ANY gaseous monitor reading > Table R-1 column "Alert" for ≥ 15 min. (Note 2)	The NEI phrase "VALID reading on ANY " has been changed to " ANY reading." All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4.
	(site specific monitor list and threshold values)		Note 2: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it	The NEI phrase "of the following radiation monitors greater than the reading shown" has been replaced with "gaseous monitors > Table R-1 column "Alert""
	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the	is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	The Ginna radiation monitors that detect radioactivity effluent release to the environment are listed in Table R-1. UE, Alert, SAE and GE thresholds for all Ginna continuously monitored gaseous release pathways are listed in Table R-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL-user.	
	applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected			The value of 1% (10 mrem) of the EPA PAG threshold (in lieu of 200 times the ODCM release rate limit) for gaseous releases is specified to provide a realistic escalation path between the Unusual Event and Site Area Emergency.
	and the release start time is unknown.			There are no values specified in Table R-1 for liquid effluent monitors at the Alert or higher classification level. Values corresponding to 200 times ODCM release limits were calculated using the methodology of the ODCM. However,

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				since there are no high range monitors associated with the liquid effluent monitoring systems and the 200 times ODCM release limit values are well beyond the upper scale of the instruments, the Alert threshold for liquid releases can only be determined by sample analysis (RA1.2). Reference to the NEI note is included in the EAL wording "(Note 2)." Numbering the note facilitates referencing in the EAL matrix.
2	VALID reading on any effluent monitor reading greater than 200 times the alarm setpoint established by a current radioactivity discharge permit for 15 minutes or longer. Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	N/A	N/A	Liquid releases at Ginna are the only planned batch releases subject to the discharge permit process. However, there are no values specified in Table R-1 for liquid effluent monitors at the Alert or higher classification level. Values corresponding to 200 times ODCM release limits were calculated using the methodology of the ODCM. However, since there are no high range monitors associated with the liquid effluent monitoring systems and the 200 times ODCM release limit values are well beyond the upper scale of the instruments, the Alert threshold for liquid releases can only be determined by sample analysis (RA1.2).
3	Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates greater than 200 times (site specific RETS values) for 15 minutes or longer. Note: The Emergency Director should not wait until the applicable time has elapsed, but	RA1.2	Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x P-9 limits for ≥ 15 min. Note 2: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the	The Ginna ODCM is the site-specific Radiological Effluent Technical Specifications. The Ginna ODCM limits are specified in Technical Procedure P-9. The NEI phrase "200 times" has been replaced with phrase "200 x" to reduce EAL-user reading burden. The phrases have the same meaning. Reference to the NEI note is included in the EAL wording "(Note 2)." Numbering the note facilitates referencing in the

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	should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.		applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.	. : : · · · · ·
4	VALID reading on perimeter radiation monitoring system reading greater than 10.0 mR/hr above normal* background for 15 minutes or longer. [for sites having telemetered perimeter monitors]	N/A	N/A	Deleted NEI Example EAL #4 because the plant is not equipped with a perimeter radiation monitoring system. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.
5	VALID indication on automatic real-time dose assessment capability indicating greater than (site specific value) for 15 minutes or longer. [for sites having such capability]	N/A	N/A	Deleted NEI Example EALs #5 because the plant is not equipped with and real-time dose assessment. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
AA2	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the reactor vessel. MODE: All	RA2	Damage to irradiated fuel or loss of water level that has resulted or will result in the uncovering of irradiated fuel outside the Reactor Vessel. MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification	
1	A water level drop in the reactor refueling cavity, spent fuel pool or fuel transfer canal that will result in irradiated fuel becoming uncovered.	RA2.2	A water level drop in a reactor refueling pathway that will result in irradiated fuel becoming uncovered	The terms "reactor refueling cavity, spent fuel pool or fuel transfer canal" have been replaced with the term "reactor refueling pathway" to encompass all three volumes where irradiated fuel may be located. This change implements EAL FAQ #6.	
2	A VALID alarm or (site specific elevated reading) on ANY of the following due to damage to	elevated reading) on ANY of the ollowing due to damage to	RA2.1	Alarm on ANY of the following radiation monitors due to damage to irradiated fuel or loss of water level:	The NEI term "VALID" has been deleted. All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4.
	irradiated fuel or loss of water level. (site specific radiation monitors)		 R-12 Containment Vent Noble Gas R-14 Plant Vent Noble Gas R-2 Containment R-5 Spent Fuel Pool 	The EAL provides a site-specific list of radiation monitors applicable to this threshold.	

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
AA3	Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions MODE: All	RA3	Rise in radiation levels within the facility that impedes operation of systems required to maintain plant safety functions MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	VALID (site-specific) radiation monitor readings GREATER THAN 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions: (Site-specific) list	RA3.1	Dose rates > 15 mRem/hr in EITHER of the following areas requiring continuous occupancy to maintain plant safety functions: Control Room (R-1) OR CAS	The NEI term "VALID" has been deleted. All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. The words "VALID (site-specific) radiation monitor readings GREATER THAN" was replaced with "Dose rates >" It doesn't matter if the 15 mRem/hr was measured with an ARM or survey instrument; therefore, the term radiation monitor was deleted to not confuse those who may think that only implies a fixed ARM. The symbol ">" means "greater than."
				continuous occupancy to maintain plant safety functions. Since both areas require continuous occupancy, elevated dose rates in any one area could preclude occupancy and, therefore, satisfy the intent of the IC.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
AS1	Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 100 mrem TEDE or 500 mrem Thyroid CDE for the actual or projected duration of the release. MODE: All MODE: All	RS1	Offsite dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology MODE: All	The NEI abbreviation "mrem" has been replaced with the plant abbreviation "mRem" to agree with units of measure given in the EPA PAGs. This change implements EAL FAQ #8. The phrase "using actual meteorology" has been added to the Ginna IC for consistency with RG1.1 IC wording. This change implements EAL FAQ #9.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	VALID reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer: (site specific monitor list and threshold values) Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.	RS1.1	 ANY gaseous monitor reading > Table R-1 column "SAE" for ≥ 15 min. (Note 1) Do not delay declaration awaiting dose assessment results If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RS1.2) Note 1: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time 	The NEI phrase "VALID reading on ANY " has been changed to " ANY gaseousreading." All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. The word "gaseous" was included consistent with RA1.1, only gaseous monitors listed in Table R-1 are applicable to AS1. The NEI phrase "of the following the reading shown" has been replaced with "Table R-1 column "SAE"" The site-specific list is provided in Table R-1. Reference to the NEI note is included in the EAL wording "(Note 1)." Numbering the note facilitates referencing in the EAL matrix. The second and third sentences of the NEI note have been incorporated in the wording of the Ginna EAL for clarification. EAL validation exercises demonstrated the need to emphasize this information in a form other than a note.

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2	Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the site boundary.	RS1.2	Dose assessment using actual meteorology indicates doses > 100 mRem TEDE or 500 mRem thyroid CDE at or beyond the site boundary	The NEI abbreviation "mrem" has been replaced with the plant abbreviation "mRem" to agree with units of measure given in the EPA PAGs. This change implements EAL FAQ #8.
3	VALID perimeter radiation monitoring system reading greater than 100 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]	N/A	N/A	Deleted NEI Example EAL #3 because the plant is not equipped with a perimeter radiation monitoring system. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.
4	Field survey results indicate closed window dose rates greater than 100 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation, at or beyond the site boundary.	RS1.3	Field survey results indicate closed window dose rates > 100 mRem/hr expected to continue for ≥ 60 min. at or beyond the site boundary OR Analyses of field survey samples indicate thyroid CDE > 500 mRem for 1 hr of inhalation at or beyond the site boundary	Split the example into two logical conditions separated by the "OR" logical connector for usability. The NEI abbreviation "R" has been replaced with the plant abbreviation "Rem" to agree with units of measure given in the EPA PAGs. This change implements EAL FAQ #8. The NEI phrase "one hour" has been abbreviated "1 hr" to reduce EAL-user reading burden.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
AG1	Off-site dose resulting from an actual or IMMINENT release of gaseous radioactivity greater than 1000 mrem TEDE or 5000 mrem Thyroid CDE for the actual or projected duration of the release using actual meteorology. MODE: All	RG1	Offsite dose resulting from an actual or imminent release of gaseous radioactivity greater than 1,000 mRem TEDE or 5,000 mRem thyroid CDE for the actual or projected duration of the release using actual meteorology MODE: All	None.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
	VALID reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer: (site specific monitor list and threshold values) Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values. Do not delay declaration awaiting dose assessment results.	RG1.1	 ANY gaseous monitor reading > Table R-1 column "GE" for ≥ 15 min. (Note 1) Do not delay declaration awaiting dose assessment results If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RG1.2) Note 1: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time 	The NEI phrase "VALID reading on ANY " has been changed to " ANY gaseousreading." All EAL thresholds assume valid readings for emergency classification. This change implements EAL FAQ #4. The word "gaseous" was included consistent with RA1.1, only gaseous monitors listed in Table R-1 are applicable to AG1. The NEI phrase "of the following the reading shown" has been replaced with "Table R-1 column "GE"" The site-specific list is provided in Table R-1. Reference to the NEI note is included in the EAL wording "(Note 1)." Numbering the note facilitates referencing in the EAL matrix. The second and third sentences of the NEI note have been incorporated in the wording of the Ginna EAL for clarification. EAL validation exercises demonstrated the need to emphasize this information in a form other than a note.

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2	Dose assessment using actual meteorology indicates doses greater than 1000 mrem TEDE or 5000 mrem thyroid CDE at or beyond the site boundary.	RG1.2	Dose assessment using actual meteorology indicates doses > 1,000 mRem TEDE or 5,000 mRem thyroid CDE at or beyond the site boundary	None
3	VALID perimeter radiation monitoring system reading greater than 1000 mR/hr for 15 minutes or longer. [for sites having telemetered perimeter monitors]	N/A	N/A	Deleted NEI Example EAL #3 because the plant is not equipped with a perimeter radiation monitoring system. This threshold is properly addressed by the radiation monitors listed in Table R-1 and dose assessment capabilities.
4	Field survey results indicate closed window dose rates greater than 1000 mR/hr expected to continue for 60 minutes or longer; or analyses of field survey samples indicate thyroid CDE greater than 5000 mrem for one hour of inhalation, at or beyond site boundary.	RG1.3	Field survey results indicate closed window dose rates > 1,000 mRem/hr expected to continue for ≥ 60 min. at or beyond the site boundary OR Analyses of field survey samples indicate thyroid CDE > 5,000 mRem for 1 hr of inhalation at or beyond the site boundary	Split the example into two logical conditions separated by the "OR" logical connector for usability. The NEI abbreviation "R" has been replaced with the plant abbreviation "Rem" to agree with units of measure given in the EPA PAGs. This change implements EAL FAQ #8. The NEI phrase "one hour" has been abbreviated "1 hr" to reduce EAL-user reading burden.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU1	RCS Leakage MODE: Cold Shutdown	CU3	RCS Leakage MODE: 5 - Cold Shutdown	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. 1. RCS leakage results in the inability to maintain or restore RPV level greater than (site specific low level RPS actuation setpoint) for 15 minutes or longer. [<i>BWR</i>] 1. RCS leakage results in the inability to maintain or restore level within (site specific pressurizer or RCS/RPV level target band) for 15 minutes or longer. [<i>PWR</i>] 	CU3.1	RCS leakage results in the inability to maintain or restore RCS level within the target band established by procedure for ≥ 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time	The BWR portion of the NEI EAL has not been implemented because Ginna is a PWR. There is no specific Pressurizer level relevant to RCS level control in the Cold Shutdown mode, only as specified by procedure for the given configuration. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU2	UNPLANNED loss of RCS/RPV inventory. MODE: Refueling	CU3	RCS leakage MODE: 6 - Refuel	IC wording aligned with NEI IC CU1 to support grouping NEI IC CU1 and CU2 EALs under the same subcategory. There is no fundamental difference between an unplanned loss of RCS inventory and RCS leakage. This change implements EAL FAQ #41.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. Unplanned RCS/RPV level drop as indicated by either of the following: RCS/RPV water level drop below the RPV flange for 15 minutes or longer when the RCS/RPV level band is established above the RPV flange. RCS/RPV water level drop below the RCS level band for 15 minutes or longer when the RCS/RPV level band is established below the RCS level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band for 15 minutes or longer when the RCS/RPV level band is established below the RPV flange. 	CU3.2	Unplanned RCS level drop below EITHER of the following for ≥ 15 min. (Note 4): Reactor Vessel flange (84 in. on loop level indicators) (when the level band is established above the flange) OR RCS level target band established by procedure (when the level band is established below the flange) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix. The NEI phrase "RPV flange" has been replaced with "Reactor Vessel flange" to use terminology commonly accepted at PWRs. In the second bullet, the NEI phrase "RCS level band" has been replaced with "RCS level target band" for consistency with terminology used in EAL CU3.1. The NEI introductory clause and the two NEI bulleted conditions have been reworded for clarification.
2	RCS/RPV level cannot be	CU3.3	RCS level cannot be monitored	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to

	monitored with a loss of RCS/RPV inventory as indicated by an unexplained level rise in (site specific sump or tank).	with a loss of RCS inventory as indicated by an unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage	use terminology commonly accepted at PWRs. The NEI phrase "(site-specific sump or tank)" has been replaced with " ANY Table C-2 sump / tank attributable to RCS leakage" for clarification. The list of sumps and tanks is too large to include within the wording of the EAL and maintain readability. Table C-2 contains the site-specific list of sumps and tanks.
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Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU3	AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. MODE: Cold Shutdown, Refueling	CU1	AC power capability to 480V safeguards buses reduced to a single power source for ≥15 min. such that ANY additional single failure would result in a complete loss of all 480V safeguards bus power MODE: 5 - Cold Shutdown, 6 - Refuel, D - Defueled	 "emergency busses" replaced with "480V safeguards buses" as the site specific terminology for emergency buses. "station blackout." replaced with "a complete loss of all 480V safeguards bus power" as this describes the intended condition for Ginna. Added "D – Defueled" to the mode applicability to correct omission in NEI 99-01.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
	 Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. a. AC power capability to (site specific emergency busses) reduced to a single power source for 15 minutes or longer. AND b. Any additional single power source failure will result in station blackout. 	CU1.1	AC power capability to 480V safeguards buses reduced to a single power source, Table C-1, for ≥ 15 min. (Note 4) AND Any additional single power source failure will result in a complete loss of all 480V safeguards bus power Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	 480V safeguards buses are the Ginna emergency buses. Table C-1 provides a list of Ginna onsite and offsite AC power sources in cold conditions. The NEI phrase "station blackout" has been replaced with " complete loss of all 480V safeguards bus power" as this describes the intended condition for Ginna. This change implements EAL FAQ #36. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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	Table C-1 AC Power Sources
Onsite	 EDG 1A (Safeguard train A, Buses 14 & 18) EDG 1B (Safeguard train B, Buses 16 & 17)
Offsite	 Station Auxiliary Transformer 12A Station Auxiliary Transformer 12B Unit Auxiliary Transformer 11 backfeed (if currently established)

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU4	UNPLANNED loss of decay heat removal capability with irradiated fuel in the RPV. MODE: Cold Shutdown, Refueling	CU4	Unplanned loss of decay heat removal capability MODE: 5 - Cold Shutdown, 6 - Refuel	The NEI phrase "with irradiated fuel in the RPV" has been deleted to implement EAL FAQ #11.

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.	. CU4.1	Unplanned event results in RCS temperature > 200°F	The NEI phrase "exceeding the Technical Specification cold shutdown temperature limit" has been replaced with "> 200°F." >200°F is the Technical Specification cold shutdown temperature limit and is specified in the EAL instead of the NEI wording to reduce EAL-user reading burden.
2	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. Loss of all RCS temperature and RCS/RPV level indication for 15 minutes or longer.	CU4.2	Loss of all RCS temperature and RCS level indication for \geq 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU6	Loss of all On-site or Off-site communications capabilities.	CU5	Loss of all onsite or offsite communications capabilities	None
	MODE: Cold Shutdown, Refueling, Defueled		MODE: 5 - Cold Shutdown, 6 - Refuel, D - Defueled	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Loss of all of the following on-site communication methods affecting	CU5.1	Loss of all Table C-5 onsite (internal) communication methods	CU5.1 implements Example EALs #1 and #2. These were combined for improved usability.
	the ability to perform routine operations:		affecting the ability to perform routine operations OR	The NEI example EALs specify site-specific lists of onsite and offsite communications methods. The Ginna EAL lists these
	(site specific list of communications methods)			methods in Table C-5 because the number of communications methods is too long to include within the text of the EAL.
2	Loss of all of the following off-site communication methods affecting the ability to perform offsite notifications:		(external) communication methods affecting the ability to perform offsite notifications	The adjectives "(internal)" and "(external)" have been added to the Ginna EAL for clarification. The terms "onsite/offsite" could be interpreted as the location in which the communication originates instead of the location to which communication is directed.
	(site specific list of communications methods)		· · · ·	· · ·

Table C-5 Communications Systems							
System	Onsite (internal)	Offsite (external)					
Commercial phone system	x	x					
Direct Dial "POTS" Lines (Blue Phones)	x	x					
Plant Page Party system	 X						
Radios/Walkie Talkies	x						
FTS 2001 telephone system (ENS, HPN)		x					
Control Room Hard Wired Satellite Phone		x					
Control Room Emergency Cell Phone		x					

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU7	Loss of required DC power for 15 minutes or longer.	CU2	Loss of required DC power for \geq 15 min.	None
	MODE: Cold Shutdown, Refueling		MODE: 5 - Cold Shutdown, 6 - Refuel	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. Less than (site specific bus voltage indication) on required (site specific Vital DC busses) for 15 minutes or longer.	CU2.1	< 108 VDC on required 125 VDC buses for ≥ 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	"108 VDC" is the site-specific bus voltage indication. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CU8	Inadvertent Criticality	CU6	Inadvertent criticality	None
	MODE: Cold Shutdown, Refueling		MODE: 5 - Cold Shutdown, 6 - Refuel	
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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	UNPLANNED sustained positive period observed on nuclear instrumentation. (BWR)	N/A	N/A	NEI Example EAL #1 has not been implemented because it applies only to BWR plants. Ginna is a PWR. PWRs are not equipped with period meters.
2	UNPLANNED sustained positive startup rate observed on nuclear instrumentation. (PWR)	CU6.1	An unplanned sustained positive startup rate observed on nuclear instrumentation	
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CA1	Loss of RCS/RPV inventory. MODE: Cold Shutdown, Refueling	CA3	Loss of RCS inventory MODE: 5 - Cold Shutdown, 6 - Refuel	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
2	Loss of RCS/RPV inventory as indicated by level less than (site specific level). [Low-Low ECCS actuation setpoint / Level 2 (BWR)] [Bottom ID of the RCS loop (PWR)] Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. RCS/RPV level cannot be monitored for 15 minutes or longer with a loss of RCS/RPV inventory as indicated by an unexplained level rise in (site specific sump or tank).	CA3.1	Loss of inventory as indicated by RCS water level < 0 in. OR RCS level cannot be monitored for ≥ 15 min. with a loss of RCS inventory as indicated by an unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	CA3.1 implements Example EALs #1 and #2. These were combined for improved usability. The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs. The bottom ID of the RCS hot leg is indicated by RCS loop level indicators at 0 in. Ginna is a PWR and is not equipped with the BWR low-low ECCS actuation setpoint. The NEI phrase "(site-specific sump or tank)" has been replaced with "ANY Table C-2 sump / tank attributable to RCS leakage" for clarification. The list of sumps and tanks is too large to include within the wording of the EAL and maintain readability. Table C-2 contains the site-specific list of sumps and tanks. Consistent with the developers guidance that the source of the leakage needs to be evaluated against other sources, clarification was added with the words "attributable to RCS leakage". Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CA3	Loss of all Off-site and all On- Site AC power to emergency busses for 15 minutes or longer.	CA1	Loss of all offsite and all onsite AC power to $480V$ safeguards buses for ≥ 15 min.	"emergency busses" replaced with "480V safeguards buses" as the site specific terminology for emergency buses.
	MODE: Cold Shutdown, Refueling, Defueled		MODE: 5 - Cold Shutdown, 6 - Refuel, D - Defueled	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time. Loss of all Off-Site and all On- Site AC Power to (site specific emergency busses) for 15 minutes or longer.	CA1.1	Loss of all offsite and all onsite AC power, Table C-1, to $480V$ safeguards buses for ≥ 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	 480V safeguards buses are the Ginna emergency buses. Table C-1 provides a list of Ginna onsite and offsite AC power sources in cold conditions. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CA4	Inability to maintain plant in cold shutdown.	CA4	Inability to maintain plant in cold shutdown	None
	MODE: Cold Shutdown, Refueling		MODE: 5 - Cold Shutdown, 6 - Refuel	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification		
1	An UNPLANNED event results in RCS temperature greater than (site specific Technical Specification cold shutdown	CA4.1	An unplanned event results in EITHER: RCS temperature > 200°F	CA4.1 implements NEI EALs #1 and #2. The NEI example EALs have been combined for simplification. The NEI phrase "exceeding the Technical Specification cold		
	temperature limit) for greater than the specified duration on table.		for > Table C-4 duration OR	OR	shutdown temperature limit" has been replaced with "> 200°F." 200°F is the Technical Specification cold shutdown temperature limit. NEI criteria associated with RCS temperature exceeding the	
2	An UNPLANNED event results		RCS pressure increase > 10 psi due to an unplanned loss of decay heat removal capability (this condition is not applicable in solid plant conditions)	psi due to an unplanned loss	psi due to an unplanned loss Table C-4.	Technical Specification cold shutdown temperature limit are given in Table C-4.
	in RCS pressure increase greater than 10 psi due to a loss of RCS cooling. (PWR-This EAL does not apply in Solid Plant conditions.)	· • •		The NEI phrase "An UNPLANNED event results in RCS pressure increase greater than 10 psi due to a loss of RCS cooling" has been changed to "RCS pressure increase > 10 psi due to an unplanned loss of decay heat removal capability" for clarification. This change implements EAL FAQ #13.		
			•	Pressure indicator PI-420 Rx Clnt Loop Lo Rng Press is capable of measuring pressure changes of 10 psig.		

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	: RCS Reheat Duration Three		
RCS	Containment Closure	Duration	
Intact (but not RCS Reduced Inventory [PWR])	N/A	60 minutes⁺	
Not intact or RCS Reduced	Established	20 minutes*	
Inventory (PWR)	Not Established	0 minutes	
If an RCS heat removal system	is in operation within this time	frame and RCS temperature is	
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being reduced, the EAL is not app	Jilcable.	•	
peing reduced, the EAL is not app		· · · · · · · · · · · · · · · · · · ·	

Table C-4 RCS Reheat Duration Thresholds				
RCS Status	Containment Closure Status	Duration		
Intact AND not reduced inventory	N/A	60 min.*		
Not intact OR reduced	Established	20 min.*		
inventory Not established 0 min.				

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

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CS1	Loss of RCS/RPV inventory affecting core decay heat removal capability	CS3	Loss of RCS inventory affecting core decay heat removal capability	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs.
	MODE: Cold Shutdown, Refueling		MODE: 5 - Cold Shutdown, 6 - Refuel	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	With CONTAINMENT CLOSURE not established, RCS/RPV level less than (site specific level).	N/A	N/A	Ginna cannot measure reactor vessel level below the bottom of the RCS hot leg. Consistent with the NEI 99-01 CS1 developers guidance this example EAL is not implemented.
	[6" below the bottom ID of the RCS loop (PWR)]			
	[6" below the low-low ECCS actuation setpoint (BWR)]			
2	With CONTAINMENT CLOSURE established, RCS/RPV level less than (site specific level for TOAF).	N/A	N/A	Ginna cannot measure reactor vessel level below the bottom of the RCS hot leg. Consistent with the NEI 99-01 CS1 developers guidance this example EAL is not implemented.
3	Note: The Emergency Director, should not wait until the	CS3.1	RCS level cannot be monitored with a loss of RCS inventory as	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs.
×	applicable time has elapsed, but should declare the event as soon as it is determined that the		indicated by ANY of the following for \geq 30 min. (Note 4):	"for \geq 30 min." has been placed at the end of the sentence for consistency with NEI CG1 Example EAL #2 and Ginna EAL CG3.1.
	condition will likely exceed the applicable time.		Containment radiation R-29 or R-30 > 1.0E+02 R/hr	Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.
	RCS/RPV level cannot be monitored for 30 minutes or longer with a loss of RCS/RPV		Erratic Source Range Nuclear Instrumentation indication	Containment radiation is indicated on R-29 or R-30. The containment radiation monitors high alarm is set at 1.0E+02 R/hr. The 1.0E+02 R/hr setpoint has been selected to be operationally

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 inventory as indicated by ANY of the following: (Site specific radiation monitor) reading greater than (site specific value). Erratic Source Range Monitor Indication. Unexplained level rise in (site specific sump or tank). 	• Unexplained level rise in ANY Table C-2 sump / tank attributable to RCS leakage Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	significant and above that expected under normal plant conditions while in the Refuel mode. The NEI phrase "(site-specific sump or tank)" has been replaced with " ANY Table C-2 sump / tank attributable to RCS leakage" for clarification. The list of sumps and tanks is too large to include within the wording of the EAL and maintain readability. Table C-2 contains the site-specific list of sumps and tanks.
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
CG1	Loss of RCS/RPV inventory affecting fuel clad integrity with containment challenged. MODE: Cold Shutdown,	CG3	Loss of Reactor Vessel inventory affecting fuel clad integrity with Containment challenged MODE: 5 - Cold Shutdown, 6 -	The NEI abbreviation "RCS/RPV" has been changed to "Reactor Vessel" to use terminology commonly accepted at PWRs.
	Refueling		Refuel	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time.	N/A	N/A	Ginna cannot measure reactor vessel level below the bottom of the RCS hot leg. Consistent with the NEI 99-01 developers guidance this example EAL is not implemented.
	a. RCS/RPV level less than (site specific level for TOAF) for 30 minutes or longer.			
	AND			
	b. ANY containment challenge indication (see Table):			
2	a. RCS/RPV level cannot be monitored with core uncovery	CG3.1	G3.1 RCS level cannot be monitored with core uncovery indicated by ANY of the following for ≥ 30 min. (Note 4):	The NEI abbreviation "RCS/RPV" has been changed to "RCS" to use terminology commonly accepted at PWRs.
	indicated by ANY of the following for 30 minutes or longer.			Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.
	monitor) reading greater or R-30 > 1.0E+02 R/hr	Containment radiation R-29 or R-30 > 1.0E+02 R/hr	Containment radiation is indicated on R-29 or R-30. The containment radiation monitors high alarm is set at 1.0E+02 R/hr.	
	than (site specific setpoint).		Erratic Source Range Nuclear Instrumentation	The 1.0E+02 R/hr setpoint has been selected to be operationally significant and above that expected under normal plant conditions
	Erratic source range		L	· · · · · · · · · · · · · · · · · · ·

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	monitor indication	indication	while in the Refuel mode.
•	UNPLANNED level rise in (site specific sump or	Unexplained level rise in ANY Table C-2 sump / tank	The NEI term "UNPLANNED" has been changed to "Unexplained" for consistency with NEI IC CS1 Example EAL #3f.
• AND	tank). [Other site specific indications]	AND Any Containment Challenge Indication, Table C-3	The NEI phrase "(site-specific sump or tank)" has been replaced with " ANY Table C-2 sump / tank attributable to RCS leakage" for clarification. The list of sumps and tanks is too large to include within the wording of the EAL and maintain readability. Table C-2 contains the site-specific list of sumps and tanks.
	b. ANY containment challenge indication (see Table):	Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time	Other site-specific indications of core uncovery could not be identified. Table C-3 lists the Containment Challenge indications. "Secondary containment radiation monitor reading above" has not been incorporated in Table C-3 because Ginna is a PWR and not equipped with a secondary containment.

Table C-2 RCS Leakage Indications

- Containment Sump A
- Containment Sump B
- Auxiliary Building Sump Tank
- Reactor Coolant Drain Tank (RCDT)

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Table C-3 Containment Challenge Indications

- Containment closure **not** established
- Hydrogen concentration in Containment $\geq 4\%$
- Unplanned rise in Containment pressure

Category D

Permanently Defueled Station Malfunction

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
D-AU1 D-AU2 D-SU1 D-HU1 D-HU2 D-HU3 D-AA1 D-AA2	Recognition Category D Permanently Defueled Station Malfunction	N/A	N/A	NEI Recognition Category D ICs and EALs are applicable only to permanently defueled stations. Ginna is not a defueled station.
D-HA1 D-HA2				

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Category E

Events Related to Independent Spent Fuel Storage Installations

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
E-HU1	Damage to a loaded cask CONFINEMENT BOUNDARY MODE: Not applicable	EU1	Damage to a loaded cask confinement boundary MODE: Not applicable	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Damage to a loaded cask confinement BOUNDARY	EU1.1	Damage to a loaded cask confinement boundary	None

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Category F

Fission Product Barrier Degradation

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
FU1	ANY Loss or ANY Potential Loss of Containment	FU1	ANY loss or ANY potential loss of Containment	None
	MODE: Power Operation, Hot Standby, Startup, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	ANY Loss or ANY Potential Loss of Containment	FU1.1	ANY loss or ANY potential loss of Containment (Table F-1)	Table F-1 contains the loss and potential loss thresholds for the three fission product barriers and is the plant representation of NEI Table 5-F-3.

NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
FA1	ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS MODE: Power Operation, Hot Standby, Startup, Hot Shutdown	FA1	ANY loss or ANY potential loss of either Fuel Clad or RCS MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	ANY Loss or ANY Potential Loss of EITHER Fuel Clad OR RCS	FA1.1	ANY loss or ANY potential loss of either Fuel Clad or RCS (Table F-1)	Table F-1 contains the loss and potential loss thresholds for the three fission product barriers and is the plant representation of NEI Table 5-F-3.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
FS1	Loss or Potential Loss of ANY Two Barriers	FS1	Loss or potential loss of ANY two barriers	None
	MODE: Power Operation, Hot Standby, Startup, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Loss or Potential Loss of ANY Two Barriers	FS1.1	Loss or potential loss of ANY two barriers (Table F-1)	Table F-1 contains the loss and potential loss thresholds for the three fission product barriers and is the plant representation of NEI Table 5-F-3.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
FG1	Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier	FG1	Loss of ANY two barriers and loss or potential loss of the third barrier	None
	MODE: Power Operation, Hot Standby, Startup, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Loss of ANY Two Barriers AND Loss or Potential Loss of Third Barrier	FG1.1	Loss of ANY two barriers AND Loss or potential loss of the third barrier (Table F-1)	Table F-1 contains the loss and potential loss thresholds for the three fission product barriers and is the plant representation of NEI Table 5-F-3.

 The logic used for these initiating conditions reflects the following considerations: The Fuel Clad Barrier and the RCS Barrier are weighted more heavily than the Containment Barrier (See Sections 3.4 and 3.8). NOUE ICs associated with RCS and The logic used for these initiating conditions reflects the following considerations: FG1.1 The Fuel Clad Barrier and the RCS Barrier are weighted more heavily than the Containment Barrier (See Sections 3.4 and 3.8). NOUE ICs associated with RCS and 	 First bullet: The NEI parenthetical phrase "See Sections 3.4 and 3.8" has been deleted because it refers to NEI EAL developmental information. First bullet: The NEI acronym "NOUE" has been implemented as "UE" for simplification. The NEI abbreviation "ICs" has been changed to "EALs" for clarification. Second bullet: The NEI abbreviation "EALs" has been changed to "thresholds" for clarification. The second sentence in the fourth bullet of the NEI notes "When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications" has been deleted to implement EAL FAQ #14.

	 to escalate to a General Emergency. The ability to escalate to higher emergency classification levels as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety. 	 Emergency. The ability to escalate to higher emergency classification levels as an event deteriorates must be maintained. For example, RCS leakage steadily increasing would represent an increasing risk to public health and safety. 	
· · · ·	• The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier. When no event is in progress (Loss or Potential Loss of either Fuel Clad and/or RCS) the Containment Barrier status is addressed by Technical Specifications.	The Containment Barrier should not be declared lost or potentially lost based on exceeding Technical Specification action statement criteria, unless there is an event in progress requiring mitigation by the Containment barrier.	

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	Fuel Clad Barrier		Reactor Coolant System Barrier		Containment Barrier	
Category	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
A CSFST	1. RED path condition exists F-0.2 Core Cooling	ORANGE path condition exists F-0.2 Core Cooling RED path condition exists F-0.3 Heat Sink and heat sink is required	None	RED path condition exists F-0.4 Integrity RED path condition exists F-0.3 Heat Sink and heat sink is required	None	RED path condition exists F-0.5 Containment
B Core Exit TCs	2. Core Exit TCs ≥ 1,200°F	3. Core Exit TCs ≥ 700°F	None	None	None	 Core Exit TCs cannot be restored < 1,200°F within 15 min. Core Exit TCs ≥ 700°F AND RVLIS level cannot be restored > 52% [> 55% adverse CNMT] with no RCPs running within 15 min.
C Inventory	None	 RVLIS level ≤ 52% [≤ 55% adverse CNMT] OR At least one RCP running RVLIS fluid fraction ≤ 66% 	 RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (< EOP Fig. MIN SUBCOOLING) Ruptured S/G results in an ECCS (SI) actuation 	3. RCS leak rate > 50 gpm with letdown isolated	 A containment pressure rise followed by a rapid unexplained drop in containment pressure Containment pressure or sump level response not consistent with LOCA conditions Ruptured S/G is also faulted outside of containment Primary-to-secondary leakrate > 10 gpm AND Unisolable prolonged steam release from affected S/G to the environment 	 Containment pressure ≥ 60 psig and rising Containment hydrogen concentration ≥ 4% Containment pressure ≥ 28 psig and < two CRFC units and one CS pump operating per design
D Radiation / Coolant Activity	 Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr Valid Letdown Monitor (R-9) reading ≥ 24,000 mRad/hr Coolant activity >300 μCi/gm dose equivalen [-131 	None	 Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr 	None	None	 Containment radiation monitor R-29/R-30 reading > 1.0E+03 R/hr
E Isolation Status	None	None .	None	None	5. Failure of all valves in ANY one line to close AND Direct downstream pathway to the environment exists after containment isolation signal	None
F Judgment	 ANY condition in the opinion of the Emergency Director that indicates loss of the fuel clad barrier 	 ANY condition in the opinion of the Emergency Director that indicates potential loss of the fuel clad barrier 	 ANY condition in the opinion of the Emergency Director that indicates loss of the RCS barrier 	4. ANY condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	 ANY condition in the opinion of the Emergency Director that indicates loss of the containment barrier 	 ANY condition in the opinion of the Emergency Director that indicates potential loss of the containment barrier

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Fuel Clad Fission Product Barrier Degradation Thresholds

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NEI FPB#	NEI Threshold Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
FC Loss 1	Critical Safety Function Status A. Core-Cooling Red Entry	FC Loss A.1	RED path condition exists F-0.2 Core Cooling	The NEI phrase "Core-Cooling Red Entry Conditions Met" has been changed to " RED path condition exists F-0.2 Core Cooling." Procedure F-0.2 is the core cooling CSFST.
	Conditions Met.			The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs.
FC Loss	Primary Coolant Activity Level	FC Loss D.5	Coolant activity >300 µCi/gm dose equivalent I-131	300 µCi/gm dose equivalent I-131 is the site-specific value for coolant activity.
-	A. Coolant activity greater than (site specific value).			The NEI phrase "greater than" has been replaced with ">" to reduce EAL-user reading burden. The symbol ">" means "greater than" and thus implements the intent of the NEI phrase.
FC Loss	Core Exit Thermocouple	FC Loss	Core Exit TCs ≥ 1,200°F	TCs is the Ginna equivalent of NEI "thermocouple readings."
3	Readings A. Core exit thermocouples	B.2		The TC value specifies "≥" vs. ">" consistent with F-0.2 Core Cooling RED path entry conditions.
	reading greater than (site specific degree F).			The NEI word "degree" has been replaced with "o" to reduce EAL- user reading burden. The symbol "o" is commonly understood to mean "degree."
	4	-		1,200°F is the Ginna specific temperature corresponding to significant core exit superheating and core uncovery.
FC Loss	Reactor Vessel Water Level	N/A	N/A	N/A
4	Not Applicable			
FC Loss 5	Not Applicable Not Applicable	N/A	N/A	N/A

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NEI FPB#	NEI Threshold Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
FC Loss 6	Containment Radiation Monitoring A. Containment radiation monitor reading greater than (site specific value).	FC Loss D.3	Containment radiation monitor R-29/R-30 reading > 1.0E+02 R/hr	1.0E+02 R/hr is the site-specific containment rad monitor reading.
FC Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	FC Loss D.4	Valid Letdown Monitor (R-9) reading ≥ 24,000 mRad/hr	A Letdown Line Monitor reading of 24,000 mRad/hr represents fuel clad damage of approximately 5% corresponding to the reactor coolant activity fuel Clad loss threshold of 300 µCi/gm dose equivalent I-131
FC Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.	FC Loss F.6	ANY condition in the opinion of the Emergency Director that indicates loss of the Fuel Clad barrier	None
FC P-Loss 1	Critical Safety Function Status A. Core Cooling-Orange Entry Conditions Met. OR B. Heat Sink-Red Entry	FC P-Loss A.1	ORANGE path condition exists F-0.2 Core Cooling	The NEI phrase "Core Cooling-Orange Entry Conditions Met" has been changed to " ORANGE path condition exists F-0.2 Core Cooling." Procedure F-0.2 is the core cooling CSFST. The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs.
	Conditions Met.	FC P-Loss A.2	RED path condition exists F-0.3 Heat Sink and heat sink is required	The NEI phrase "Heat Sink-Red Entry Conditions Met" has been changed to " RED path condition exists F-0.3 Heat Sink." Procedure F-0.3 is the heat sink CSFST. The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs. The phrase "and heat sink is required" has been added to the Ginna threshold to implement EAL FAQ #18.

Level

Not Applicable

Readings

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NEI Threshold Wording

Primary Coolant Activity

Core Exit Thermocouple

Ginna

FPB #(s)

N/A

FC

P-Loss

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NEI

FPB#

FC P-Loss

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FC

P-Loss

Ginna FPB Wording	Difference/Deviation Justification
N/A	N/A
Core Exit TCs <u>></u> 700°F	TCs is the Ginna equivalent of NEI "thermocouple readings." The TC value specifies "≥" vs. ">" consistent with F-0.2 Core Cooling Orange path entry conditions.
	The NEI word "degree" has been replaced with " ⁶ " to reduce EAL-

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3	A Core exit thermocouples	B.3		Cooling Orange path entry conditions.
	reading greater than (site specific degree F).			The NEI word "degree" has been replaced with "o" to reduce EAL- user reading burden. The symbol "o" is commonly understood to mean "degree."
				700°F is the Ginna specific temperature corresponding to significant core exit superheating.
FC P-Loss	Reactor Vessel Water Level A. RCS/RPV level less than	FC P-Loss	RVLIS level ≤ 52% [≤ 55% adverse CNMT]	The NEI phrase "RCS/RPV" has been replaced with "RVLIS" to use terminology consistent with the Ginna EOPs.
4	(site specific level for TOAF).	C.4	OR	The Reactor Vessel water level threshold is used in the EOPs to
	· · · · · · · · · · · · · · · · · · ·		At least one RCP running RVLIS fluid fraction ≤ 66%	signal core uncovery and is, therefore, indication of inadequate coolant inventory. If the RVLIS indication drops to 52% [≤ 55% adverse CNMT] or with at least one RCP running RVLIS fluid fraction ≤ 66%, a core covered condition cannot be confirmed. According to the Core Cooling-ORANGE path, this water level indicates subcooling has been lost and that some fuel clad damage may occur.
FC	Not Applicable	N/A	N/A	N/A
P-Loss 5	Not Applicable			
FC P-Loss	Containment Radiation Monitoring	N/A	N/A	N/A .
. 6	Not Applicable			

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NEI FPB#	NEI Threshold Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
FC P-Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	N/A	None	Other site-specific indications of fuel clad potential loss have not been identified.
FC P-Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.	FC P-Loss F.5	ANY condition in the opinion of the Emergency Director that indicates potential loss of the Fuel Clad barrier	None

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RCS Fission Product Barrier Degradation Thresholds

NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
RCS Loss 1	Critical Safety Function Status Not Applicable	N/A	N/A	None
RCS Loss 2	RCS Leak Rate A. RCS leak rate greater than available makeup capacity as indicated by a loss of RCS subcooling.	RCS Loss C.1	RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (< EOP Fig. MIN SUBCOOLING)	Critical Safety Function Status Trees (CSFST) Core Cooling indicates that if subcooling margin based on core exit TCs is in the Inadequate Subcooling Region of EOP Fig. MIN SUBCOOLING, a loss of RCS subcooling has occurred. The loss of subcooling as a result of inability to establish RCS heat transfer to the ultimate heat sink is indicative of potential losses of the Fuel Cladding and RCS barriers.
RCS Loss 3	Not Applicable Not Applicable	N/A	N/A	None
RCS Loss 4	SG Tube Rupture A. RUPTURED SG results in an ECCS (SI) actuation.	RCS Loss .C.2	Ruptured S/G results in an ECCS (SI) actuation	None
RCS Loss 5	Not Applicable Not Applicable	N/A	N/A	None
RCS Loss 6	Containment Radiation Monitoring A. Containment radiation monitor reading greater than (site specific value).	RCS Loss D.3	Containment radiation monitor R-29/R-30 reading > 1.0E+01 R/hr	R-29 & R-30 alert alarms at 1.0E+01 R/hr, indicative of a significant RCS breach (LOCA) in containment (~0.1% gap activity).
RCS Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	N/A	None	Other site-specific indications of RCS loss have not been identified.

NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
RCS Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.	RCS Loss F.4	ANY condition in the opinion of the Emergency Director that indicates loss of the RCS barrier	None
RCS P-Loss 1	Critical Safety Function Status A. RCS Integrity-Red Entry Conditions Met. OR B. Heat Sink-Red Entry Conditions Met. 	RCS P-Loss A.1	RED path condition exists F-0.4 Integrity	The NEI phrase "RCS Integrity-Red Entry Conditions Met" has been changed to " RED path condition exists F-0.4 Integrity." Procedure F-0.4 is the integrity CSFST. The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs.
		RCS P-Loss A.2	RED path condition exists F-0.3 Heat Sink and heat sink is required	The NEI phrase "Heat Sink-Red Entry Conditions Met" has been changed to " RED path condition exists F-0.3 Heat Sink." Procedure F-0.3 is the heat sink CSFST. The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs. The phrase "and heat sink is required" has been added to the Ginna threshold to implement EAL FAQ #18.
RCS P-Loss 2	RCS Leak Rate A. RCS leak rate indicated greater than (site specific capacity of one charging pump in the normal charging mode) with Letdown isolated.	RCS P-Loss C.3	RCS leak rate > 50 gpm with letdown isolated	The CVCS includes three positive displacement horizontal pumps with a capacity of 46 gpm each. The single charging pump capacity is rounded up to 50 gpm for this threshold consistent with the generic developers guidance for plants with low capacity charging pumps and clearly signals that operation of more than one charging pump is needed.
RCS P-Loss 3	Not Applicable Not Applicable	N/A	N/A	N/A
RCS P-Loss 4	SG Tube Rupture Not Applicable	N/A	N/A .	N/A .

NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
RCS P-Loss 5	Not Applicable Not Applicable	N/A	N/A	N/A
RCS P-Loss 6	Containment Radiation Monitoring Not Applicable	N/A	N/A	N/A
RCS P-Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	N/A	None	Other site-specific indications of RCS potential loss have not been identified.
RCS P-Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.	RCS P-Loss F.4	ANY condition in the opinion of the Emergency Director that indicates potential loss of the RCS barrier	None

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Containment Fission Product Barrier Degradation Thresholds

NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
CNMT Loss 1	Critical Safety Function Status Not Applicable	N/A	N/A	None
CNMT Loss 2	Containment Pressure A. A containment pressure rise followed by a rapid unexplained drop in containment pressure.	CNMT Loss C.1	A containment pressure rise followed by a rapid unexplained drop in containment pressure	The NEI threshold has been divided into two Ginna thresholds to improve clarity.
	 B. Containment pressure or sump level response not consistent with LOCA conditions. 	CNMT Loss C.2	Containment pressure or sump level response not consistent with LOCA conditions	The NEI threshold has been divided into two Ginna thresholds to improve clarity.
CNMT Loss 3	Core Exit Thermocouple Readings Not applicable	N/A	N/A	N/A
CNMT Loss 4	SG Secondary Side Release with P- to-S Leakage A. RUPTURED SG is also FAULTED	CNMT Loss C.3	Ruptured S/G is also faulted outside of containment	None

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NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
	outside of containment. OR	CNMT Loss	Primary-to-secondary leakrate > 10 gpm	The NEI threshold has been divided into two Ginna thresholds to improve clarity.
	 B. a. Primary-to-Secondary leakrate greater than 10 gpm. AND b. UNISOLABLE steam release from affected SG to the environment. 	C.4	AND Unisolable prolonged steam release from affected S/G to the environment	Consistent with the generic developers guidance "Prolonged" as used here is in the context meaning that the release from the affected S/G within the time frame expected when implementing E-3 Steam Generator Tube Rupture. Cooldowns conducted to allow controlled isolation of the affected S/G per emergency procedures are not considered prolonged releases. The criterion for prolonged release is met if the objective of E-3 to isolate the affected S/G cannot be met.
CNMT Loss 5	Containment Isolation Failure or Bypass A. a. Failure of all valves in any one line to close. AND b. Direct downstream pathway to the environment exists after	CNMT Loss E.5	Failure of all valves in ANY one line to close AND Direct downstream pathway to the environment exists after containment isolation signal	None
CNMT Loss 6	containment isolation signal. Containment Radiation Monitoring Not Applicable	N/A	N/A	N/A
CNMT Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	N/A	None	Other site-specific indications of Containment loss have not been identified.
CNMT Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.	CNMT Loss F.6	ANY condition in the opinion of the Emergency Director that indicates loss of the Containment barrier	None

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NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
CNMT P-Loss 1	Critical Safety Function Status A. Containment-Red Entry Conditions Met.	CNMT P-Loss A.1	RED path condition exists F-0.5 Containment	The NEI phrase "Containment-Red Entry Conditions Met" has been changed to " RED path condition exists F-0.5 Containment." Procedure F-0.5 is the containment CSFST.
			•	The NEI phrase "Entry Conditions Met" has been changed to "condition exists" for consistency with terminology used by Ginna operators when using the EOPs.
CNMT P-Loss	Containment Pressure A. Containment pressure greater than	CNMT P-Loss	Containment pressure ≥ 60 psig and rising	The NEI threshold has been divided into three plant thresholds to improve clarity.
2	 (site specific value) and rising. OR B. Explosive mixture exists inside 	C.4		This threshold is the containment design pressure and is in excess of that expected from the design basis loss of coolant accident (LOCA).
	containment. OR	CNMT P-Loss	Containment hydrogen concentration ≥ 4%	The NEI threshold has been divided into three Ginna thresholds to improve clarity.
	C. a. Pressure greater than containment depressurization actuation setpoint.	C.5		Containment hydrogen concentration of 4% is the minimum concentration associated with an explosive mixture.
	AND b. Less than one full train of depressurization equipment operating.	CNMT P-Loss	Containment pressure <u>></u> 28 psig and < two CRFC units and one CS pump	The NEI threshold has been divided into three Ginna thresholds to improve clarity.
		C.6	operating per design	The word "Containment" has been added to the plant threshold for clarification.
			-	The Containment pressure setpoint (28 psig) is the Containment depressurization actuation setpoint.
				The phrase "Less than one full train of depressurization equipment operating" has been replaced with "< two CRFC units and one CS pump operating per design." This represents the minimum design requirement for containment cooling.

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NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
CNMT P-Loss . 3	 Core Exit Thermocouple Readings A. a. Core exit thermocouples in excess of (site specific) ° F. AND b. Restoration procedures not effective within 15 minutes. OR B. a Core exit thermocouples in excess of (site-specific) F. AND 	CNMT P-Loss B.2	Core Exit TCs cannot be restored < 1,200°F within 15 min.	The NEI threshold has been divided into two Ginna thresholds to improve clarity. "TCs" is the Ginna equivalent of NEI "thermocouples." The NEI phrase "in excess of (site specific) ° F AND Restoration procedures not effective" has been replaced with " cannot be restored < 1,200°F". The phrase "cannot be restored <" implies Core Exit TC readings have exceeded the threshold temperature and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful. Whether or not guidance is effective should be apparent within fifteen minutes.

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NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
	(site specific level). AND	CNMT P-Loss	Core Exit TCs ≥ 700ºF AND	The NEI threshold has been divided into two Ginna thresholds to improve clarity.
	c. Restoration procedures not	B.3	RVLIS level cannot be restored	"TCs" is the Ginna equivalent of NEI "thermocouples."
	effective within 15 minutes.		> 52% [> 55% adverse CNMT] with no RCPs running within 15 min.	The NEI phrase "in excess of (site specific) ° F AND reactor vessel level belowAND Restoration procedures not effective" has been replaced with "Core Exit TCs ≥ 700° AND RVLIS level cannot be restored > 52% [> 55% adverse CNMT] with no RCPs running".
				Core Exit TCs are a component of inadequate core cooling instrumentation and provide an indirect indication of fuel cladding temperature by measuring the temperature of the reactor coolant that leaves the core region. The threshold temperature is consistent with Attachment 1 of EPIP-2-16, Core Damage Estimation . RCS superheat, as indicated by Core Exi TCs reading in excess of 700°F, signals the transition from a subcooled to a superheated regime. In a superheated regime, heat transfer mechanics are not as efficient as the subcooled condition and could lead to a rapid rise in cladding temperatures.
				The phrase "cannot be restored >" implies RVLIS lever readings have exceeded the threshold level and procedural guidance used to restore RCS inventory has been attempted but is thus far unsuccessful. Whether or not guidance is effective should be apparent within fifteen minutes.
CNMT P-Loss	SG Secondary Side Release with P- to-S Leakage	N/A	N/A	N/A
4	Not applicable			

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NEI FPB#	NEI IC Wording	Ginna FPB #(s)	Ginna FPB Wording	Difference/Deviation Justification
CNMT P-Loss 5	Containment Isolation Failure or Bypass Not Applicable	N/A	N/A	N/A
CNMT P-Loss 6	Containment Radiation Monitoring A. Containment radiation monitor reading greater than (site specific value).	CNMT P-Loss D.7	Containment radiation monitor R-29/R-30 reading > 1.0E+03 R/hr	A reading on containment radiation monitors greater than 1.0E+03 R/hr is indicative of significant fuel activity and thus considered a potential loss of Containment.
CNMT P-Loss 7	Other (Site-Specific) Indications A. (Site-specific) as applicable	N/A	None	Other site-specific indications of Containment potential loss have not been identified.
CNMT P-Loss 8	Emergency Director Judgment A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.	CNMT P-Loss F.8	ANY condition in the opinion of the Emergency Director that indicates potential loss of the Containment barrier	None

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Category H

Hazards and Other Conditions Affecting Plant Safety

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HU1	Natural or destructive phenomena affecting the PROTECTED AREA.	HU1	Natural or destructive phenomena affecting the Protected Area	None
	MODE: All		MODE: All	

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
	Seismic event identified by ANY 2 of the following: • Seismic event confirmed by (site specific indication or method) • Earthquake felt in plant • National Earthquake Center	HU1.1	 Seismic event identified by ANY two of the following: Red LED event indicator on Kinemetrics ETNA Digital Recorder indicates seismic event detected Earthquake felt onsite National Earthquake Information Center (Note 6) Note 6: The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of Ginna Nuclear Power Plant. Provide the analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude. 	Red LED event indicator on Kinemetrics ETNA Digital Recorder provides the site specific indication or method of detecting a seismic event. The NEI phrase "felt in plant" has been changed to "felt onsite" for consistency with the NEI basis which states: "the vibratory ground motion is felt at the nuclear plant site." Note 6 provides guidance for contacting the NEIC and verifying seismic activity near the Ginna site.
2	Tornado striking within PROTECTED AREA boundary or high winds greater than (site specific mph).	HU1.2	Tornado striking within Protected Area boundary OR Sustained high winds > 75 mph	The wind speed of 75 mph is the sustained design wind speed for Class 1 safe shutdown structures.

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3	Internal flooding that has the potential to affect safety related equipment required by Technical Specifications for the current operating mode in ANY of the following areas: (site specific area list)	HU1.3	Internal flooding that has the potential to affect ANY safety- related structure, system, or component required by Technical Specifications for the current operating mode in ANY Table H- 1 area	The NEI phrase "safety related equipment" has been changed to " ANY safety-related structure, system, or component" for clarification Ginna areas containing safety related equipment are specified in Table H-1. This change implements EAL FAQ #44.
4	Turbine failure resulting in casing penetration or damage to turbine or generator seals.	HU1.4	Turbine failure resulting in casing penetration or damage to turbine or generator seals	None
5	(Site specific occurrences affecting the PROTECTED AREA).	HU1.5	Deer Creek flooding over entrance road bridge hand rail OR Lake level > 252 ft OR Screen House Suction Bay water level < 17 ft or < 15.5 ft by manual level measurement	 Flooding in Deer Creek above the plant entrance handrails will ultimately result in water accumulation in the Turbine Building and Screenhouse. This may preclude emergency response personnel access and egress. A lake level of 252 ft has been selected for this threshold to be anticipatory of exceeding design flood levels and is the level at which flood control actions are procedurally taken. When Screenhouse Suction Bay water level drops to 17.0 ft indicated (this corresponds to a level of 15.5 ft measured manually) increased Control Room monitoring is initiated. This level has been selected for this threshold to be anticipatory of a potential loss of service water system pump suction at 16.0 ft.

	Table H-1 Safe Shutdown Areas
•	Reactor Containment Building
•	Auxiliary Building
•	Control Building
•	Intermediate Building
•	Emergency Diesel Building(s)
•	SAFW Building
•	Screenhouse
•	Cable Tunnel
•	Battery Rooms

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	×.	Difference/Deviation Justification
HU2	FIRE within the PROTECTED AREA not extinguished within 15 minutes of detection or EXPLOSION within the PROTECTED AREA. MODE: All	HU2	Fire within the Protected Area not extinguished within 15 min. of detection or explosion within the Protected Area MODE: All		

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	FIRE not extinguished within 15 minutes of control room notification or verification of a control room FIRE alarm in ANY of the following areas: (site specific area list)	HU2.1	Fire not extinguished within 15 min. of Control Room notification or verification of a Control Room fire alarm in ANY Table H-1 area or Turbine Building (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The NEI phrase "of the following areas(site specific area list)" has been changed to "in ANY Table H-1 area." The areas listed in Tabl H-1 are areas containing functions and systems required for safe shutdown. This change implements EAL FAQ #44. The phrase "or Turbine Building" has been added to the Ginna EAI to identify an area immediately adjacent to a Table H-1 area that could be susceptible to fires. Note 4 has been added consistent with other NEI based EALs that include the 15 min. transitory condition exclusion. The third paragraph of the NEI basis has been edited to clarify the significance of the 15-minute duration. If the alarm cannot be verified by redundant Control Room or nearby Fire Panel indications, notification from the field that a fire exists starts the concurrent 15-minute classification and fire suppression clocks. Th change is consistent with the manner in which the Control Room and Fire Brigade leaders verify fires. This change is necessary to avoid declaring Unusual Event emergencies for spurious alarms that, due to the sensor location, cannot be verified within 15 minute of receipt of the alarm. This is a deviation from NEI 99-01 Revision 5.
.2	EXPLOSION within the	HU2.2	Explosion within the Protected	None

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EAL Comparison Matrix	

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PROTECTED AREA.	Area	
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HU3	Release of toxic, corrosive, asphyxiant, or flammable gases deemed detrimental to NORMAL PLANT OPERATIONS. MODE: All	HU3	Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal plant operations MODE: All	None

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS.	HU3.1	Release of toxic, corrosive, asphyxiant or flammable gases of sufficient quantity to affect normal plant operations	Revised wording to be consistent with the first sentence of the generic bases and consistent with the IC.
2	Report by local, county or state officials for evacuation or sheltering of site personnel based on an off-site event.	HU3.2	Recommendation by local, county or state officials to evacuate or shelter site personnel based on offsite event	Reworded EAL for readability.

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NEI IC#	NEHC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HU4	Confirmed SECURITY CONDITION or threat which indicates a potential degradation in the level of safety of the plant. MODE: All	HU4	Confirmed security condition or threat which indicates a potential degradation in the level of safety of the plant MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	A SECURITY CONDITION that does NOT involve a HOSTILE ACTION as reported by the (site specific security shift supervision).	HU4.1	A security condition that does not involve a hostile action as reported by Security Shift Supervision OR	The NEI Example EALs have been combined in one plant EAL for simplification. "Security Shift Supervision" is the site-specific security supervision that are qualified and trained to confirm that a security event is occurring or has occurred.
2	A credible site specific security threat notification.	- 	A credible site-specific security threat notification OR A validated notification from NRC	
3	A validated notification from NRC providing information of an aircraft threat.		providing information of an aircraft threat	

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HU5	Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE. MODE: All	HU6	Other conditions existing that in the judgment of the Emergency Director warrant declaration of a UE MODE: All	The NEI acronym "NOUE" has been implemented as "UE" for simplification. Replaced the word "which" with "that" for proper grammar.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Other 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 or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring off-site response or monitoring are expected unless further degradation of safety systems occurs.	HU6.1	Other 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 OR indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs	None

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HA1	Natural or destructive phenomena affecting VITAL AREAS MODE: All	HA1	Natural or destructive phenomena affecting Vital Areas MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 a. Seismic event greater than Operating Basis Earthquake (OBE) as indicated by (site specific seismic instrumentation) reading (site specific OBE limit). AND b. Earthquake confirmed by ANY of the following: Earthquake felt in plant National Earthquake Contact 	HA1.1	EITHER: Confirmation of an earthquake of an intensity > 0.08 g per ER-SC.4 Earthquake Emergency Plan OR Control Room indication of degraded performance of ANY safety-related structure, system, or	The site-specific instrumentation used to indicate a seismic event > OBE cannot be analyzed in a timely manner and requires analysis of the Strong Motion Accelerograph by site I&C and engineering per procedure ER-SC.4 Earthquake Emergency Plan. To allow for timely classification under this threshold, actual indication of degraded performance of safety-related structures systems or component has been included as a primary indicator of exceeding the OBE threshold. The NEI phrase "felt in plant" has been changed to "felt onsite" for consistency with the NEI basis which states: "the vibratory ground motion is felt at the nuclear plant site."
	 National Earthquake Center Control Room indication of degraded performance of systems required for the safe shutdown of the plant. 	-	component AND Earthquake confirmed by EITHER:	Note 6 provides guidance for contacting the NEIC for confirmation of seismic activity in the vicinity of Ginna.
		Earthquake felt onsite OR National Earthquake Information Center (Note 6)		
			Note 6: The NEIC can be contacted by calling (303) 273-8500. Select option #1 and inform the analyst you wish to confirm recent seismic activity in the vicinity of Ginna Nuclear Power Plant. Provide the	

-			analyst with the following Ginna coordinates: 43° 16.7' north latitude, 77° 18.7' west longitude	
2	Tornado striking or high winds greater than (site specific mph) resulting in VISIBLE DAMAGE to ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety systems: (site specific structure list)	HA1.2	Tornado striking or sustained high winds > 75 mph resulting in EITHER: Visible damage to ANY safety- related structure, system, or component within ANY Table H-1 area OR Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area	The wind speed of 75 mph is the sustained design wind speed for Class 1 safe shutdown structures. The logic term " EITHER " has been added to the threshold so that the two indicated results of the tornado/high wind could be presented in list format. The NEI phrase " ANY of the following structures containing safety systems or components" has been changed to " ANY safety-related structure, system, or component within ANY Table H-1 area" to be consistent with the definition of visible damage and related HA1 EAL thresholds. This also permits presentation of the site specific list in a table. Table H-1 provides the list of structures containing safety systems or components. This change implements EAL FAQ #44. The NEI phrase "those safety systems" has been changed to " ANY safety-related structure, system, or component within ANY Table H-1 area" for clarification.
3	Internal flooding in ANY of the following areas resulting in an electrical shock hazard that precludes access to operate or monitor safety equipment OR control room indication of degraded performance of those safety systems: (site specific area list)	HA1.3	Internal flooding in ANY Table H-1 area resulting in EITHER : An electrical shock hazard that precludes access to operate or monitor ANY safety-related structure, system, or component within ANY Table H-1 area OR Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area	Ginna areas containing safety related equipment are specified in Table H-1. This change implements EAL FAQ #44. The logic term " EITHER " has been added to the threshold so that the two indicated results of the flooding could be presented in list format. The NEI phrase "those safety systems" has been changed to " ANY safety-related structure, system, or component within ANY Table H-1 area" for clarification.

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4	Turbine failure-generated PROJECTILES resulting in VISIBLE DAMAGE to or penetration of ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety systems: (site specific structure list)	HA1.4	Turbine failure-generated projectiles resulting in EITHER: Visible damage to or penetration of ANY safety- related structure, system, or component within ANY Table H-1 area OR Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area	The logic term " EITHER " has been added to the threshold so that the two indicated results of the turbine failure-generated projectiles could be presented in list format. The NEI phrase " ANY of the following structures containing safety systems or components" has been changed to " ANY safety-related structure, system, or component within ANY Table H-1 area" to be consistent with the definition of visible damage and related HA1 EAL thresholds. This also permits presentation of the site specific list in a table. Table H-1 provides the list of areas/structures containing safety systems or components. This change implements EAL FAQ #44. The NEI phrase "those safety systems" has been changed to " ANY safety-related structure, system, or component within ANY Table H-1 area" for clarification.
5	Vehicle crash resulting in VISIBLE DAMAGE to ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety systems: (site specific structure list)	HA1.6	Vehicle crash resulting in EITHER: Visible damage to ANY safety-related structure, system, or component within ANY Table H-1 area OR Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area	The logic term "EITHER " has been added to the threshold so that the two indicated results of the vehicle crash could be presented in list format. The NEI phrase "ANY of the following structures containing safety systems or components" has been changed to "ANY safety-related structure, system, or component within ANY Table H-1 area" to be consistent with the definition of visible damage and related HA1 EAL thresholds. This also permits presentation of the site specific list in a table. Table H-1 provides the list of areas/structures containing safety systems or components. This change implements EAL FAQ #44. The NEI phrase "those safety systems" has been changed to "ANY safety-related structure, system, or component within ANY Table H-1 area" for clarification.
6	(Site specific occurrences) resulting in VISIBLE DAMAGE to ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety	HA1.5	Lake level > 253 ft OR Screen House Suction Bay water level < 16 ft or < 14.5 ft by manual level measurement	Lake water level > 253.28 ft msl corresponds to plant design levels (ref. 1). A lake level of 253 ft has been selected for this threshold to be indicative of exceeding design flood levels. If indicated service water pump bay level drops below 16 ft (this corresponds to a lake level of 14.5 ft measured manually) the service water pumps are declared inoperable. This level has been

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systems:	selected for this threshold to be indicative of a loss of service water
	system pump suction.

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Table H-1 Safe Shutdow	wn Areas
Reactor Containment Building	
Auxiliary Building	
Control Building	······································
Intermediate Building	
Emergency Diesel Building(s)	
SAFW Building	and the second
Screenhouse	
Cable Tunnel	the second se
Battery Rooms	
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HA2	FIRE or EXPLOSION affecting the operability of plant safety systems required to establish or maintain safe shutdown MODE: All	HA2	Fire or explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	FIRE or EXPLOSION resulting in VISIBLE DAMAGE to ANY of the following structures containing safety systems or components OR control room indication of degraded performance of those safety systems: (site specific structure list)	HA2.1	Fire or explosion resulting in EITHER: Visible damage to ANY safety-related structure, system, or component within ANY Table H-1 area OR Control Room indication of degraded performance of ANY safety-related structure, system, or component within ANY Table H-1 area	The logic term "EITHER " has been added to the threshold so that the two indicated results of the fire/explosion could be presented in list format. The NEI phrase "ANY of the following structures containing safety systems or components" has been changed to "ANY safety-related structure, system, or component within ANY Table H-1 area" so that the site specific list could be presented in a table. Table H-1 provides the list of areas/structures containing safety systems or components. This change implements EAL FAQ #44. The NEI phrase "those safety systems" has been changed to "ANY safety-related structure, system, or component within ANY Table H-1 1 area" for clarification.

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Table H-1 Safe Shutdown Areas

- **Reactor Containment Building** . .
- Auxiliary Building ٠
- Control Building ٠
- Intermediate Building ٠
- Emergency Diesel Building(s) ٠
- SAFW Building ٠
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- Screenhouse
- , Cable Tunnel
- Battery Rooms
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
НАЗ	Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shutdown the reactor. MODE: All	НАЗ	Access to a Vital Area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safely shut down the reactor MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 Note: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then this EAL should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event. 1. Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of systems required to maintain safe operations or safely shutdown the reactor. 	HA3.1	Access to ANY Table H-1 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of ANY safety-related structure, system, or component (Note 5) Note 5: If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then EAL HA3.1 should not be declared as it will have no adverse impact on the ability of the plant to safely operate or safely shut down beyond that already allowed by Technical Specifications at the time of the event.	Ginna vital areas are specified in Table H-1. This change implements EAL FAQ #44. The NEI phrase "systems required to maintain safe operations or safely shutdown the reactor" has been changed to " ANY safety- related structure, system, or component" for consistency with subcategory H1 and H2 Alert EALs. Safety-related structures, systems, and components are systems that are required to maintain safe operations or safely shut down the reactor. Reference to the NEI note is included in the EAL wording "(Note 5)." Numbering the note facilitates referencing in the EAL matrix. The NEI phrase "this EAL" has been changed to "EAL HA3.1" for clarification.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HA4	HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat. MODE: All	HA4	Hostile action within the Owner Controlled Area or airborne attack threat. MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site specific security shift supervision).	HA4.1	A hostile action is occurring or has occurred within the Owner Controlled Area as reported by Security Shift Supervision OR	The NEI Example EALs have been combined in one plant EAL for simplification. "Security Shift Supervision" is the site-specific security supervision that are qualified and trained to confirm that a security event is occurring or has
2	A validated notification from NRC of an airliner attack threat within 30 minutes of the site.	ι	A validated notification from NRC of an airliner attack threat within 30 min. of the site	occurred.
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification			
HA5	Control Room Evacuation Has Been Initiated	HA5	Control Room evacuation has been initiated	None			
	MODE: All		MODE: All				
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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	(Site-specific procedure) requires control room evacuation.	HA5.1	Control Room evacuation has been initiated	AP-CR.1 Control Room Inaccessibility provides specific instructions for evacuating the Control Room and establishing plant control in alternate locations. The IC wording has been utilized since the intent is to classify the Alert based on Control Room evacuation, regardless whether the associated procedure has been entered or executed. This change implements EAL FAQ #28.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HA6	Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.	HA6	Other conditions exist that in the judgment of the Emergency Director warrant declaration of an Alert MODE: All	Replaced the word "which" with "that" for proper grammar.

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	HA6.1	Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant OR a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE)	EPA PAG values have been added for clarification.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HS2	Control room evacuation has been initiated and plant control cannot be established. MODE: All	HS5	Control Room evacuation has been initiated and plant control cannot be established MODE: All	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 a. Control room evacuation has been initiated. AND b. Control of the plant cannot be established within (site specific minutes). 	HS5.1	Control Room evacuation has been initiated AND Control of the plant cannot be established within 30 min.	 AP-CR.1 Control Room Inaccessibility provides specific instructions for evacuating the Control Room and establishing plant control in alternate locations. An analysis was performed as part of the Fire Protection Program to determine how quickly control must be reestablished at Ginna without core uncovery or damage. There are 5 time-critical actions which must be accomplished to enable established performance goals to be met. In evaluating a reasonable timeline for completion of tasks required in the ER-FIRE procedures to restore charging, it was estimated that restoration should be completed in less than 30 minutes. This is consistent with information obtained during operator walk-throughs of the ER-FIRE procedures which consistently indicated restoration in 17 to 24 minutes.

NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HS3	Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency. MODE: All	HS6	Other conditions existing that in the judgment of the Emergency Director warrant declaration of a Site Area Emergency MODE: All	Replaced the word "which" with "that" for proper grammar

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the 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.	HS6.1	Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public OR hostile action that results in intentional damage or malicious acts: (1) toward site personnel or equipment that could lead to the likely failure of, or (2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) beyond the site boundary	EPA PAG values have been added for clarification.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HS4	HOSTILE ACTION within the PROTECTED AREA MODE: All	HS4	Hostile action within the Protected Area MODE: All	None .

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site security shift supervision)	HS4.1	A hostile action is occurring or has occurred within the Protected Area as reported by Security Shift Supervision	The "Security Shift Supervisor" is the title of the site-specific security shift supervision.

NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HG1	HOSTILE ACTION resulting in loss of physical control of the facility.	HG4	Hostile action resulting in loss of physical control of the facility	None
	MODE: All		MODE: All	· · · · · · · · · · · · · · · · · · ·

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.	HG4.1	A hostile action has occurred such that plant personnel are unable to operate equipment required to maintain safety functions	None
2	A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off- loaded reactor core in pool.	HG4.2	A hostile action has caused failure of Spent Fuel Cooling systems AND Imminent fuel damage is likely	The logic term "AND " has been added to the threshold for format consistency. The NEI phrase "for a freshly off-loaded reactor core in pool" has been deleted because any imminent fuel damage caused by hostile action warrants a GE declaration even if it is not from a freshly off-loaded core in pool. This change implements EAL FAQ # 29.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
HG2	Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency. MODE: All	HG6	Other conditions exist that in the judgment of the Emergency Director warrant declaration of a General Emergency MODE: All	Replaced the word "which" with "that" for proper grammar

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
	Other 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 for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels off-site for more than the immediate site area.	HG6.1	Other 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 for loss of containment integrity OR hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) offsite for more than the immediate site area	EPA PAG values have been added for clarification.

EAL Comparison Matrix

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Category S

System Malfunction

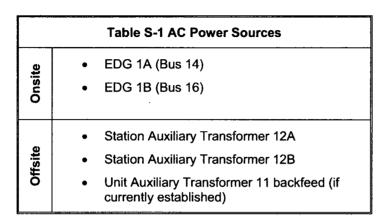
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification	
SU1	Loss of all Off-site AC power to emergency busses for 15 minutes or longer.	SU1	Loss of all offsite AC power to 480V safeguards buses for \geq 15 min.	"480V safeguards buses" is the Ginna specific terminology for "emergency busses."	
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby		

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all off-site AC power to (site specific emergency busses) for 15 minutes or longer.	SU1.1	Loss of all offsite AC power, Table S-1, to 480V safeguards buses for \geq 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	Table S-1 provides a list of onsite and offsite AC power supplies.480V safeguards buses are the Ginna emergency buses in hot conditions.Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.



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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU2	Inability to reach required shutdown within Technical Specification limits.	SU4	Inability to reach required shutdown within Technical Specification limits	None
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Plant is not brought to required operating mode within Technical Specifications LCO Action Statement Time.	SU4.1	Plant is not brought to required operating mode within Technical Specifications LCO required action completion time	" required action completion time" is the Ginna Technical Specification terminology for " Action Statement Time."

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU3	UNPLANNED loss of safety system annunciation or indication in the control room for 15 minutes or longer. MODE: Power Operation, Startup, Hot Standby, Hot Shutdown	SU5	Unplanned loss of safety system annunciation or indication in the Control Room for \geq 15 min. MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. UNPLANNED Loss of greater than approximately 75% of the following for 15 minutes or longer:	SU5.1	Unplanned loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications for \geq 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The NEI phrase "greater than approximately 75% of the following ab" has been changed to "loss of 6 or more annunciator panels, Table S-2 or >75% of MCB indications," for clarity. Table S-2 lists the safety-related annunciation panels. Loss of 6 annunciator panels would be a loss of 75% of the safety related annunciators. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.
	a. (Site specific control room safety system annunciation)			
	OR			
	b. (Site specific control room safety system indication)		· · · ·	· · · · · · ·

1 - 1 - 1 - 2 - 2 1	Table S-2 Vital Control Room Panels									
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU4	Fuel Clad Degradation MODE: Power Operation, Startup, Hot Standby, Hot Shutdown	SU7	Fuel clad degradation MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification	
1	(Site specific radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.)	SU7.2	Valid Letdown Monitor (R-9) reading ≥ 4800 mRad/hr	The Letdown Line Monitor (R-9) gross radiation channel continuously monitors the activity in a sample drawn from the RCS (NaOH tank room) and actuates an alarm in the Control Room if a predetermined activity level is reached. 4800 mRad/hr correspondent to the transient TS coolant activity limit of 60 µCi/gm (3.4.16).	
2	(Site specific coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.)	SU7.1	RCS specific activity > 60 μCi/gm dose equivalent I-131	Consistent with the generic NEI 99-01 Rev. 5 bases, the Technical Specification threshold limit value selected is 60 μ Ci/gm dose equivalent I-131. This limit accommodates iodine spike phenomenon that may occur following changes in thermal power and during reactor startup and shutdown.	

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU5	RCS Leakage MODE: Power Operation, Startup, Hot Standby, Hot Shutdown	SU8	RCS leakage MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	None

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification		
1	Unidentified or pressure boundary leakage greater than 10 gpm.	SU8.1	leakage > 10 gpm for ≥ 15 min. f (Note 4) F OR F	SU8.1 implements Example EALs #1 and #2. These were combined for improved usability. The phrase "for \ge 15 min. (Note 4)" has been added to the Ginna		
2	Identified leakage greater than 25 gpm,			EAL to allow mitigation by operating procedures prior to declaration. This is a deviation from NEI 99-01 Revision 5.		
			Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.			

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU6	Loss of all On-site or Off-site communications capabilities.	SU6	Loss of all onsite or offsite communications capabilities	None
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Loss of all of the following on- site communication methods affecting the ability to perform routine operations. (site specific list of communications methods)	· SU6.1	Loss of all Table S-4 onsite (internal) communication methods affecting the ability to perform routine operations OR Loss of all Table S-4 offsite	SU6.1 implements Example EALs #1 and #2. These were combined for improved usability. The NEI example EALs specify site-specific lists of onsite and offsite communications methods. The Ginna EAL lists these methods in Table S-4 because the number of communications methods is too long to include within the text of the EAL.
2	Loss of all of the following off- site communication methods affecting the ability to perform offsite notifications. (site specific list of communications methods)		(external) communication methods affecting the ability to perform offsite notifications	The adjectives "(internal)" and "(external)" have been added to the Ginna EAL for clarification. The terms "onsite/offsite" could be interpreted as the location in which the communication originates instead of the location to which communication is directed.

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Table S-4 Communications Systems							
System	Onsite (internal)	Offsite (external)					
Commercial phone system	x	x					
Direct Dial "POTS" Lines (Blue Phones)	x	x					
Plant Page Party system	x						
Radios/Walkie Talkies	x						
FTS 2001 telephone system (ENS, HPN)		x					
Control Room Hard Wired Satellite Phone		x					
Control Room Emergency Cell Phone		x					

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SU8	Inadvertent Criticality.	SU3	Inadvertent criticality	None
	MODE: Hot Standby, Hot Shutdown		MODE: 3 - Hot Shutdown, 4 - Hot Standby	

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	UNPLANNED sustained positive period observed on nuclear instrumentation. [<i>BWR</i>]	N/A	N/A	NEI Example EAL #1 has not been implemented because it applies only to BWR plants. Ginna is a PWR. PWRs are not equipped with period meters.
1	UNPLANNED sustained positive startup rate observed on nuclear instrumentation. [<i>PWR</i>]	SU3.1	An unplanned sustained positive startup rate observed on nuclear instrumentation	None

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SA2	Automatic Scram (Trip) fails to shutdown the reactor and the	SA3	Automatic trip failed to shut down the reactor and the manual	The term "scram" was replaced with "trip" consistent with PWR 'terminology.
	manual actions taken from the reactor control console are successful in shutting down the		actions taken from the reactor control console are successful in shutting down the reactor	The NEI term "fails" has been changed to "failed" for consistency with the example EAL wording. This change implements EAL FA #31.
	reactor. MODE: Power Operation, Startup		MODE: 1 - Power Operation	The Startup mode has been deleted from the Ginna EAL. Ginna Technical Specifications definition of Startup mode is $K_{eff} \ge 0.99$ a rated thermal power $\le 5\%$. It is not possible to be in Startup mode
	All and a second sec			with reactor power above 5%. Since the definition of reactor shutdown is reactor power less than or equal to 5% (in accordance with the NEI 99-01 basis for this EAL), this EAL would never be applicable in Startup mode.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	a. An automatic scram (trip) failed to shutdown the	SA3.1	An automatic trip failed to shut down the reactor	The term "scram" was replaced with "trip" consistent with PWR terminology.
	 reactor. AND b. Manual actions taken at the reactor control console successfully shutdown the reactor as indicated by (site specific indications of plant shutdown). 		AND Manual actions taken at the reactor control console successfully shut down the reactor as indicated by reactor power ≤ 5%	The power range indication above 5% is greater than the decay heat which the shutdown systems (Auxiliary Feed Water and Atmospheric Dump Valves) were designed to remove and is indicative of a condition requiring immediate response to prevent subsequent core damage.
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SA4	UNPLANNED Loss of safety system annunciation or indication in the control room with EITHER (1) a SIGNIFICANT TRANSIENT in progress, or (2) compensatory indicators unavailable.	SA5	Unplanned loss of safety system annunciation or indication in the Control Room with either (1) a significant transient in progress, or (2) compensatory indicators are unavailable	None
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. a. UNPLANNED loss of greater than approximately 75% of the following for 15 minutes or longer: (Site specific control room safety system annunciation) OR (Site specific control room safety system indication) b. EITHER of the following: A SIGNIFICANT TRANSIENT is in progress. 	SA5.1	Unplanned loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications for ≥ 15 min. (Note 4) AND EITHER: A significant transient is in progress, Table S-3 OR Compensatory indications are unavailable (PPCS) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The NEI phrase "greater than approximately 75% of the following ab" has been changed to "loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications," for clarity. Table S- 2 lists the safety-related annunciation panels. Loss of 6 annunciator panels would be a loss of 75% of the safety related annunciators. Table S-3 provides the list of events that constitute a "significant transient" as specified in the NEI 99-01 Section 5.4 definition of significant transient. The Ginna compensatory indications are provided by PPCS. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

EAL Comparison Matrix

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Cor are	npensatory indications unavailable.		
15			· · · · · · · · · · · · · · · · · · ·
	Table S-3 Sign	ificant Transients	
	Automatic turbine runback	> 25% thermal power	
	 Electric load rejection > 25 Reactor trip Safety Injection activation 	· .	
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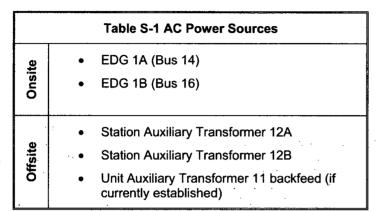
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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SA5	AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout. MODE: Power Operation, Startup, Hot Standby, Hot Shutdown	SA1	AC power capability to 480V safeguards buses reduced to a single power source for ≥15 min. such that ANY additional single failure would result in a complete loss of all 480V safeguards bus power MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	"480V safeguards buses" is the Ginna specific terminology for "emergency busses." The phrase " ANY additional single failure would result in station blackout." was replaced with " ANY additional single failure would result in a complete loss of all 480V safeguards bus power." This is consistent with the intent that classification be based on a loss of AC power to emergency buses. A Station Blackout involves a loss of all AC power, not just emergency bus power. This change implements EAL FAQ #36.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. a. AC power capability to (site-specific emergency busses) reduced to a single power source for 15 minutes or longer. b. Any additional single power source failure will result in station blackout. 	SA1.1	AC power capability to 480V safeguards buses reduced to a single power source, Table S-1, for ≥ 15 min. (Note 4) AND Any additional single power source failure will result in a complete loss of all 480V safeguards bus power Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	 Table S-1 provides a list of onsite and offsite AC power supplies. 480V safeguards buses are the Ginna emergency buses in hot conditions. The NEI phrase "station blackout" has been replaced with " complete loss of all 480V safeguards bus power" as this describes the intended condition for Ginna. This change implements EAL FAQ #36. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SS1	Loss of all Off-site and all On- Site AC power to emergency busses for 15 minutes or longer.	SS1	Loss of all offsite and all onsite AC power to 480V safeguards buses for \geq 15 min.	"480V safeguards buses" is the Ginna specific terminology for "emergency busses."
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Loss of all Off-Site and all On- Site AC power to (site specific emergency busses) for 15 minutes or longer.	SS1.1	Loss of all offsite and all onsite AC power, Table S-1, to $480V$ safeguards buses for ≥ 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	Table S-1 provides a list of onsite and offsite AC power supplies.480V safeguards buses are the Ginna emergency buses in hot conditions.Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SS2	Automatic Scram (Trip) fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor. MODE: Power Operation, Startup	SS3	Automatic trip and manual actions taken from the reactor control console failed to shut down the reactor 1 - Power Operation	The term "scram" was replaced with "trip" consistent with PWR terminology. The NEI phrase "fails to shutdown the reactor and manual actions taken from the reactor control console are not successful in shutting" has been changed to "and manual actions taken from the reactor control console failed to shut" for clarification. This change implements EAL FAQ #31.
				The Startup mode has been deleted from the Ginna EAL. Ginna Technical Specifications definition of Startup mode is $K_{eff} \ge 0.99$ and rated thermal power $\le 5\%$. It is not possible to be in Startup mode with reactor power above 5%. Since the definition of reactor shutdown is reactor power less than or equal to 5% (in accordance with the NEI 99-01 basis for this EAL), this EAL would never be applicable in Startup mode.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
· · · ·	 a. An automatic scram (trip) failed to shutdown the reactor. AND b. Manual actions taken at the reactor control console do not shutdown the reactor as indicated by (site specific indications of reactor not shutdown). 	SS3.1	An automatic trip failed to shut down the reactor as indicated by reactor power > 5% AND Manual actions taken at the reactor control console failed to shut down the reactor as indicated by reactor power > 5%	The term "scram" was replaced with "trip" consistent with PWR terminology. The phrase "as indicated by reactor power > 5%" has been added to the first contingent and the NEI phrase "do not shutdown the reactor" has been changed to "failed to shut down the reactor" in the second contingent for clarification and consistency of wording. This change implements EAL FAQ #31. The power range indication above 5% is greater than the decay heat which the shutdown systems (Auxiliary Feed Water and Atmospheric Dump Valves) were designed to remove and is indicative of a condition requiring immediate response to prevent subsequent core damage.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SS3	Loss of all vital DC power for 15 minutes or longer. MODE: Power Operation,	SS2	Loss of all vital DC power for ≥ 15 min.	None
	Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. Less than (site specific bus voltage indication) on all (site specific Vital DC busses) for 15 minutes or longer.	SS2.1	< 108 VDC on both 125 VDC buses 1A and 1B for ≥ 15 min. (Note 4) Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	"108 VDC" is the site-specific bus voltage indication. 125 VDC buses 1A and 1B are the Ginna vital DC buses. Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SS6	Inability to monitor a SIGNIFICANT TRANSIENT in progress. MODE: Power Operation, Startup, Hot Standby, Hot Shutdown	SS5	Inability to monitor a significant transient in progress MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	None

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	Note: The Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has	SS5.1	Unplanned loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications for ≥ 15 min. (Note 4) AND	The NEI phrase "greater than approximately 75% of the followingab" has been changed to "loss of 6 or more annunciator panels, Table S-2, or >75% of MCB indications," for clarity. Table S-2 lists the safety-related annunciation panels. Loss of 6 annunciator panels would be a loss of 75% of the safety related annunciators.
	exceeded, or will likely exceed, the applicable time.		A significant transient is in progress, Table S-3	Reference to the NEI note is included in the EAL wording "(Note 4)." Numbering the note facilitates referencing in the EAL matrix.
	 Loss of greater than approximately 75% of the following for 15 minutes or longer: 	•	AND Compensatory indications are unavailable (PPCS)	Table S-3 provides the list of events that constitute a "significant transient" as specified in the NEI 99-01 Section 5.4 definition of significant transient.
	 (Site specific control room safety system annunciation) OR (Site specific control room safety system indication) AND b. A SIGNIFICANT TRANSIENT is in progress. AND 	· · ·	Note 4: The ED should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.	The Ginna compensatory indications are provided by PPCS.

	Compensatory indications are inavailable.			· · · ·	· · ·
	Table S-3 Sign	ficant Transients			
	Automatic turbine runback	> 25% thermal power			
	Electric load rejection > 25	% full electrical load			
	Reactor trip				
	Safety Injection activation			-	· .

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EAL Comparison Matrix

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SG1	Prolonged loss of all Off-site and all On-Site AC power to emergency busses.	all o	Prolonged loss of all offsite and all onsite AC power to 480V safeguards buses	"emergency busses."
	MODE: Power Operation, Startup, Hot Standby, Hot Shutdown		MODE: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Hot Standby	

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NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 a. Loss of all off-site and all on-site AC power to (site specific emergency busses). AND b. EITHER of the following: Restoration of at least one emergency bus in less than (site specific hours) is not likely. (Site specific indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.) 	SG1.1	Loss of all offsite and all onsite AC power, Table S-1, to 480V safeguards buses AND EITHER: Restoration of at least one 480V safeguards bus within 4 hours is not likely OR ORANGE or RED path condition exists F-0.2 Core Cooling	 480V safeguards buses are the Ginna emergency buses in hot conditions. The NEI phrase "of the following:" has been deleted. It is evident from the subsequent paragraphs and indentation applied to the Ginna EAL that they follow the previous paragraph. 4 are the "(site-specific)" hours for station blackout coping. The four-hour interval to restore AC power is based on the blackout coping analysis performed in conformance with 10 CFR 50.63 and Regulatory Guide 1.155. The NEI phrase "(Site-Specific) Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring" has been replaced with "ORANGE or RED path condition exists F-0.2 Core Cooling" for clarification. This threshold represents the NEI conditions consistent with the corresponding fission product barrier Fuel Clad Loss and Potential Loss thresholds.

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NEI IC#	NEI IC Wording	Ginna IC#(s)	Ginna IC Wording	Difference/Deviation Justification
SG2	Automatic Scram (Trip) and all manual actions fail to shutdown the reactor and indication of an extreme challenge to the ability to cool the core exists. MODE: Power Operation, Startup	SG3	Automatic trip and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists MODE: 1 - Power Operation	The term "scram" was replaced with "trip" consistent with PWR terminology. The Startup mode has been deleted from the Ginna EAL. Ginna Technical Specifications definition of Startup mode is $K_{eff} \ge 0.99$ and rated thermal power $\le 5\%$. It is not possible to be in Startup mode with reactor power above 5%. Since the definition of reactor shutdown is reactor power less than or equal to 5% (in accordance with the NEI 99-01 basis for this EAL), this EAL would never be applicable in Startup mode.

NEI Ex. EAL #	NEI Example EAL Wording	Ginna EAL #	Ginna EAL Wording	Difference/Deviation Justification
1	 a. An automatic scram (trip) failed to shutdown the reactor. AND b. All manual actions do not shutdown the reactor as indicated by (site specific indications of reactor not shutdown). AND c. EITHER of the following exist or have occurred due to continued power generation: (Site specific indication that core cooling is extremely challenged.) (Site specific indication that heat removal is extremely challenged.) 	SG3.1	An automatic trip failed to shut down the reactor as indicated by reactor power > 5% AND All manual actions fail to shut down the reactor as indicated by reactor power > 5% AND EITHER of the following exist or have occurred: RED path condition exists F-0.2 Core Cooling OR RED path condition exists F-0.3 Heat Sink	The term "scram" was replaced with "trip" consistent with PWR terminology. The phrase "as indicated by reactor power > 5%" has been added to the Ginna EAL for clarification. This change implements EAL FAQ #31. The power range indication above 5% is greater than the decay heat which the shutdown systems (Auxiliary Feed Water and Atmospheric Dump Valves) were designed to remove and is indicative of a condition requiring immediate response to prevent subsequent core damage. The NEI phrase "do not shutdown" has been changed to "fail to shut down" for consistency with the IC wording. This change implements EAL FAQ #31. The NEI phrase "due to continued power generation" has been deleted because the extreme challenge to heat removal, equivalent to core cooling red, should not be constrained by requiring it to be caused by continued power generation. This change implements EAL FAQ #37. The NEI example EAL specifies site-specific indication that core

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		cooling is extremely challenged and site-specific indication that heat removal is extremely challenged. The Ginna EAL includes the specific combination of conditions (RED path condition exists F-0.2 Core Cooling or RED path condition exists F-0.3 Heat Sink) that indicates the core cooling or ultimate heat sink function is under extreme challenge and therefore a core melt sequence may exist and rapid degradation of the fuel cladding could begin.
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ATTACHMENT (4)

RADIATION MONITOR SUPPORTING CALCULATIONS

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CALCULATION COVER SHEET

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A. INITIATION				1 1 1	Page 1 of 37		
Site			🛛 REG	-	~		
Calculation No.:	CALC-2011-0019		Revision No.:	000			
Vendor Calculation (Che							
Responsible Group:	SHANE R. GA	RDNER			· · ·		
Responsible Engineer:	NUCLEAR ANA	LYSIS UNIT - FLEET	NUCLEAR FUELS				
		<u>.</u>					
B. CALCULATION		x.					
ENGINEERING DISCIPLINE:			Controls	Nuc Eng			
		Mecha		Nuc Fuel N	/lgmt		
	Other:	L Reliab	ility Eng				
Title:	NEI 99-01 TEC ACTION LEVE		OR THE GINNA F	R-9 LETDOWN L	INE MONITOR EME		
Unit:	⊠ 1	2					
Proprietary or Safeguar	ds Calculation:	YES		🛛 NO			
Comments:	SUPPORTS NEL						
Vendor Calc No.:	N/A	1	REVISION NO .:	N/A			
Vendor Name:	N/A	· · · ·					
Safety Class (Check on	e): 🗍 SR		ENTED QUALITY				
There are assumptions	that require Verification	n during walkdow	n: N/A		TRACKING ID:		
This calculation SUPERSEDES: EAL-TECH-BASES-R9-NUE							
C. REVIEW AND APPR	ROVAL:	· · ·			· · · · · · · · · · · · · · · · · · ·		
Responsible Engineer:	S. R. GARDNER	San	e Sun		12/19/2011		
	P	ninted Name and Sig	inature		Date		
Is Design Verification R	equired?	Yes 🛛 N	0				
If yes, Design Verification	on Form is	Attached D	led with:				
			11				
Independent Reviewer:		rinter Name and Si	m		12/19/2011		
• . · · · · ·		rinted Name and Sig	nature		12/19/2011		

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REVISION SUMMARY AND LIST OF EFFECTIVE PAGES

Initial Issue – All pages Rev. 0.

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The objective of this calculation is to evaluate the letdown line radiation monitor, R-9 (Reference 6.1), response during Emergency Action Level (EAL) conditions specified in NEI 99-01 Revision 5 (Reference 6.2). The calculation will provide the radiation levels at the monitor due to various degrees of fuel failure.

2 SCOPE OF CALCULATION

The R-9 monitor results correspond specifically to the technical basis guidance specified in the NEI 99-01 Rev. 5. Future changes in the EAL technical bases will require review of this calculation for continued applicability or revision.

3 CONCLUSIONS

The R-9 monitor EAL values based on NEI 99-01 Rev. 5 are shown in Table 3-1. These values correspond to a notification of Unusual Event (UE) on fuel cladding degradation (SU4, action level 1) and an Alert on exceeding the threshold for loss of the fuel cladding fission product barrier (2.A., Table 5-F-3). Note these results are only valid when letdown is in operation and the Alert value may be offscale for the R-9 monitor.

	DE			R-9 EAL
Fuel	I-131	Frac		Value
Failure	(uCi/gm)	100/EBAR	EAL	(mrad/hr)
1%	60	1	UE	4,800
5%	300	5	Alert	24,000

TABLE 3-1 R-9 EAL VALUES BASED ON NEI 99-01 REV. 5

4 DESIGN INPUTS

Design input data are specified below. Key inputs are provided as indicated. Other data used may not be replicated specifically below, but are traceable to the source provided.

- 4.1. The design basis Reactor Coolant System (RCS) activity concentrations for 1% failed fuel are shown in Table 4-1 based on Westinghouse calculation CN-REA-04-34 (Reference 6.3).
- 4.2. Letdown line data is taken from Gilbert drawing C-381-357 (Reference 6.4). The geometry of the piping based on this drawing is shown in Figure 4-1 along with the approximate position of R-9. The pipe data from the drawing also used is as follows:
 - a) Outside diameter 2.375"
 - b) Wall thickness 0.145" (601R line spec)

4.3. Reactor coolant mass is 1.123E+08 grams (Reference 6.3).

- 4.4. Iodine gas gap fractions for 35,000 MWd/MTU fuel are taken from DA-NS-08-49 (Reference 6.5, Table 6.2) as: I-131, 0.0039; I-132, 0.0004; I-133, 0.0013; I-134, 0.0003; I-135, 0.0007.
- 4.5. Iodine dose conversion factors from ICRP 30 (Reference 6.6) are used to calculate the Dose Equivalent (DE) I-131 coolant activity concentration. This is consistent with CHI-PRI-EBAR (Reference 6.7) for TS 3.4.16 surveillance
- 4.6. Average energy per disintegration data from Attachments 1 and 2 from CHI-PRI-EBAR are used for Ebar calculations. For nuclides not specified in CHI-PRI-EBAR, ICRP 38 (Reference 6.8) data are used.
- 4.7. Normal RCS activities used are based on Westinghouse calculation CN-REA-04-57 (Reference 6.9).
- 4.8. Design basis core activities used are based on Westinghouse calculations CN-REA-04-32 (Reference6.10) for EPU operation and CN-REA-02-33 (Reference 6.11) for pre-EPU operation.
- 4.9. Flux-to-dose rate conversion factors from ANSI/ANS-6.1.1-1977 are used to calculate equivalent dose rates. These values are provided in the MCNP manual (Reference 6.12), Appendix H.

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	1	Activity		Activity
• • • • •	Nuclide	(uCi/gm)	Nuclide	(uCi/gm)
,	Kr-83m	4.74E-01	Rb-88	4.40E+00
	Kr-85m	1.93E+00	Rb-89	2.00E-01
	Kr-85	8.21E+00	Sr-89	4.56E-03
	Kr-87	1.24E+00	Sr-90	2.33E-04
	Kr-88	3.60E+00	Sr-91	6.00E-03
	Kr-89	1.00E-01	Sr-92	1.32E-03
	Xe-131m	3.54E+00	Y-90	6.68E-05
	Xe-133m	3.84E+00	Y-91m	3.26E-03
	Xe-133	2.71E+02	Y-91	6.00E-04
	Xe-135m	5.58E-01	Y-92	1.16E-03
	Xe-135	9.49E+00	Y-93	3.96E-04
	Xe-137	1.91E-01	Zr-95	6.99E-04
	Xe-138	6.92E-01	Nb-95	7.03E-04
	Br-83	1.00E-01	Mo-99	8.38E-01
	Br-84	4.90E-02	Tc-99m	7.78E-01
	Br-85	5.70E-03	Ru-103	6.11E-04
			Rh-103m	6.14E-04
1	I-129	6.86E-08	Ru-106	2.12E-04
	I-130	4.41E-02	Rh-106	2.12E-04
	I-131	3.05E+00	Ag-110m	1.99E-03
	I-132	2.97E+00	Te-125m	7.75E-04
	I-133	4.72E+00	Te-127m	3.46E-03
	I-134	6.49E-01	Te-127	1.43E-02
· · ·	· I-135 ·	2.59E+00	Te-129m	1.17E-02
,	Cs-134	3.22E+00	Te-129	1.46E-02
	Cs-136	3.90E+00	Te-131m	2.68E-02
	Cs-137	2.27E+00	Te-131	1.40E-02
	Cs-138	1.06E+00	Te-132	3.15E-01
	Mn-54	1.60E-03	Te-134	3.15E-02
	H-3	3.24E+00	Ba-137m	2.15E+00
	Cr-51	5.40E-03	Ba-140	4.43E-03
	Mn-56	2.20E-02	La-140	1.52E-03
	Fe-55	2.10E-03	Ce-141	6.80E-04
	Fe-59	5.10E-04	Ce-143	5.41E-04
	Co-58	1.40E-02	Pr-143	6.55E-04
	Co-60	1.30E-03	Ce-144	5.14E-04
	Rb-86	3.76E-02	Pr-144	5.14E-04

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FIGURE 4-1 RCS LETDOWN PIPING NEAR R-9

FOR CONT. SEE DAG. C-381-357 SHT.7 (C-3) 1.200 EL. 241.000 490 6 SLH3 QU-315 5 CVU-376 2040 1.500 204C ,115 PC 30 204E 98 Ň *REA (0.6)

(Reference 6.4)

5 ASSUMPTIONS

- 5.1. It is assumed that the R-9 detector is position 6 inches from the RCS letdown line. This assumption is justified by the original design specifications (References 6.14 and 6.15).
- 5.2. It is assumed that the DE I-131 concentration for 0.1% failed fuel is 1.6 uCi/gm. This is based on assuming that 0.1% failed fuel, equivalent to about 22 rods (0.001*121*179), releases its iodine gap activity to the RCS and mixes completely. Depending on the gas gap activity, the dose equivalent iodine will vary. However the value is expected to be greater than 1.0 uCi/gm. The value of 1.6 uCi/gm is supported by using Design Inputs 4.3, 4.4 and 4.8 above and is shown in the attached spreadsheet. It is noted that the assumed value of 1.6 uCi/gm is based on 35,000 MWd/MTU fuel burnup and core inventory pre-EPU. These values were chosen to represent the conditions most likely associated with a 0.1% gap release and to benchmark the UFSAR R-9 setpoint. With the EPU source term the DE I-131 becomes about 2 uCi/gm.
- 5.3. Decay due to transit from the reactor to R-9 is not considered. This is reasonable since most isotopes are long-lived. There are only 5 out of 72 isotopes with a half-life of less than 15 minutes. Also, N-16 (half-life of 7.3 seconds) is not modeled since it is expected to decay many half-lives before reaching R-9.
- 5.4. The density of water is assumed to be 1.0 g/cc. This is done for simplicity and has minimal impact on the results.
- 5.5. It is assumed that 1 rem equals 1 rad, which is a good assumption for gamma radiation.
- 5.6. Shielding model features such as pipe insulation and concrete are neglected. This assumption should have a minimal impact on the results. The concrete behind the detector and pipes would provide backscatter resulting in an increase in lower energy photons in the detector. This would result in a slight under-prediction in the monitor response.
- 5.7. SCALE standard composition library is used for pipe material. The pipes are assumed to be SS304. ANSI/ANS-6.6.1 (Reference 6.16) dry air composition is assumed.

6 **REFERENCES**

6.1 P-9, "Radiation Monitoring System."

- 6.2 NEI 99-01, Rev. 5, "Methodology for Development of Emergency Action Levels."
- 6.3 CN-REA-04-34, Rev. 0, "R. E. Ginna RCS Sources for 1811 MWt Uprate."
- 6.4 C-381-357 (C381-357,2 controlled docno), Rev. 6, "Chemical and Volume Control System from Non-Regenerative HTX to Wall Enclosure (EWR-2512)."

6.5 DA-NS-08-049, Rev. 0, Ginna Gas Gap Isotopic Fraction Calculations."

- 6.6 ICRP-30, "Limits for Intakes of Radionuclides by Workers," 1979.
- 6.7 CHI-PRI-EBAR, Rev. 01602, "EBAR, Total Activity and Maximum Activity in the Primary Coolant."
- 6.8 ICRP-38, "Radionuclide Transformations Energy and Intensity of Emissions," 1983.
- 6.9 CN-REA-04-57, Rev. 1, "R. E. Ginna Normal Operation RCS and Secondary Coolant Sources for 1811 MWt Uprate."
- 6.10 CN-REA-04-32, Rev. 0, "Ginna 1811 MW Uprate Core, Fuel Handling Accident, and POST/FIPCO ORIGEN Sources."
- 6.11 CN-REA-02-33, Rev. 0, "Radiation Source Terms for R. E. Ginna Alternate Source Term Analysis."
- 6.12 "MCNP/MCNPX Monte Carlo N-Particle Transport Code System Including MCNP5 1.40 and MCNPX 2.4.0," Oak Ridge National Laboratory, RSICC Computer Code Collection CCC-730.
- 6.13 "SCALE: A Modular Code System for Performing Standardized Computer Analysis for Licensing Evaluations for Workstations and Personal Computers," Oak Ridge National Laboratory, RSICC Computer Code Collection, NUREG/CR-0200, Revision 6, ORNL/NUREG/CSD-2/V2/R6.
- 6.14 RGE ECN-70070, "Failed Fuel Element Detector." (see Appendix Section 14).
- 6.15 Westinghouse Ltr SA-RA-C-43 (Ginna Docno WPLREC-19990719-04721), "Functional Requirements of a Failed Fuel Detector," dated May 26, 1969.
- 6.16 ANSI/ANS-6.6.1, "Calculation and Measurement of Direct and Scattered Gamma Radiation from LWR Nuclear Power Plants."

7 DOCUMENTATION OF COMPUTER CODES

ORIGEN-S (Reference 6.13) and MCNP5 (Reference 6.12) were used in this calculation. Spreadsheets were used for input preparation and data reduction.

Computer files associated with this calculation are listed in Table 7-1. The files are stored in electronic format in the configuration management system. No CD-ROMs are part of this calculation.

		•	TABLE 7-1 LIS	TING OF COMPUT	ER FILES				• • •
12/19/2011	03:25	AM	593,815	CALC-2011-0019	REV000.xlsx	•			
12/19/2011	02:31	AM	5,562	r9					
12/19/2011	02:52	AM	38,904	r90	•				•
12/19/2011	02:52	AM	2,658,640	r9r					
12/19/2011	02:57	AM	3,630	s0p1failed.inp			• •		
12/19/2011	02:57	AM	61,472	s0p1failed.out					
12/19/2011	02:58	AM	3,630	sALERT.inp	•		•		
12/19/2011	02:58	AM	61,568	sALERT.out					
12/19/2011	02:57	AM	3,630	sUE.inp				•	
12/19/2011	02:57	AM	61,568	sUE.out					
12/19/2011	02:58	AM	3,630	sUE 16DEI.inp					
12/19/2011	02:58	AM	61,472	sUE 16DEI.out					

METHOD OF ANALYSIS 8

There are two steps in the method of analysis for this calculation. In the first step, the gamma source term is calculated from nuclide specific activities. ORIGEN-S (Reference 6.13) is used to convert nuclide inventories to gamma photon sources. The nuclide inventories are input as concentrations in units of Ci/gm to produce gamma source terms in units of photons/sec/gm. This gamma source concentration is converted to volumetric concentration by multiplying by the density of water.

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The second step is the calculation of the dose rates at the R-9 detector. An MCNP (Reference 6.12) model of the letdown piping and the detector arrangement is constructed. A uniform source, by energy group, is applied to calculate the dose rate for each energy group. The ORIGEN-S output, the MCNP output and the source volume are multiplied to obtain the R-9 dose rate.

In order to properly scale the source terms, the methods of calculating the DE I-131 and the 100/EBAR concentrations are required. These methods are disclosed in CHI-PRI-EBAR, but are repeated here. DE I-131 is the equivalent amount of I-131 that corresponds to the activity of a set of iodine isotopes, typically I-131, I-132, I-133, I-134 and I-135, on a dose basis. In other words, it is the dose-weightedaverage I-131 of the activity of a set of iodine isotopes. It is calculated by the general expression below:

$$DE \ I - 131 = \frac{\sum_{i} A_{i} * DCF_{i}}{DCF_{I-131}} = \sum_{i} A_{i} * f_{i}, \text{ where } f_{i} = \frac{DCF_{i}}{DCF_{I-131}}.$$

In the above expression, A_i is the activity concentration and DCF_i is the dose conversion factor.

The 100/EBAR applies to the non-iodine isotopes in the reactor coolant. This is calculated in a similar way, but instead the average energy per disintegration (hence the EBAR) is calculated for the RCS mix. The resultant EBAR is then used to calculate the allowable total of the non-iodine isotopes. Per the TS 3.4.16, the total concentration of the non-iodine isotopes is limited to 100/EBAR in uCi/gm. EBAR is and a first second second *. . . calculated as follows: · •

$$EBAR = \frac{\sum_{i} A_{i} * E_{i}}{A_{total}} = \sum_{i} A_{i} * g_{i}, \text{ where } g_{i} = \frac{A_{i}}{A_{total}}$$

In the above expression, E_i is the total (beta + gamma) energy released per disintegration for the non-. . iodine isotopes. 1. A. J. 1. A. A.

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9 ACCEPTANCE CRITERIA

There are no acceptance criteria for this calculation. The results are used to define the technical bases for EALs in the Emergency Plan. . .

10 CALCULATIONS/COMPUTATIONS

10.1 SOURCE TERM CALCULATIONS

There are three RCS source terms considered in this calculation:

- 0.1% failed fuel .
- 1% failed fuel corresponding to 100/EBAR and DE I-131 of 60 uCi/gm (TS 3.4.16 limiting RCS activity)
- 5% failed fuel corresponding 5x the 100/EBAR concentration and DE I-131 of 300 uCI/gm

The 0.1% failed fuel case is not necessary for EAL calculations; however it was considered for benchmarking purposes. The historical basis for the R-9 high alarm setpoint (Reference 6.1), as indicated in UFSAR 9.3.4.4.9.3, is the dose rate that corresponds to approximately 0.1% fuel rod cladding defects. The high alarm setpoint is 200 mrem/hr. The DE I-131 calculated for the RCS design coolant activity in Table 4-1 is about 4 uCi/gm and therefore one would expect the 0.1% failed fuel DE I-131 to be at least 0.4 uCi/gm. For the 0.1% failed fuel case the DE I-131 modeled is 1.6 uCi/gm and is based on Assumption 5.2.

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The 1% and 5% failed fuel cases correspond to the technical bases behind UE and Alert EALs as defined in NEI 99-03 Rev. 5. More specifically, the technical guidance in the determination of these EALs is provided in Appendix Section 13.

EBAR was calculated in the spreadsheet for the RCS design concentrations. The results indicate that the RCS design activity was within about 95% of the 100/EBAR limit, which is expected since the 100/EBAR limit corresponds to 1% failed fuel. Accordingly, the non-iodine isotopes (including activation/corrosion products) were adjusted up by this small difference.

The 1% failed fuel is the base case because it historically is the basis for the maximum design RCS coolant activity in PWRs. From this case, the others are determined. The 5% failed fuel case is simply the 1% failed fuel case activities scaled up by the factor of 5x, with the exception of activation/corrosion products. Since those isotopes are considered independent of the failed fuel, those are left the same.

For the 0.1% case an analogous calculation is performed, with the exception of the iodines as indicated previously. In other words, the non-iodine and non-corrosion/activation products are scaled by the factor of 1/10x.

One additional case was performed for sensitivity purposes. This case is the same as the 1% failed fuel case, except the DE I-131 is adjusted to 16 uCi/gm. This case was made to test the sensitivity of the iodine source term on the R-9 dose rate. The ORIGEN-S runs made are identified in the Table 11-3. Appendix Sections 12.1 and 12.2 contain the ORIGEN-S inputs and selected outputs, respectively.

10.2 DOSE RATE CALCULATIONS

An MCNP model was used to calculate the dose rates at the R-9 detector location. The geometry of the model is shown in Figure 10-1. This model is based on the geometry of Design Input 4.2and is also based on the positioning established in Assumption 5.1. Note, Figure 10-2 is a photograph of the detector for comparison to the MCNP model.

A total of 4 letdown pipe segments were modeled. These pipes represent the line spec 601R piping and the most dose-significant piping in the area. RCC macrobodies were used to model the piping and the ends are unshielded. The unshielded ends are not important since none of them are facing or are in close proximity to the detector.

A tally cell of air is used to represent the R-9 detector volume. A volume flux tally is used on the volume and an energy dependent dose function is used with the flux-to-dose factors identified in Design Input 4.9. A standard CASK-81 energy group is used to represent the source and is sampled using a probability of 1.0 for each energy group. The dose tally is treated with the special treatments input to bin the response by energy group (SCX n option). To get the absolute value correct, the tally is multiplied by 18 in the tally multiplier card. Additionally, the tally is multiplied by the volume of the source piping so that resulting dose rates are mrem-cc/hr. This allows easy multiplication of the ORIGEN-S output which is photon/sec-cc to obtain fluxes in the correct units.

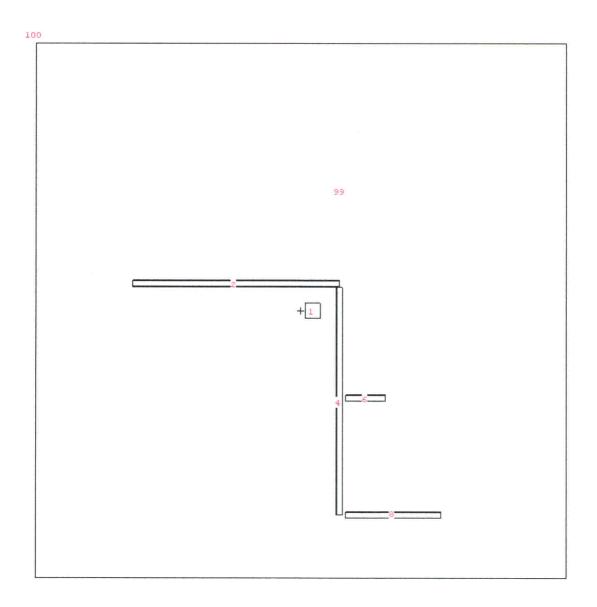


FIGURE 10-1 MCNP GEOMETRY PLOT

The above plot is a representation of the MCNP model in Section 12.3

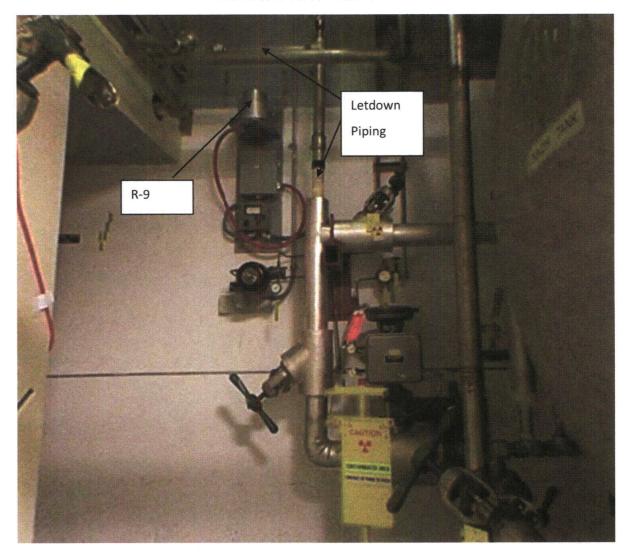


FIGURE 10-2 PHOTOGRAPH OF R-9

11 RESULTS

11.1 RCS SOURCE TERMS

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The RCS source term inventories are shown in Table 11-1. The column headings in Table 11-1 correspond to the ORIGEN-S run IDs.

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NuclideSOp1failedSUESUE_16DEISALERTKr-83m4.99E-024.99E-014.99E-012.49E+00Kr-85m2.03E-012.03E+002.03E+001.02E+01Kr-85m2.03E-013.0E+001.30E+004.32E+01Kr-858.64E-018.64E+008.64E+004.32E+01Kr-871.30E-011.30E+001.30E+006.52E+00Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E+062.78E+075.22E+06I-1301.79E-026.71E+011.79E+013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.05E+003.99E+003.39E+001.69E+01I-1331.92E+007.19E				····			
Kr-83m4.99E-024.99E-014.99E-012.49E+00Kr-85m2.03E-012.03E+002.03E+001.02E+01Kr-858.64E-018.64E+008.64E+004.32E+01Kr-871.30E-011.30E+001.30E+001.30E+00Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-133m4.04E-012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-015.26E-01Br-845.15E-035.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E+06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+00		RCS Activity Concentration (uCi/gm)					
Kr-85m2.03E-012.03E+002.03E+001.02E+01Kr-858.64E-018.64E+008.64E+004.32E+01Kr-871.30E-011.30E+001.30E+006.52E+00Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+002.39E+001.69E+01Cs-1372.39E-012.39E+002.39E+001.69E+01Cs-138 <td< td=""><td>Nuclide</td><td>s0p1failed</td><td>sUE</td><td>sUE_16DEI</td><td>sALERT</td></td<>	Nuclide	s0p1failed	sUE	sUE_16DEI	sALERT		
Kr-858.64E-018.64E+008.64E+004.32E+01Kr-871.30E-011.30E+001.30E+006.52E+00Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-133m4.04E-012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-135m5.87E-025.87E-012.01E-011.00E+00Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E+062.78E+075.22E+06I-1301.79E+026.71E+011.79E+013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+003.94E+011.05E+011.97E+02Cs-1343.39E+013.39E+003.39E+001.69E+01Cs-1343.39E+013.39E+003.39E+001.69E+01Cs-1343.39E+011.18E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-56 <td< td=""><td>Kr-83m</td><td>4.99E-02</td><td>4.99E-01</td><td>4.99E-01</td><td>2.49E+00</td></td<>	Kr-83m	4.99E-02	4.99E-01	4.99E-01	2.49E+00		
Kr-871.30E-011.30E+001.30E+006.52E+00Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-133m4.04E-012.85E+022.85E+021.43E+03Xe-133m5.87E-025.87E-015.87E-012.93E+00Xe-135m5.87E-025.87E-012.93E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+003.94E+011.92E+013.59E+02I-1331.92E+007.19E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1343.39E-012.39E+002.39E+001.19E+01Cs-1341.11E+011.11E+003.41E+003.41E+00Cs-1331.11E-011.11E+003.41E+003.41E+00Cr-51 <t< td=""><td>Kr-85m</td><td>2.03E-01</td><td>2.03E+00</td><td>2.03E+00</td><td>1.02E+01</td></t<>	Kr-85m	2.03E-01	2.03E+00	2.03E+00	1.02E+01		
Kr-883.79E-013.79E+003.79E+001.89E+01Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.26E+02I-1321.21E+007.19E+011.92E+013.59E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1343.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+003.41E+003.41E+00Cr-515	Kr-85	8.64E-01	8.64E+00	8.64E+00	4.32E+01		
Kr-891.05E-021.05E-011.05E-015.26E-01Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-133m2.85E+012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E+06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1381.11E-011.11E+003.41E+003.41E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.6	Kr-87	1.30E-01	1.30E+00	1.30E+00	6.52E+00		
Xe-131m3.72E-013.72E+003.72E+001.86E+01Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+007.19E+011.92E+013.59E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.	Kr-88	3.79E-01	3.79E+00	3.79E+00	1.89E+01		
Xe-133m4.04E-014.04E+004.04E+002.02E+01Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-012.39E+002.39E+001.69E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+003.41E+003.41E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.21E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-0	Kr-89	1.05E-02	1.05E-01	1.05E-01	5.26E-01		
Xe-1332.85E+012.85E+022.85E+021.43E+03Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+007.19E+011.92E+013.59E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1381.11E-011.11E+001.11E+001.19E+01Cs-1381.11E-013.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E	Xe-131m	3.72E-01	3.72E+00	3.72E+00	1.86E+01		
Xe-135m5.87E-025.87E-015.87E-012.93E+00Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E+02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+007.19E+011.92E+013.59E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+003.41E+00Mn-541.68E-031.68E-031.68E-031.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Xe-133m	4:04E-01	4.04E+00	4.04E+00	2.02E+01		
Xe-1359.98E-019.98E+009.98E+004.99E+01Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1381.11E-011.11E+001.11E+001.19E+01Cs-1381.11E-013.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Xe-133	2.85E+01	2.85E+02	2.85E+02	1.43E+03		
Xe-1372.01E-022.01E-012.01E-011.00E+00Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Xe-135m	5.87E-02	5.87E-01	5.87E-01	2.93E+00		
Xe-1387.28E-027.28E-017.28E-013.64E+00Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+001.19E+011.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Xe-135	9.98E-01	9.98E+00	9.98E+00	4.99E+01		
Br-831.05E-021.05E-011.05E-015.26E-01Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+002.39E+001.19E+01Cs-1372.39E-012.39E+001.19E+011.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	- Xe-137	2.01E-02	2.01E-01	2.01E-01	1.00E+00		
Br-845.15E-035.15E-025.15E-022.58E-01Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Xe-138	7.28E-02	7.28E-01	7.28E-01	3.64E+00		
Br-856.00E-046.00E-036.00E-033.00E-02I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Br-83	1.05E-02	1.05E-01	1.05E-01	5.26E-01		
I-1292.78E-081.04E-062.78E-075.22E-06I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	Br-84	5.15E-03	5.15E-02	5.15E-02	2.58E-01		
I-1301.79E-026.71E-011.79E-013.36E+00I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	Br-85	6.00E-04	6.00E-03	. 6.00E-03	3.00E-02		
I-1311.24E+004.64E+011.24E+012.32E+02I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	I-129	2.78E-08	1.04E-06	2.78E-07	5.22E-06		
I-1321.21E+004.52E+011.21E+012.26E+02I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	-130	1.79E-02	6.71E-01	1.79E-01	3.36E+00		
I-1331.92E+007.19E+011.92E+013.59E+02I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-601.37E-031.37E-031.37E-031.37E-03	-131	1.24E+00	4.64E+01	1.24E+01	2.32E+02		
I-1342.63E-019.88E+002.63E+004.94E+01I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	-132	1.21E+00	4.52E+01	1.21E+01	2.26E+02		
I-1351.05E+003.94E+011.05E+011.97E+02Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	I-133	1.92E+00	7.19E+01	1.92E+01	3.59E+02		
Cs-1343.39E-013.39E+003.39E+001.69E+01Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	l-134	2.63E-01	9.88E+00	2.63E+00	4.94E+01		
Cs-1364.10E-014.10E+004.10E+002.05E+01Cs-1372.39E-012.39E+002.39E+001.19E+01Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	I-135	1.05E+00	3.94E+01	1.05E+01	1.97E+02		
Cs-1372.39E-012.39E+002.39E+001.19E+01.Cs-1381.11E-011.11E+001.11E+005.57E+00Mn-541.68E-031.68E-031.68E-031.68E-03H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	Cs-134	3.39E-01	3.39E+00	3.39E+00	1.69E+01		
Cs-138 1.11E-01 1.11E+00 1.11E+00 5.57E+00 Mn-54 1.68E-03 1.68E-03 1.68E-03 1.68E-03 H-3 3.41E+00 3.41E+00 3.41E+00 3.41E+00 Cr-51 5.68E-03 5.68E-03 5.68E-03 5.68E-03 Mn-56 2.31E-02 2.31E-02 2.31E-02 2.31E-02 Fe-55 2.21E-03 2.21E-03 2.21E-03 2.21E-03 Fe-59 5.36E-04 5.36E-04 5.36E-04 5.36E-04 Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Cs-136	4.10E-01	4.10E+00	4.10E+00	2.05E+01		
Mn-54 1.68E-03 1.68E-03 1.68E-03 1.68E-03 H-3 3.41E+00 3.41E+00 3.41E+00 3.41E+00 Cr-51 5.68E-03 5.68E-03 5.68E-03 5.68E-03 Mn-56 2.31E-02 2.31E-02 2.31E-02 2.31E-02 Fe-55 2.21E-03 2.21E-03 2.21E-03 2.21E-03 Fe-59 5.36E-04 5.36E-04 5.36E-04 5.36E-04 Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Cs-137	2.39E-01	2.39E+00	2.39E+00	1.19E+01		
H-33.41E+003.41E+003.41E+003.41E+00Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	, Cs-138	1.11E-01	1.11E+00	1.11E+00	5.57E+00		
Cr-515.68E-035.68E-035.68E-035.68E-03Mn-562.31E-022.31E-022.31E-022.31E-02Fe-552.21E-032.21E-032.21E-032.21E-03Fe-595.36E-045.36E-045.36E-045.36E-04Co-581.47E-021.47E-021.47E-021.47E-02Co-601.37E-031.37E-031.37E-031.37E-03	Mn-54	1.68E-03	1.68E-03	1.68E-03	1.68E-03		
Mn-56 2.31E-02 2.31E-02 2.31E-02 2.31E-02 2.31E-02 Fe-55 2.21E-03 2.21E-03 2.21E-03 2.21E-03 2.21E-03 Fe-59 5.36E-04 5.36E-04 5.36E-04 5.36E-04 5.36E-04 Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	H-3	3.41E+00	3.41E+00	3.41E+00	3.41E+00		
Fe-55 2.21E-03 2.21E-03 2.21E-03 2.21E-03 Fe-59 5.36E-04 5.36E-04 5.36E-04 5.36E-04 Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Cr-51	5.68E-03	5.68E-03	5.68E-03	5.68E-03		
Fe-59 5.36E-04 5.36E-04 5.36E-04 5.36E-04 Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Mn-56	2.31E-02	2.31E-02、	2.31E-02	2.31E-02		
Co-58 1.47E-02 1.47E-02 1.47E-02 1.47E-02 Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Fe-55	2.21E-03	2.21E-03	2.21E-03	2.21E-03		
Co-60 1.37E-03 1.37E-03 1.37E-03 1.37E-03	Fe-59	5.36E-04	5.36E-04	5.36E-04	5.36E-04		
	Co-58	1.47E-02	1.47E-02	1.47E-02	1.47E-02		
Rb-86 3.96E-03 3.96E-02 3.96E-02 1.98E-01	Co-60	1.37E-03	1.37E-03	1.37E-03	1.37E-03		
	Rb-86	3.96E-03	3.96E-02	3.96E-02	1.98E-01		

TABLE 11-1 RCS SOURCE TERMS FOR VARIOUS FAILED FUEL SCENARIOS

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	RCS Activity Concentration (uCi/gm)						
Nuclide	s0p1failed	sUE	sUE_16DEI	SALERT			
Rb-88	4.63E-01	4.63E+00	4.63E+00	2.31E+01			
Rb-89	2.10E-02	2.10E-01	2.10E-01	1.05E+00			
Sr-89	4.80E-04	4.80E-03	4.80E-03	2.40E-02			
Sr-90	2.45E-05	2.45E-04	2.45E-04	1.23E-03			
Sr-91	6.31E-04	6.31E-03	6.31E-03	3.16E-02			
Sr-92	1.39E-04	1.39E-03	1.39E-03	6.94E-03			
Y-90	7.03E-06	7.03E-05	7.03E-05	3.51E-04			
Y-91m	3.43E-04	3.43E-03	3.43E-03	1.71E-02			
Y-91	6.31E-05	6.31E-04	6.31E-04	3.16E-03			
Y-92	1.22E-04	1.22E-03	1.22E-03	6.10E-03			
Y-93	4.17E-05	4.17E-04	4.17E-04	2.08E-03			
Zr-95	7.35E-05	7.35E-04	7.35E-04	3.68E-03			
Nb-95	7.40E-05	7.40E-04	7.40E-04	3.70E-03			
Mo-99	8.82E-02	8.82E-01	8.82E-01	4.41E+00			
Tc-99m	8.18E-02	8.18E-01	8.18E-01	4.09E+00			
Ru-103	6.43E-05	6.43E-04	6.43E-04	, 3.21E-03			
Rh-103m	6.46E-05	6.46E-04	6.46E-04	3.23E-03			
Ru-106	2.23E-05	2.23E-04	2.23E-04	1.12E-03			
Rh-106	2.23E-05	2.23E-04	2.23E-04	1.12E-03			
Ag-110m	2.09E-04	2.09E-03	2.09E-03	1.05E-02			
Te-125m	8.15E-05	8.15E-04	8.15E-04	4.08E-03			
Te-127m	3.64E-04	3.64E-03	3.64E-03	1.82E-02			
Te-127	1.50E-03	1.50E-02	1.50E-02	7.52E-02			
Te-129m	1.23E-03	1.23E-02	1.23E-02	6.15E-02			
Te-129	1.54E-03	1.54E-02	1.54E-02	7.68E-02			
Te-131m	2.82E-03	2.82E-02	2.82E-02	1.41E-01			
Te-131	1.47E-03	1.47E-02	1.47E-02	7.36E-02			
Te-132	3.31E-02	3.31E-01	3.31E-01	1.66E+00			
Te-134	3.31E-03	3.31E-02	3.31E-02	1.66E-01			
Ba-137m	2.26E-01	2.26E+00	2.26E+00	1.13E+01			
Ba-140	4.66E-04	4.66E-03	4.66E-03	2.33E-02			
La-140	1.60E-04	1.60E-03	1.60E-03	7.99E-03			
Ce-141	7.15E-05	7.15E-04	7.15E-04	3.58E-03			
Ce-143	5.69E-05	5.69E-04	5.69E-04	2.85E-03			
Pr-143	6.89E-05	6.89E-04	6.89E-04	3.45E-03			
Ce-144	5.41E-05	5.41E-04	5.41E-04	2.70E-03			
Pr-144	5.41E-05	5.41E-04	5.41E-04	2.70E-03			

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11.2 R-9 RELATIVE DOSE RATES

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The relative dose rates for the R-9 detector are summarized in Table 11-2. To utilize these results convert an activity concentration to photon/sec per cc according to the energy group structure specified and multiply the values in Table 11-2 to get the dose rate in mrem/hr.

	ENERGY (MEV)		Dose Rate	Relative		
FROM	то	AVE	(mrem- ·· cc/hr)	Error	. <u>-</u>	
1.00E-02	5.00E-02	3.00E-02	1.39E-11	0.2357		
5.00E-02	1.00E-01	7.50E-02	7.30E-09	0.0494	· ·	
1.00E-01	2.00E-01	1.50E-01	5.32E-08	0.0216	•	• • • •
2.00E-01	3.00E-0 <u>1</u>	2.50E-01	1.17E-07	0.018		
3.00E-01	4.00E-01	3.50E-01	1.76E-07	0.0171		
4.00E-01	6.00E-01	5.00E-01	2.47E-07	0.0168		
6.00E-01	8.00E-01	7.00E-01	3.20E-07	0.0167		•
8.00E-01	1.00E+00	9.00E-01	4.04E-07	0.0165	. •	•
1.00E+00	1.33E+00	1.17E+00	4.99E-07	0.0163		•
1.33E+00	1.66E+00	1.50E+00	5.79E-07	0.0165		
1.66E+00	2.00E+00	1.83E+00	7.12E-07	0.0161		
2.00E+00	2.50E+00	2.25E+00	8.17E-07	0.0162		•
2.50E+00	3.00E+00	2.75E+00	9.46E-07	0.016	•	
3.00E+00	4.00E+00	3.50E+00	1.08E-06	0.0163	,	<i>.</i> .
4.00E+00	5.00E+00	4.50E+00	1.29E-06	0.0161		
5.00E+00	6.50E+00	5.75E+00	1.58E-06	0.0158		1.11 T
6.50E+00	8.00E+00	7.25E+00	1.85E-06	0.0158		÷
8.00E+00	1.00E+01	9.00E+00	2.21E-06	0.0157		23

TABLE 11-2 R-9 RELATIVE DOSE RATES

 $(1,1,2,\dots,n_{n-1}) = (1,1,2,\dots,n_{n-1}) + (1,1$



11.3 R-9 DOSE RATES DUE TO FUEL FAILURE

The calculated R-9 radiation monitor dose rates for the scenarios analyzed are summarized in Table 11-3.

The 0.1% result shows reasonable agreement to the historical alarm setpoint basis of 200 mrem/hr. This result is predicated on the assumption that the iodine activity is 1.6 uCi/gm DE I-131. Although Assumption 5.2 establishes a basis for this, a change in the DE I-131 will change the results considerably. For example, with the EPU core source term the 1.6 uCi/gm increases to approximately 2 uCi/gm, which would most likely lead to an R-9 response greater than 200 mrem/hr.

The 1% and 60 uCi/gm DE I-131 case establishes the basis for the UE EAL. This case shows the significance of the iodine to the R-9 response as the dose rate increases almost by 30x even though the non-iodine fission products only increases 10x. A tenfold (9.8) increase of the 0.1% case is shown at the bottom of Table 11-3 when the iodine activity concentration increases by the same amount. The DE I-131 of 60 uCi/gm is used because the NEI 99-01 Rev. 5 guidance specifies the UE occurs when the coolant activity exceeds "technical specifications for transient iodine spiking limits".

The last case shows the results when the DE I-131 is 300 uCi/gm. According to NEI 99-01 Rev. 5, "this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage." The NEI 99-01 Rev. 5 goes on to say that this RCS activity level indicates "significant clad damage and thus the Fuel Clad Barrier is considered lost."

The results for the 300 uCl/gm DE I-131 case are rather high and exceed the upper range identified in the UFSAR 9.3.4.4.9.3. Nevertheless, they are still included in case the use of R-9 or other detector is desired for the Alert EAL.

Note the RCS source terms are included in Appendix Section 12.2.

	DE		R-9 Dose	
Fuel	I-131	Frac	Rate	ORIGEN-S
Failure	(uCi/gm)	100/EBAR	(mrem/hr)	Case
0.10%	1.6	0.1	177.26	s0p1failed
1%	60	1	4855.15	sUE
5%	300	5	24253.97	sALERT
1%	16	1	1739.46	sUE_16DEI

TABLE 11-3 R-9 DOSE RATES DUE TO FUEL FAILURE

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12 APPENDIX: COMPUTER FILES

12.1 ORIGEN-S INPUT FILES

s0p1failed

#ORIGENS 0\$\$ E T DECAY CASE 3\$\$ 21 1 1 0 A16 4 A33 18 E T 35\$\$ 0 T 54\$\$ A8 1 E 56\$\$ A2 1 A6 1 A10 0 A13 74 A14 3 A15 3 E 57** O E T CONVERSION OF ACTIVITIES TO ENERGY GROUPS BASTS 60** 0.0000E+00 E 61** F1e-20 65\$\$ 'GRAM-ATOMS GRAMS CURIES WATTS-ALL WATTS-GAMMA 1 0 0 1 0 0 1 0 0 1 0 0 3Z 6Z · 1 0 0 1 0 0 1 0 0 1 0 0 3z 67 1 0 0 1 0 0 1 0 0 1 0 0 3z 6Z 81\$\$ 2 0 26 1 E 82\$\$ F2 83** 1.0000E+07 8.0000E+06 6.5000E+06 5.0000E+06 4.0000E+06 3.0000E+06 2.5000E+06 2.0000E+06 1.6600E+06 1.3300E+06 1.0000E+06 8.0000E+05 6.0000E+05 4.0000E+05 3.0000E+05 2.0000E+05 1.0000E+05 5.0000E+04 1.0000E+04 73\$\$ 110240 360831 360851 360850 360870 360880 360890 541311 541331 541330 541351 541350 541370 541380 350830 350840 350850 531290 531300 531310 . 531320 531330 531340 531350 551340 551360 551370 551380 250540 010030 240510 250560 260550 260590 270580 270600 370860 370880 370890 380890 380900 380910 380920 390900 390911 390910 390920 390930 400950 410950 420990 430991 441030 451031 441060 451060 471101 521251 521271 521270 521291 521290 521311 521310 521320 521340 561371 561400 571400 581410 581430 591430 581440 591440 74** 5.0000E-08 4.9900E-08 2.0300E-07 8.6400E-07 1.3000E-07 3.7900E-07 1.0500E-08 3.7200E-07 4.0400E-07 2.8500E-05 5.8700E-08 9.9800E-07 2.0100E-08 7.2800E-08 1.0500E-08 5.1500E-09 6.0000E-10 2.7800E-14 1.7900E-08 1.2400E-06 1.2100E-06 1.9200E-06 2.6300E-07 1.0500E-06 3.3900E-07 4.1000E-07 2.3900E-07 1.1100E-07 1.6800E-09 3.4100E-06 5.6800E-09 2.3100E-08 2.2100E-09 5.3600E-10 1.4700E-08 1.3700E-09 3.9600E-09 4.6300E-07 2.1000E-08 4.8000E-10 2.4500E-11 6.3100E-10 1.3900E-10 7.0300E-12 3.4300E-10 6.3100E-11 1.2200E-10 4.1700E-11 7.3500E-11 7.4000E-11

 8.8200E-08
 8.1800E-08
 6.4300E-11
 6.4600E-11
 2.2300E-11

 2.2300E-11
 2.0900E-10
 8.1500E-11
 3.6400E-10
 1.5000E-09

 1.2300E-09
 1.5400E-09
 2.8200E-09
 1.4700E-09
 3.3100E-08

 3.3100E-09
 2.2600E-07
 4.6600E-10
 1.6000E-10
 7.1500E-11

 · · . 5.6900E-11 6.8900E-11 5.4100E-11 5.4100E-11

CALC-2011-0019 Rev. 000

<u>sUE</u>

#ORIGENS 0\$\$ E T DECAY CASE 3\$\$ 21 1 1 0 A16 4 A33 18 E T 35\$\$ 0 T 54\$\$ A8 1 E 56\$\$ A2 1 A6 1 A10 0 A13 74 A14 3 A15 3 E 57** 0 E T CONVERSION OF ACTIVITIES TO ENERGY GROUPS BASIS 60** 0.0000E+00 E 61** F1e-20 65\$\$ 'GRAM-ATOMS GRAMS CURIES WATTS-ALL WATTS-GAMMA 3z 1 0 0 1 0 0 1 0 0 1 0 0 67. $1 0 0 \\
 1 0 0$ 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 3Z 6Z 1 0 0 3Z 6Z 81\$\$ 2 0 26 1 E 82\$\$ F2 83** 1.0000E+07 8.0000E+06 6.5000E+06 5.0000E+06 4.0000E+06 3.0000E+06 2.5000E+06 2.0000E+06 1.6600E+06 1.3300E+06 1.0000E+06 8.0000E+05 6.0000E+05 4.0000E+05 3.0000E+05 2.0000E+05 1.0000E+05 5.0000E+04 1.0000E+04 73\$\$ 110240 360831 360851 360850 360870 360880 360890 541311 541331 541330 541351 541350 541370 541380 350830 350840 350850 531290 531300 531310 531320 531330 531340 531350 551340 551360 551370 551380 250540 010030 240510 250560 260550 260590 270580 270600 370860 370880 370890 380890 380900 380910 380920 390900 390911 390910 390920 390930 400950 410950 420990 430991 441030 451031 441060 451060 471101 521251 521271 521270 521291 521290 521311 521310 521320 521340 561371 561400 571400 581410 581430 591430 581440 591440 74** 5.0000E-08 4.9900E-07 2.0300E-06 8.6400E-06 1.3000E-06 3.7900E-06 1.0500E-07 3.7200E-06 4.0400E-06 2.8500E-04 5.8700E-07 9.9800E-06 2.0100E-07 7.2800E-07 1.0500E-07 5.1500E-08 6.0000E-09 1.0400E-12 6.7100E-07 4.6400E-05 4.5200E-05 7.1900E-05 9.8800E-06 3.9400E-05 3.3900E-06 4.1000E-06 2.3900E-06 1.1100E-06 1.6800E-09 3.4100E-06 5.6800E-09 2.3100E-08 2.2100E-09 5.3600E-10 1.4700E-08 1.3700E-09 3.9600E-08 4.6300E-06 2.1000E-07 4.8000E-09

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2.4500E-10 6.3100E-09 1.3900E-09 7.0300E-11 3.4300E-09
     6.3100E-10 1.2200E-09 4.1700E-10 7.3500E-10 7.4000E-10

      8.8200E-07
      8.1800E-07
      6.4300E-10
      6.4600E-10
      2.2300E-10

      2.2300E-10
      2.0900E-09
      8.1500E-10
      3.6400E-09
      1.5000E-08

      1.2300E-08
      1.5400E-08
      2.8200E-08
      1.4700E-08
      3.3100E-07

      3.3100E-08
      2.2600E-06
      4.6600E-09
      1.6000E-09
      7.1500E-10

     5.6900E-10 6.8900E-10 5.4100E-10 5.4100E-10
75$$ 1 3 3 3 3 3 3 3 3 3 3
   3 3 3 3 3 3 3 3 3 3 3
   3 3 3 3 3 3 3 3 1 3
   1 1 1 1 1 1 3 3 3 3
   3 3 3 3 3 3 3 3 3 3 3
   3 3 3 3 3 3 3 3 3 3 3
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74** 5.0000E-08 2.4900E-	06 1.0200E	-05 4.3200E	-05 6.5200E-06
1.8900E-05 5.2600E-07	1.8600E-05	2.0200E-05	1.4300E-03
2.9300E-06 4.9900E-05	1.0000E-06	3.6400E-06	5.2600E-07
2.5800E-07 3.0000E-08	5.2200E-12	3.3600E-06	2.3200E-04
2.2600E-04 3.5900E-04	4.9400E-05	1.9700E-04	1.6900E-05
2.0500E-05 1.1900E-05	5.5700E-06	1.6800E-09	3.4100E-06
5.6800E-09 2.3100E-08	2.2100E-09	5.3600E-10	1.4700E-08
1.3700E-09 1.9800E-07	2.3100E-05	1.0500E-06	2.4000E-08
1.2300E-09 3.1600E-08	6.9400E-09	3.5100E-10	1.7100E-08
3.1600E-09 6.1000E-09	2.0800E-09	3.6800E-09	3.7000E-09
4.4100E-06 4.0900E-06	3.2100E-09	3.2300E-09	1.1200E-09
1.1200E-09 1.0500E-08	4.0800E-09	1.8200E-08	7.5200E-08
6.1500E-08 7.6800E-08	1.4100E-07	7.3600E-08	1.6600E-06
1.6600E-07 1.1300E-05	2.3300E-08	7.9900E-09	3.5800E-09
2.8500E-09 3.4500E-09	2.7000E-09	2.7000E-09	
75\$\$ 1 3 3 3 3 3 3 3 3 3			
3 3 3 3 3 3 3 3 3 3 3			
3 3 3 3 3 3 3 3 1 3			
1 1 1 1 1 1 3 3 3 3			
3 3 3 3 3 3 3 3 3 3			
3 3 3 3 3 3 3 3 3 3 3			
3 3 3 3 3 3 3 3 3 3 3			
3 3 3			
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@DECAY STEP 1 : 0.0000E+	00		
56\$\$ FO T			
END			

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. #ORIGENS 0\$\$ E T DECAY CASE 3\$\$ 21 1 1 0 A16 4 A33 18 E T 35\$\$ О Т 54\$\$ A8 1 E 56\$\$ A2 1 A6 1 A10 0 A13 74 A14 3 A15 3 E 57** 0 E T CONVERSION OF ACTIVITIES TO ENERGY GROUPS BASIS 60** 0.0000E+00 E 61** F1e-20 65\$\$ GRAM-ATOMS GRAMS CURIES WATTS-ALL WATTS-GAMMA 1 0 0 1 0 0 1 0 0 1 0 0 32 6Z 1 0 0 1 0 0 1 0 0 3z 6Z 1 0 0 1 0 0 3z 6Z· 81\$\$ 2 0 26 1 E 82\$\$ F2 83** 1.0000E+07 8.0000E+06 6.5000E+06 5.0000E+06 4.0000E+06 3.0000E+06 2.5000E+06 2.0000E+06 1.6600E+06 1.3300E+06 1.0000E+06 8.0000E+05 6.0000E+05 4.0000E+05 3.0000E+05 2.0000E+05 1.0000E+05 5.0000E+04 1.0000E+04 73\$\$ 110240 360831 360851 360850 360870 360880 360890 541311 541331 541330 541351 541350 541370 541380 350830 350840 350850 531290 531300 531310 531320 531330 531340 531350 551340 551360 551370 551380 250540 010030 240510 250560 260550 260590 270580

270600 370860 370880 370890 380890 380900 380910 380920 390900 390911 390910 390920 390930 400950 410950 420990 430991 441030 451031 441060 451060 471101 521251 521271 521270 521291 521290 521311 521310 521320 521340 561371 561400 571400 581410	
581430 591430 581440 591440	
	-06 8.6400E-06 1.3000E-06
74** 5.0000E-08 4.9900E-07 2.0300E 3.7900E-06 1.0500E-07 3.7200E-06 5.8700E-07 9.9800E-06 2.0100E-07 5.1500E-08 6.0000E-09 2.7800E-13 1.2100E-05 1.9200E-05 2.6300E-06 4.1000E-06 2.3900E-06 1.1100E-06 5.6800E-09 2.3100E-08 2.2100E-09 1.3700E-09 3.9600E-08 4.6300E-06 2.4500E-10 6.3100E-09 1.3900E-09 6.3100E-10 1.2200E-09 4.1700E-10 8.8200E-07 8.1800E-07 6.4300E-10 2.2300E-10 2.0900E-08 2.8200E-08 3.3100E-08 2.2600E-06 4.6600E-09 5.6900E-10 6.8900E-10 5.4100E-10 75\$\$ 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	-06 8.6400E-06 1.3000E-06 4.0400E-06 2.8500E-04 7.2800E-07 1.0500E-07 1.7900E-07 1.2400E-05 1.0500E-05 3.3900E-06 1.6800E-09 3.4100E-06 5.3600E-10 1.4700E-08 2.1000E-07 4.8000E-09 7.0300E-11 3.4300E-09 7.3500E-10 7.4000E-10 6.4600E-10 2.2300E-10 3.6400E-09 1.5000E-08 1.4700E-08 3.3100E-07 1.6000E-09 7.1500E-10 5.4100E-10
3 3 3 3 3 3 3 3 3 3 3	
3 3 3	
3 T @DECAY STEP 1 : 0.0000E+00 56\$\$ F0 T END	. · ·

12.2 ORIGEN-S OUTPUT SUMMARY

s0p1failed

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the sources include photons of nuclides for...

light elements actinides fission products

gamma source spectrum for @DECAY STEP 1 : 0.0000E+00

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0.00 hour time of the requested nuclides

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energ	y interval	l in mev	photons / second	mev / second
1.0000E-02 5.0000E-02		5.0000E-02 1.0000E-01	6.3901E+05 4.5617E+05	1.9170E+04 3.4213E+04
1.0000E-01		2.0000E-01	3.6783E+04	5.5174E+03
2.0000E-01		3.0000E-01	5.0969E+04	1.2742E+04
3.0000E-01 4.0000E-01		4.0000E-01 6.0000E-01	5.4061E+04 1.0663E+05	1.8921E+04 5.3315E+04
6.0000E-01		8.0000E-01	1.2921E+05	9.0447E+04
8.0000E-01	to	1.0000E+00	6.5094E+04	5.8585E+04
1.0000E+00	to	1.3300E+00	5.5107E+04	6.4199E+04

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1.3300E+00	to	1.6600E+00	1.8524E+04	2.7694E+04
1.6600E+00	to	2.0000E+00	1.5295E+04	2.7990E+04
2.0000E+00	to	2.5000E+00	1.1935E+04	2.6853E+04
2.5000E+00	to	3.0000E+00	3.4912E+03	9.6009E+03
3.0000E+00	to	4.0000E+00	2.1907E+02	7.6673E+02
4.0000E+00	to	5.0000E+00	3.6685E+01	1.6508E+02
5.0000E+00	to	6.5000E+00	1.6096E-01	9.2549E-01
6.5000E+00	to	8.0000E+00	0.0000E+00	0.0000E+00
8.0000E+00	to	1.0000E+01	0.0000E+00	0.0000E+00
totals			1.6425E+06	4.5018E+05

·total	energy	from	nuclides	with	spe	ectrum	dat	a	=	4.5018E+05
									•	
total	energy	from	nuclides	with	no	spectr	cum	data	=	1.3626E-01

<u>sUE</u>

the sources include photons of nuclides for...

light elements actinides fission products

gamma source spectrum for @DECAY STEP 1 : 0.0000E+00

0.00 hour time of the requested nuclides

energy inter	val in mev	photons / second	mev / second
1.0000E-02 to	5.0000E-02	7.2521E+06	2.1756E+05
5.0000E-02 to	1.0000E-01	4.8510E+06	3.6382E+05
1.0000E-01 to	2.0000E-01	5.5102E+05	8.2654E+04
2.0000E-01 to	3.0000E-01	7.5417E+05	1.8854E+05
3.0000E-01 to	4.0000E-01	1.6782E+06	5.8736E+05
4.0000E-01 to	6.0000E-01	3.4661E+06	1.7330E+06
6.0000E-01 to	8.0000E-01	4.2192E+06	2.9534E+06
8.0000E-01 to	1.0000E+00	1.6840E+06	1.5156E+06
1.0000E+00 to	1.3300E+00	1.5858E+06	1.8474E+06
1.3300E+00 to	1.6600E+00	4.5838E+05	6.8527E+05
1.6600E+00 to	2.0000E+00	4.3064E+05	7.8808E+05
2.0000E+00 to	2.5000E+00	1.6445E+05	3.7001E+05
2.5000E+00 to	3.0000E+00	1.9089E+04	5.2495E+04
3.0000E+00 to	4.0000E+00	2.1668E+03	7.5838E+03
4.0000E+00 to	5.0000E+00	3.6672E+02	1.6502E+03
5.0000E+00 to	6.5000E+00	1.6096E+00	9.2549E+00
6.5000E+00 to	8.0000E+00	0.0000E+00	0.0000E+00
8.0000E+00 to	1.0000E+01	0.0000E+00	0.0000E+00
totals		2.7117E+07	1.1395E+07

total energy from nuclides with spectrum data = 1.1395E+07
total energy from nuclides with no spectrum data = 1.3626E-01

<u>sALERT</u>					
the sources include	photons of	nuclides	s for	·.	
light elements actinides fission products			•		
Tacoron Provoce	gamma sour	ce spect:	rum for @DECAY	STEP 1 : 0.0000E	+00
			0.00 hour	time of the request	ed nuclides
	energy	interva.	l in mev	photons / second	mev / second
	1.0000E-02	to	5.0000E-02	3.6351E+07	1.0905E+06
	5.0000E-02		1.0000E-01	2.4328E+07	1.8246E+06
	1.0000E-01		2.0000E-01	2.7547E+06	4.1321E+05
	2.0000E-01	to	3.0000E-01	3.7704E+06	9.4261E+05
	3.0000E-01	to	4.0000E-01	8.3908E+06	2.9368E+06
	4.0000E-01	to	6.0000E-01	1.7311E+07	8.6556E+06
	6.0000E-01	to	8.0000E-01	2.1094E+07	, 1.4766E+07
	8.0000E-01	to	1.0000E+00	8.4126E+06	7.5713E+06
	1.0000E+00	to	1.3300E+00	7.9275E+06	9.2356E+06
	1.3300E+00	to	1.6600E+00	2.2852E+06	3.4164E+06
	1.6600E+00	to	2.0000E+00	2.1519E+06	3.9380E+06
	2.0000E+00		2.5000E+00	8.2077E+05	1.8467E+06
	2.5000E+00	to	3.0000E+00	8.8077E+04	2.4221E+05
	3.0000E+00	to	.4.0000E+00	1.0827E+04	3.7894E+04
	4.0000E+00		5.0000E+00	1.8307E+03	8.2383E+03
	5.0000E+00		6.5000E+00	8.0304E+00	4.6175E+01
	6.5000E+00		8.0000E+00	0.0000E+00 .	0.0000E+00
	8.0000E+00	to .	1.0000E+01	0.0000E+00	0.0000E+00
•				1 05305.00	F (005 m) 07

totals .

.

.

total energy from nuclides with spectrum data = 5.6925E+07 total energy from nuclides with no spectrum data = 1.3626E-01

sUE 16DEI

the sources include photons of nuclides for...

light elements actinides fission products

gamma source spectrum for @DECAY STEP. 1 : 0.0000E+00

0.00 hour time of the requested nuclides

1.3570E+08 5.6925E+07

energy interval in mev			photons / second	mev / second	
1.0000E-02	to	5.0000E-02	6.3840E+06	1.9152E+05	
5.0000E-02	to	1.0000E-01	4.5596E+06	3.4197E+05	
1.0000E-01	to	2.0000E-01	3.6638E+05	5.4957E+04	
2.0000E-01	to	3.0000E-01	5.0923E+05	1.2731E+05	
3.0000E-01	to	4.0000E-01	5.4011E+05	1.8904E+05	
4.0000E-01	to	6.0000E-01	1.0646E+06	5.3230E+05	
6.0000E-01	to	8.0000E-01	1.2920E+06	9.0441E+05	

8.0000E-01 t	0 1	.0000E+00	6.3882E+05	5.7494E+05
1.0000E+00 t			5.5032E+05	6.4112E+05
1.3300E+00 t		.6600E+00	1.6980E+05	2.5384E+05
1.6600E+00 t	.0 2	.0000E+00	1.5086E+05	2.7606E+05
2.0000E+00 t	.o 2	.5000E+00	1.1831E+05	2.6620E+05
2.5000E+00 t	:0 3	.0000E+00	1.8120E+04	4.9830E+04
3.0000E+00 t	.0 4	.0000E+00	2.1668E+03	7.5838E+03
4.0000E+00 t	:0 5	.0000E+00	3.6672E+02	1.6502E+03
5.0000E+00 t	.o 6	.5000E+00	1.6096E+00	9.2549E+00
6.5000E+00 t	.0 8	.0000E+00	0.0000E+00	0.0000E+00
8.0000E+00 t	:o 1	.0000E+01	0.0000E+00	0.0000E+00
totals			1.6365E+07	4.4127E+06

total energy from nuclides with spectrum data = 4.4127E+06 total energy from nuclides with no spectrum data = 1.3626E-01

12.3 MCNP MODEL INPUT FILE

```
GINNA FAILED FUEL RAD MONITIOR R-9
С
c This model calculates the gamma response factors for the R\mathchar`-9 radiation
c monitor at Ginna station. The radiation monitor is on the let down
c line in the NOAH tank room in the AUXB basement. The monitor is
c referred to as the "failed fuel" monitor and has a range of 0.1 to 10E7 mR.
c The detector was a G-M tube and is situated about 6" from
c the 2" letdown line. Drawing C-381-357 (C381-357,2 DOCNO) shows the
c piping at B-8. R-9 is just upstream of PCV-135. The piping is line
c spec 601R, has an OD of 2.375" and a wall thickness of .145".
c An approximate size of the detector (outside of cylinder housing) is
c 5.5" diameter and 5.5" high. The PO for the replacement detector
c is NQ-10037-B-TS. The detector is assumed to be 10" from
c vertical letdown pipe.
С
c cell cards
С
     4 -1.225E-3 -1
                                    imp:p=1 $ detector volume
imp:p=1 $ upper pipe
imp:p=1 $ upper pipe wall
imp:p=1 $ right pipe
1
                                        imp:p=1 $ detector volume
                                       imp:p=1 $ upper pipe ;
     1 -1.0 -2
2
    2 -7.94
                     2 -3
3
    1 -1.0
4
                      -4
     2 -7.94
                     4 -5
                                       imp:p=1 $ right pipe wall
5
6
     1 -1.0
                      -6
                                        imp:p=1 $ tee pipe
                      6 -7
7
     2 -7.94
                 6
-8
8 -9
                                        imp:p=1 $ tee pipe wall
                                        imp:p=1 $ tee pipe
     1 -1.0
8
                                      imp:p=1 $ tee pipe wall
    2 -7.94
9
99 3 -1.225E-3 -99 +1 +3 +5 +7 +9 imp:p=1 $ air surround
                     +99
100 0
                                        imp:p=0 $ outside world
С
c surface cards
С
1 rcc 5.08 0 -6.985 0 0 13.97 6.985
                                                                        $ detector
2 rcc -158.93288 0 25.24125 195.25488 0 0 2.64795 $ upper 2" pipe ID

      100
      30.322
      0
      22.224
      0
      0
      -213.36
      2.64795
      $ right 2" pipe ID

      5
      rcc
      36.322
      0
      22.224
      0
      0
      -213.36
      3.01625
      $ right 2" pipe OD

      6
      rcc
      42.3545
      0
      -81.43875
      37.368
      0
      2.64795
      $ tee off upright piece ID

      7
      rcc
      42.3545
      0
      -81.43875
      37.368
      0
      3.01625
      $ tee off upright piece OD

      8
      rcc
      42.3545
      0
      -191.136
      89.52
      0
      2.64795
      $ bottom horizontal TD

3 rcc -158.93288 0 25.24125 195.25488 0 0 3.01625 $ upper 2" pipe OD
```

```
9 rcc 42.3545 0 -191.136 89.52 0 0 3.01625
                                   $ bottom horizontal OD
99 rpp -250 250 -250 250 -250 250
                                   $ outside world
С
c data cards
С
c Water Density = 1.0 g/cm^3
c Composition by atom fraction
С
m1
    1001 2.0000 $ H
    8016 1.0000 $ 0
С
c Stainless Steel 304
c Density = 7.94 g/cm^3 SCALE Standard Comp. Library
С
    26000 -0.68375 $ Fe
m2
    24000 -0.19000 $ Cr
    28000 -0.09500 $ Ni
    25055 -0.02000 $ Mn
    14000 -0.01000 $ Si
    6012 -0.00080 $ C
    15031 -0.00045 $ P
С
c AIR: ANSI/ANS-6.6.1, Dry air; density = 0.001225 g/cm^3
c Composition by weight fraction
С
    7014 -0.75519 $ N
m3
    8016 -0.23179 $ 0
    6012 -0.00014 $ C
    18000 -0.01288 $ Ar
С
c AIR: ANSI/ANS-6.6.1, Dry air; density = 0.001225 g/cm^3
c Composition by weight fraction
c this for detector plotting
    7014 -0.75519 $ N
m4
    8016 -0.23179 $ 0
    6012 -0.00014 $ C
    18000 -0.01288 $ Ar
ċ
С
mode p
С
    cel=d1 rad=d2 ext=fcel=d3 pos=fcel=d4 axs=fcel=d5
sdef
    erg=d6
С
si1 1 2 4 6 8
spl d 4.30102E+03 4.69983E+03 8.23132E+02 1.97192E+03 $ MCNP volumes
    2.6347
si2
ds3 s 31 32 33 34
si31 97.627
si32 106.67
si33 18.684
si34 44.76
ds4 s 41 42 43 44
si41 1 -61.30544 0 25.24125
```

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-

sp41 d 1 si42 1 36.322 0 -84.455 sp42 d 1 si43 1 61.0385 0 -81.43875 sp43 d 1 si44 1 87.1145 0 -191.136 sp44 d 1 ds5 s 51 52 53 54 si51 l l 0 0 sp51 d 1 si52 l 0 0 l sp52 d 1 si53 l 1 0 0 sp53 d 1 si54 l 1 0 0 sp54 d 1 sp6 # si6 sb6 \$ this will create a response function by group 1.0000E-02 0 Ω 5.0000E-02 1 1.0000E-01 1 50 1 2.0000E-01 1 1 3.0000E-01 1 1 4.0000E-01 1 1 6.0000E-01 1 1 8.0000E-01 1 1 1.0000E+00 1 1 1.3300E+00 1 1 1.6600E+00 1 1 2.0000E+00 1 1 2.5000E+00 1 1 3.0000E+00 1 1 4.0000E+00 1 1 5.0000E+00 1 1 6.5000E+00 1 1 8.0000E+00 1 1 1.0000E+01 1 1 С R-9 DOSE RATE TALLY fc4 f4:p 1 fm4 2.12E+05 \$ 1 pho/sec per group; 18 groups; x source volume ft4 scx 6 \$ tally contribution by group c flux-to-dose in rem/hr de0 log 0.01 0.03 0.05 0.07 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.80 1.00 1.40 1.80 2.20 2.60 2.80 3.25 3.75 4.25 4.75 5.00 5.25 5.75 6.25 6.75 7.50 9.00 11.00 13.00 15.00 df0 log 3.96E-06 5.82E-07 2.90E-07 2.58E-07 2.83E-07 3.79E-07 5.01E-07 6.31E-07 7.59E-07 8.78E-07 9.85E-07 1.08E-06 1.17E-06 1.27E-06 1.36E-06 1.44E-06 1.52E-06 1.68E-06 1.98E-06 2.51E-06 2.99E-06 3.42E-06 3.82E-06 4.01E-06 4.41E-06 4.83E-06 5.23E-06 5.60E-06 5.80E-06 6.01E-06 6.37E-06 6.74E-06 7.11E-06 7.66E-06 8.77E-06 1.03E-05 1.18E-05 1.33E-05 С

ctme 20

13 APPENDIX: NEI 99-01 REV 5 EXCERPTS

SYSTEM MALFUNCTIONS

Initiating Condition - NOTIFICATION OF UNUSUAL EVENT

Fuel Clad degradation.

Operating Mode Applicability: Power Operation, Startup, Hot Standby, Hot Shutdown

Example Emergency Action Levels: (1 or 2)

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

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

Basis:

This EAL is included because it is a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant.

Escalation of this EAL to the Alert level is via the Fission Product Barriers.

EAL #1

This threshold addresses site-specific radiation monitor readings that provide indication of a degradation of fuel clad integrity.

[Such as BWR air ejector monitors, PWR failed fuel monitors, etc.]

EAL #2

This threshold addresses coolant samples exceeding coolant technical specifications for transient iodine spiking limits.

SU4

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Basis Information For PWR EAL Fission Product Barrier Table 5-F-3

FUEL CLAD BARRIER THRESHOLDS: (1 or 2 or 3 or 4 or 6 or 7 or 8)

The Fuel Clad barrier consists of the zircalloy or stainless steel fuel bundle tubes that contain the fuel pellets.

1. Critical Safety Function Status

[These thresholds are for PWRs using Critical Safety Function Status Tree (CSFST) monitoring and functional restoration procedures. For more information, please refer to Section 3.9 of this document.]

Loss Threshold A

Core Cooling - RED indicates significant superheating and core uncovery and is considered to indicate loss of the Fuel Clad Barrier.

Potential Loss Threshold A

Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur.

Potential Loss Threshold B

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

2. Primary Coolant Activity Level

The site specific value corresponds to 300 μ Ci/gm I-131 equivalent. Assessment by the EAL Task Force indicates that this amount of coolant activity is well above that expected for iodine spikes and corresponds to less than 5% fuel clad damage. This amount of radioactivity indicates significant clad damage and thus the Fuel Clad Barrier is considered lost.

[The value can be expressed either in mR/hr observed on the sample or as μ Ci/gm results from analysis.]

There is no Potential Loss threshold associated with this item.

3. Core Exit Thermocouple Readings

[Core Exit Thermocouple Readings are included in addition to the Critical Safety Functions to include conditions when the CSFs may not be in use (initiation after SI is blocked) or plants which do not have a CSF scheme.]

Loss Threshold A

The site specific reading should correspond to significant superheating of the coolant.

[This value typically corresponds to the temperature reading that indicates core cooling - RED in Fuel Clad Barrier loss threshold 1.A which is usually about 1200 degrees F.]

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14 REFERENCE 6.14

FERENCE 6.14
ENGINEERING CHANGE NOTICE COPIES TO: 1 D. Beatty
$\begin{array}{c} \hline \text{Correstor} & \text{E-NCS-1007} \\ \hline 1 & \text{H. Patalon } & 1 & \text{E. U. Powell} \\ \hline 1 & \text{S. G. Caslake} & 1 & \text{E. J. Staffel} \\ \hline 1 & \text{A. A. Simmons} & 1 & \text{Efle RGE-310/1-1} \\ \hline \end{array}$
DESCRIPTION OF CHANGE (INCLUDE NATURE, REASON, INSTRUCTIONS TO DRAFTING, TEST DATA, ETC.) SUBJECT: FAILED FUEL ELEMENT DETECTOR REFERENCES: (a) EUP-2150 dated April 23, +960-1969
Ref. (a) stated that a failed fuel detector in the form of a G-M tube on the letdown line is to be added to the RGE Plant at the request of the AEC-DRL. This failed fuel element detector is to be an area monitor channel ($R-9$).
The drawer will be mounted in the Radiation Monitoring Equipment rack by Tracerlab.
The detector is to be mounted by the field. The detector is to be located in line with and approximately six inches away from the letdown line inside the spray addative tank cubicle (i.e., between the non-regenerative heat exchanger and TCV 145). The alarm set point is 1 x 10 ³ mr/Hr.
The required cabling is to be the same type (Tracerlab type A503247) as cables 9 through 16 listed in the cable legend shown on Tracerlab drawing D997498.
Tracerlab is supplying the mounting bracket for the detector.
The equipment is scheduled to be shipped from Tracerlab approximately September 1, 1969.
INADMISSABLE AS EVIDENCE PURSUANT TO THE AGREEMENT OF RGRE AND WESTINGHOUSE THE AGREEMENT OF RGRE AND WESTINGHOUSE
PART EFFECT NONE Estimated Change in Product Cost Capitol Equipment Regulated SALVAGE \$
Initiated By H. B. Kearton III. Leaster Doto August 26, 1969 APPROVED BY: SUNCTIONAL ENG. & DATE OL. (PROJECTION, & DATE / AND INC. ENG. & DATE / COMPLETED BY DANTING
M. Patalon (AF BRE/69) for Wingue for fill formandes

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ATTACHMENT 1, DESIGN VERIFICATION REPORT (FOR INFORMATION ONLY)

Doc Type being verified: Design Change Calculation Specification Other: Other: Other: Other:						
Docu	ment No.:	CALC-2011-0019	Rev.: 000			
Exten	nt of Design Verificatio	n (Briefly describe):	·			
Check	ked inputs, spreadsheet	, ORIGEN and MCNP in	nput and output.			
Moth	od of Design Verificati					
Wieth	Design Vermaan		tion Testing			
	Alternate Calculat		ility of Proven Design			
Resul	ts of Design Verificati			····		
11004	-	vith no issues identified				
			sues identified and resolved:			
No.	Verifier's Comment		Preparer's Response	Verifier		
			(Indicate if not required)	Concurs?		
	T-1-1-0-400	<u>,</u>	O-market	(Yes/No)		
1		should be 1.06 uCi/g /g per Table 2-1 of	Corrected.	Y		
	Reference 6-3.					
2		e a basis for the	The basis was engineering judgment.			
	assumption of 35,000		The use of the gap fractions is			
ł	select gap fractions	. Review of core 36 indicates that BOC	explained in Assumption 5.2. A clarification of this burnup is added to			
		21 GWd/MTU, MOC is	5.2 with respect to recent past cycle	Y I		
	~30 GWd/MTU, ar	nd EOC is ~39.5	operating history.			
		Table 4-1 in CN-REA-				
	08-11, CN-REA-09-53	, and CN-REA-11-7).				

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3	Assumption 5.1 and Section 10.2 – The R-9 detector was modeled as being 6 inches from both the horizontal and vertical runs of letdown piping. Visual inspection of Figure 10-2 suggests that the detector is farther from the vertical run than the horizontal run. The Figure 4-1 distances from the bottom end of the coupling on the vertical line to the center of the horizontal piping at El. 241.5 ft (1.68 ft) was used to scale Figure 10-2 to estimate distances between the detector and the piping. This estimate yielded ~7 inches from the detector to the horizontal piping and ~12 inches to the vertical piping. This would lower estimated dose rates, but may be compensated for by the lack of modeling of the concrete wall (neglects backscatter). The successful benchmark to UFSAR section 9.3.4.4.9.3 suggests these	The visual inspection of Figure 10-2 for dimensions is difficult due to the parallax error present. The apparent 7 inch distance from the top horizontal letdown line to the detector is expected to be close to 6" without parallax. That said, review of the figure again does suggest the detector is farther than 6" from the vertical line. To compensate the detector was moved to 10" from the pipe.	
4	two effects may cancel each other out. Assumption 5.2 – 0.1% failed fuel is equivalent to about 22 rods based on 121 assemblies per core and 179 rods per assembly. Also, the DEQ I-131 value of 1.6 uCi/g appears to be based on pre-EPU core inventories of iodine. Using the EPU core inventories indicated in DA-NS-2002-037 (used in all AST and EQ dose analyses for EPU) a DEQ I-131 of 2.0 uCi/g is calculated for 0.1% failed fuel. This may be appropriate if used only for the UFSAR benchmark case (if so you should indicate this explicitly where 1.6 DEQ I-131 is mentioned).	Agreed. However, the 1.6 uCi/gm case was intended to use pre-EPU sources since the UFSAR 200 mrem/hr is believed to be the setpoint prior to EPU.	Y
5	Assumption 5.3 – "man half-lives" should be "many half-lives"	Corrected.	Y
6	Section 5 – Should probably add an assumption that the insulation shown on the lower half of the vertical section of piping has negligible shielding value was ignored in the MCNP model.	Corrected. Added Assumption 5.6.	Y
7	Section 11.2 and 11.3 - The response function listed in Table 11-2 appears to use the relative dose rate multipliers based on the upper bin energy rather than the average of the upper and lower energies of the bin. This would yield conservative dose rates, but may not be appropriate for a calculation intended to be best estimate. However, this may also be a compensatory measure for some of the approximations noted in comment 3.	As shown in source distribution 6 the gamma energy spectrum was entered in histogram format. And the special treatment ft4 scx 6 bins the f4 tally by the source energy groups. Therefore the response function is group-wise, not by upper bin energy.	Y

CALC-2011-0019 Rev. 000

				1_			
Lead Design Verifier:	J. R. Massari	\langle		fm-	2		9/2011
	Name	/	<u> </u>	Signature		<u>D</u>	ate
Engineering Manag	er (if required): N/A	(
Discipline Design V	erifiers if required: N/A			· · · ·			
· · · · · · · · · · · · · · · · · · ·							•
				۰.	:		
	·			• • •		•	
Discipline	Name			Signature			Date
(USE ADDITIONAL	SHEETS AS REQUIRED)						
Check if Design Rev	view Checklist is attached	\boxtimes					

Check if additional sheets are used

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ATTACHMENT 2, DESIGN VERIFICATION CHECKLIST (FOR INFORMATION ONLY)

The following questions are required to be addressed based on Constellation Nuclear Generation commitment to ANSI/ASME NQA-1-1994 for design verification activities. This checklist is intended to assist when using the Design Review method of design verification to ensure relevant items are addressed in the verification effort. Each "No" answer will require correction or resolution by the originator of the document being verified prior to full acceptance by the design verifier(s).

Doc #:	CALC-2011-0019 Rev 000	Lead Design Verifier's Name:	J. R. MASSARI

			Review Check			
		Yes	S No	N/A		
1.	Were the design inputs correctly selected?	x				
2.	Are assumptions necessary to perform the design activity adequately described and reasonable?	x				
	Where necessary, are the assumptions identified for subsequent re- verifications when the detailed design activities are completed?	x				
3.	Was an appropriate design method used?	x				
4.	Were the design inputs correctly incorporated into the design?	x				
5.	Is the design output reasonable compared to design inputs?	x				
6.	Are the necessary design input and verification requirements for interfacing organizations specified in the design documents or in supporting procedures or instructions?			x		

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CALCULATION COVER SHEET A. INITIATION Page 1 of 52 Site 🖾 REG CALC-2011-0020 Calculation No.: **Revision No.:** 000 🛛 No Vendor Calculation (Check one): ☐ Yes **Responsible Group:** SHANE R. GARDNER Responsible Engineer: NUCLEAR ANALYSIS UNIT - FLEET NUCLEAR FUELS **B. CALCULATION** Civil ENGINEERING DISCIPLINE: Instr & Controls Nuc Eng Electrical Mechanical Nuc Fuel Mgmt Other: Reliability Eng NEI 99-01 TECHNICAL BASIS FOR THE GINNA EFFLUENT MONITOR EMERGENCY ACTION Title: LEVELS (EALS) Unit: 🖾 1 2 Proprietary or Safeguards Calculation: □ YES 🛛 NO Comments: SUPPORTS NEI 99-01 UPGRADE Vendor Calc No.: N/A N/A **REVISION NO.:** N/A Vendor Name: Safety Class (Check one): AUGMENTED QUALITY 🛛 NSR There are assumptions that require Verification during walkdown: N/A TRACKING ID: This calculation SUPERSEDES: N/A C. REVIEW AND APPROVAL: Son R. Du S. R. GARDNER 12/19/2011 **Responsible Engineer:** Printed Name and Signature Date ☐ Yes 🛛 No Is Design Verification Required? If yes, Design Verification Form is Attached ed with: -----Independent Reviewer: J. R. MASSARI 12/19/2011 Printed Name and Signature PHILIP WENGES w 121 Approval: 20/11 Printed Name and Signatu Date

REVISION SUMMARY AND LIST OF EFFECTIVE PAGES

Initial Issue – All pages Rev. 0.

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1 OBJECTIVE AND PURPOSE

The objective of this calculation is to determine the Emergency Action Level (EAL) values for the effluent radiation monitors in P-9 (Reference 6.1) in accordance with the guidance provided in NEI 99-01 Revision 5 (Reference 6.2). The calculation will provide or summarize the EALs for the gaseous and effluent radiation monitors.

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2 SCOPE OF CALCULATION

Future changes in the EAL technical bases will require review of this calculation for continued applicability or revision. This calculation does not establish Offsite Dose Calculation Manual (ODCM) release limits and any modification of ODCM limits may necessitate revision of this calculation.

3 CONCLUSIONS

The gaseous effluent monitor EAL values based on NEI 99-01 Rev. 5 are reported to two significant figures in Table 3-1.

Release	Monitor	GE	SAE	ALERT	UE	Note
	R-12	N/A	N/A	N/A	7.4E+6 (cpm)	1 fan operation
CNMT	R-12 .	N/A	N/A	N/A	5.1E+6 (cpm)	2 fan operation
	R-12A	1.8E+2 (uCi/cc)	1.8E+1 (uCi/cc)	1.8E+0 (uCi/cc)	N/A	
	R-14	N/A	N/A	N/A	6.0E+5 (cpm)	
Plant Vent	R-14A	2.1E+1 (uCi/cc)	2.1E+0 (uCi/cc)	2.1E-1 (uCi/cc)	N/A	· · · · · · · · · · · · · · · · · · ·
• · · · · · · ·	R-15	N/A	N/A	N/A	6.3E+5 (cpm)	· · · · · · · · · · · · · · · · · · ·
Air Ejector	R-48	5.7E+2 (uCi/cc)	5.7E+1 (uCi/cc)	57E+0 (uCi/cc)	N/A	· · · ·
1 ARV	·	5.0E+3 (mR/ḥr)	5.0E+2 (mR/hr)	5.0E+1 (mR/hr)	8.0E+0 (mR/hr)	
1 Safety		2.3E+3 (mR/hr)	2.3E+2 (mR/hr)	2.3E+1 (mR/hr)	3.7E+0 (mR/hr)	
2 Safeties	R-31/R-32	1.1E+3 (mR/hr)	1.1E+2 (mR/hr)	1.1E+1 (mR/hr)	N/A	· · · · · · · · · · · · · · · · · · ·
3 Safeties		7.7E+2 (mR/hr)	7.7E+1 (mR/hr)	7.7E+0 (mR/hr)	· N/A	
4 Safeties		5.7E+2 (mR/hr)	5.7E+1 (mR/hr)	5.7E+0 (mR/hr)	N/A	· · · · · · · · · · · · · · · · · · ·

TABLE 3-1 EFFLUENT RADIATION MONITOR EAL VALUES BASED ON NEI 99-01 REV. 5

Release	Monitor	GE	SAE	ALERT	UE
Liq Radwaste	R-18	N/A	N/A	N/A	3.6E+5 (cpm)
SFP HX A	R-20A	N/A	N/A	N/A	4.0E+4 (cpm)
SFP HX B	R-20B	N/A	N/A	N/A	5.2E+3 (cpm)
TB Floor Drains	R-21	N/A	N/A	N/A	5.0E+4 (cpm)
Hi Cond Waste	R-22 .	N/A	N/A	N/A	9.2E+4 (cpm)

4 DESIGN INPUTS

- 4.1. The key inputs to the determination of the gaseous effluent EAL values are shown in Table 4-1 below. The other key inputs are the air immersion Total Effective Dose Equivalent (TEDE) dose conversion factors (DCFs). Since the TEDE DCF is dependent on the mixture of radionuclides it is developed in Assumption 5.2.
- 4.2. The key inputs to the determination of the liquid EAL values are the ODCM release rate limits. The precaution and limitation Section 5.2 of P-9 (Reference 6.1) states that the release rate limits are determined in accordance with the methods of the ODCM; i.e. the release limits listed in P-9 are the ODCM release limits. Therefore, for the purposes of this calculation the ODCM limits come from P-9, unless specified otherwise.

- 4.3. The NEI 99-01 Rev. 5 sets the initiating conditions for radiological effluent EALs. These are covered in the following EALS: AG1 General Emergency (GE), AS1 Site Area Emergency (SAE), AA1 Alert and AU1 Unusual Event (UE). The fundamental characteristics (see Table 5-A-1 of NEI 99-01) associated with these EALs are as follows:
 - a) GE 1,000 mrem TEDE or 5,000 mrem Thyroid over 1 hour
 - b) SAE 100 mrem TEDE or 500 mrem Thyroid over 1 hour
 - c) Alert 200 x ODCM limits (noble gas)
 - d) UE 2 x ODCM limits (noble gas)
 - e) Meteorology should be consistent with ODCM derived values. Therefore, the ODCM annual average X/Q values for the effluent monitors will be used (see Table 2-2 of ODCM).
 - f) The gaseous dose limit associated with ODCM is 500 mrem/yr whole body per ODCM Section 2.6. Therefore the UE would be 2 x 500 mrem/yr x 1 yr/8760 hrs = 0.1 mrem/hr. The Alert is 100x the UE, or 10 mrem/hr. See Appendix A, page 156, of NEI 99-01 for an explanation. Therefore, the effective transition points for the gaseous EALs are:
 - i) 1,000 mrem/hr General Emergency
 - ii) 100 mrem/hr Site Area Emergency
 - iii) 10 mrem/hr Alert
 - iv) 0.1 mrem/hr Unusual Event
 - g) The dose criteria above apply to a receptor at or beyond the site boundary.

4.4. The ODCM Xe-133 immersion dose conversion factor for release limit setpoint calculations is 294 mrem/yr per uCi/m³ (see Table 2-3 of the ODCM). This value is converted to rem/hr per uCi/cc by multiplying by (1E6 cc/m³)/(8760 hrs/yr) or 1/8.76. The converted value is 33.6 rem/hr per uCi/cc.

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Release	Monitor	Flow Rate (cfm)	Reference	X/Q (sec/m3)	Reference
CNMT	R-12A	15,300	EPIP-2-4	1.60E-06	ODCM Table 2-2
Plant Vent	R-14A	77,000	Assumption	2.70E-06	ODCM Table 2-2
Air Ejector	R-15	600	DA-RP-2001-018	1.30E-05	ODCM Table 2-2
	R-48			6.50E-05	
ARV	R-31/R-32	2,565	EPIP-2-3	2.70E-06	Assumption
Safety	R-31/R-32	5,550	EPIP-2-3	2.70E-06	Assumption

TABLE 4-1 GASEOUS EFFLUENT RADIATION MONITOR EAL INPUTS

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its Reference
DA-RP-98-091
m DA-RP-98-091
m DA-RP-98-091
DA-RP-2001-019
/hr P-9
/hr P-9
m P-9
m P-9
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m P-9
m P-9

1. Note, the MS relief valve pathways are not called out as an effluent pathway. The P-9 states the release limit corresponds to a monitor setpoint just above background. Since this is not set by the ODCM, a new release rate limit will be calculated.

Release	Monitor	Detector Calibration Factor (uCi/cc/cpm)	Reference
CNMT	R-12	5.50E-08	DA-RP-98-091
Plant Vent	R-14	5.60E-08	DA-RP-98-091
Air Ejector	R-15	1.45E-06	DA-RP-2001-019

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5 ASSUMPTIONS

- 5.1. A dose rate conversion factor of 0.1295 uCi/cc per mrem/hr (at t=0) is assumed for converting the calculated main steam safety/relief valve effluent radiation monitor (R-31/R-32) values. This value is justified by the assumption that the source terms are not decayed. This value comes from EPIP-2-3 Attachment 3 (Reference 6.11)
- 5.2. It is assumed that the air immersion TEDE dose conversion factor of 471.74 rem/hr per uCi/cc, with no decay, is applicable to gaseous effluent monitor calculations. This value is chosen to be consistent with the Emergency Planning (EP) dose projection software. It is also based on the EPA Protective Action Guidelines (PAGs) (Reference 6.14), which is consistent with NEI 99-01 Rev. 5. A basis for using this factor for the Alert and above calculations is developed in Appendix Section 12.
- 5.3. It is assumed that the air immersion TEDE dose conversion factor of 42.3 rem/hr per uCi/cc, with no decay, is representative of main steam safety/relief discharges without significant fuel failure or steam generator tube leaks. This value is based on the activity concentrations in the RCS and the basis is developed in Appendix Section 12.
- 5.4. It is assumed that the liquid effluent release pathway is not capable of reaching a dose level of 10 mrem/hr (Alert EAL) at the nearest potable water supply. This is supported by the fact that liquid discharges are greatly reduced by dilution and that liquid releases pathways are isolated upon high radiation signals. Therefore, the GE, SAE and Alert EALs are not applicable to the liquid effluent radiation monitors.
- 5.5. For R-48 calculations the ODCM X/Q for R-15 is used for consistency. This is a good assumption because the R-15 X/Q value is the bounding land sector whereas the R-48 X/Q corresponds to a worst sector over the lake. The R-15 X/Q is more appropriate for EP.
- 5.6. For the main steam safety/relief valve release the X/Q of the plant vent is assumed. This assumption is taken as there is no X/Q listed in the ODCM for this release. This assumption is justified by the similarity in the release characteristics between the plant vent and the main steam releases. Per drawing 33013-1231 (Reference 6.19), the ARV stack diameter is 12" and the safeties stack diameter is 14". The plant vent is 54" diameter. Using the flow rates from Table 4-1 and the stack area the flow velocities were compared. The main steam safeties and the plant vent effluent velocity are on the order of 80 ft/sec. The main steam ARVs are slightly less on the order of 50 ft/sec. The release points are horizontally located in the same roof area (intermediate building) of the plant (Reference 6.20). However, there is an approximate 40 ft difference in elevation (Reference 6.21). Since the ARV/safeties are sheltered by the façade of the containment building

- this elevation difference is minimized. Therefore, it is reasonable to assume the ODCM plant vent X/Q for the main steam releases.
- 5.7. The plant vent flow rate is assumed to be 77,000 cfm for all EAL conditions above UE. This assumption is made to cover the range of values in the reference documentation. DA-RP-2001-017
- (Reference 6.18) considers the design flow rate of the system to be 75,000 cfm, but states that flow surveillances verify the flow is greater than 80,000 cfm (also shown in P-9). The value in EPIP-2-4 (page 4) is 77,844 cfm normal and 71,289 cfm emergency, while the value in EPIP-2-3 (Attachment 1) is 76,000 cfm. Based on the above, 77,000 cfm is a reasonable assumption for EAL calculations.

6 **REFERENCES**

- 6.1 P-9, Rev. 09807, "Radiation Monitoring System."
- 6.2 NEI 99-01, Rev. 5, "Methodology for Development of Emergency Action Levels."
- 6.3 ODCM, Revision 27.
- 6.4 CN-REA-04-34, Rev. 0, "R. E. Ginna RCS Sources for 1811 MWt Uprate."
- 6.5 CN-REA-04-57, Rev. 1, "R. E. Ginna Normal Operation RCS and Secondary Coolant Sources for 1811 MWt Uprate."
- 6.6 CN-REA-04-32, Rev. 0, "Ginna 1811 MW Uprate Core, Fuel Handling Accident, and POST/FIPCO ORIGEN Sources."
- 6.7 CN-REA-02-33, Rev. 0, "Radiation Source Terms for R. E. Ginna Alternate Source Term Analysis."
- 6.8 DA-RP-98-091, Rev. 3, "Radiation Process Monitors Setpoint Calculations."
- 6.9 DA-RP-2001-018, Rev. 2, "Air Ejector Process Radiation Accident Monitor R-47 & R-48 Setpoints."
- 6.10 DA-RP-2001-019, Rev. 2, "Air Ejector Process Radiation Monitor R-15 Setpoints."
- 6.11 EPIP-2-3, Rev. 01800, "Emergency Release Rate Determination."
- 6.12 EPIP-2-4, Rev. 01700, "Emergency Dose Projections Manual Method."
- 6.13 DA-NS-2001-087, Rev. 4, "Large-Break LOCA Offsite and Control Room Doses."
- 6.14 EPA-400, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," May 1992.
- 6.15 USNRC NUREG/CR-6604, "RADTRAD: A Simplified Model for Radionuclide Transport and Removal and Dose Estimation," Dec. 1997.
- 6.16 USNRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977.

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- 6.17 DA-RP-08-064, Rev. 0000, "Technical Basis of the Ginna Nuclear Power Plant Dose Projection Program Calculations."
- 6.18 DA-RP-2001-017, Rev. 2, "Plant Vent Radiation Accident Monitor RM-14A Setpoints."

6.19 33013-1213, Rev. 40, "Main Steam (MS) P & ID."

6.20 33013-2122, Rev. 2, "Plant Arrangement Containment Struct. Tendon Access Platform & Main Steam Access Plat."

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6.21 33013-2131, Rev. 1, "Plant Arrangement Reactor Containment Structure Section 1-1."

7 DOCUMENTATION OF COMPUTER CODES

RADTRAD (Reference 6.15) was used in this calculation. Spreadsheets were used for input preparation and data reduction.

Computer files associated with this calculation are listed in Table 7-1. The files are stored in electronic format in the configuration management system. No CD-ROMs are part of this calculation.

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CALC-2011-0020 Rev. 000

		TABLE 7-1 LIS	TING OF COMPUTER FILES
12/19/2011	11:41 AM		CALC-2011-0020 REV000.xlsx
12/13/2011	12:42 PM	241,904	contleak.o0
12/13/2011	12:42 PM	5,228	contleak.psf
12/13/2011	01:21 PM	79,848	eccs.o0
12/13/2011	01:21 PM	4,219	eccs.psf
09/10/2010	01:55 PM	978	ECCS.RFT
12/02/2009	01:20 PM	9,352	Ginna LOCA63.nif
12/01/2009	01:31 PM	51,396	Ginna.inp
12/03/2009	03:17 PM	983	LOCA.RFT
08/29/2002	08:07 AM	824	PWR_DBA.RFT

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METHOD OF ANALYSIS 8

To determine the gaseous EAL values a dose calculation is performed for an airborne release. The dose rate is calculated using the following equation: .

EQUATION 8-1

D = R * X/Q * DCF,

where D is the dose rate, R is the activity release rate, X/Q is the atmospheric dispersion coefficient and DCF is the nuclide-specific airborne dose conversion factor. . . .

The activity release rate is defined by the product of the activity concentration, A, and the volumetric flow rate, F:

EQUATION 8-2

R = A * F

.

Substituting the above and re-arranging gives:

EQUATION 8-3

· . . A = D / (CF * F * X/Q * DCF),and the second . . where, ·· · , 2. A = the activity concentration in uCi/cc

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F = the flow rate in cfm

X/Q = the atmospheric dispersion factor in sec/m³

DCF = the air immersion TEDE dose conversion factor in rem/hr per uCi/cc

and,

 $CF \approx is a conversion factor = 1 min / 60 sec * (0.3048 m)^3 / 1 ft^3 = (1/2118.88) min-m^3/sec-ft^3$.

Equation 8-3 is used to calculate the activity concentration that corresponds to the specified dose rate, D, which is set by the EAL.

If the radiation monitor system does not output activity concentration then it can be converted by a response factor, RF, to achieve the desired monitor response units. This typically is either a dose rate or count rate factor. The calculation to determine the monitor response from the calculated activity concentration is shown by the equation below:

EQUATION 8-4

EAL = A * RF,

where, RF is the response factor in units of (x) per uCi/cc; (x) is the monitor output units.

The above equations are used to calculate the EAL for each initiating condition. For initiating conditions that are driven by ODCM the methodology prescribed by the NEI 99-01 Rev. 5 is used.

9 ACCEPTANCE CRITERIA

There are no acceptance criteria for this calculation. The results are used to define the technical bases for EALs in the Emergency Plan.

10 CALCULATIONS/COMPUTATIONS

The calculations are performed in the attached spreadsheet CALC-2011-0020 REV000.xlsx. These are hand calculations and can easily be examined by inspecting the formulas. The variables identified in the methodology are identified in the heading columns. The gaseous monitor calculations can be found in the EAL CALC – FINAL worksheet. The liquid monitor calculations can be found in EAL – LIQUID worksheet.

As identified in Table 4-1 the release rate limit for the main steam relief/safety valves pathway in P-9 is not derived from the ODCM. Therefore, it is necessary to calculate a value. For this calculation the ODCM dose limit of 500 mrem/yr is used and the Xe-133 dose conversion factor from Design Input 4.4 is used. The resulting R-31/R-32 monitor response is the value corresponding to the requirements of ODCM. Since the P-9 limit on R-31/R-32 is tied to background the ODCM limit was much higher. This value is then used to calculate the UE EAL value.

Additional calculations were performed to assess the EAL transitions. This was done because of the potential gap that can occur with the transition from the ODCM EAL to the higher level EAL (GE, SAE or Alert). In this calculation, this transition occurs in going from the UE to the SAE. The reason a gap can occur is because of the underlying bases behind the dose calculation. In ODCM the setpoints are determined for Xe-133 using Regulatory Guide 1.109 (Reference 6.16) dose conversion factors. In all gaseous calculations the ODCM X/Q values are used thus eliminating the potential for a gap. To assess the transition, the ALERT value is compared to the ODCM UE EAL. The ODCM UE should be less than the Alert EAL, by the factor of 100. To compare values of the same quantity, detector calibration factors are used to convert UE EALs from cpm to uCi/cc. The results of these calculations are shown in Table 10-1 and confirm that there is no overlap.

The results do show the differences in ODCM and the methodology used for the Alert EAL. The dose conversion factor causes a difference of a factor of 471.73 to 33.5 or about 14. When accounting for this difference the adjusted ALERT/UE ratio gets very close to about 100.

		Calibration Factor	UE EAL Ove with ODC		
Release	Detector	(uCi/cc/cpm)	UE	ALERT	ALERT/UE Ratio
CNMT 1 fan	R-12	5.50E-08	4.08E-01	1.83E+00	4.5
CNMT 2 fan	R-12	5.50E-08	2.82E-01	1.35E+00	4.8
Plant Vent	R-14	5.60E-08	3.36E-02	2.16E-01	6.4
Air Ejector	R-15	1.45E-06	9.25E-01	5.76E+00	6.2
MS - 1 ARV	R-31/R-32	n/a	1.04E+00	6.49E+00	6.2
MS - 1 Safety	R-31/R-32	: n/a	4.81E-01	3.00E+00	6.2
	1			1	

TABLE 10-1 EAL TRANSITION COMPARISON

11 RESULTS

The following tables summarize the results of this calculation. Table 11-1 shows the inputs and calculation for determining the gaseous monitor EALs for the GE. The ODCM based gaseous monitor

.

EAL calculation results are shown in Table 11-2. Finally, the ODCM based liquid monitor EAL calculation results are shown in Table 11-3.

The results shown in the above described tables are combined in Table 11-4. The General Emergency EALs (1 rem/hr) are scaled by the appropriate factor of 10 to obtain the Site Area Emergency and Alert EALs. The Unusual Event EALs are taken from the 2x ODCM results. All results are adjusted to be rounded down to two significant digits.

		D	F	x/q	DCF	<u>A</u>		RF	EA	L
		Dose Rate	Effluent Flow	Atmospheric Dispersion	TEDE Dose Conversion	Concentration	Monitor Calibration Factor			
		Limit	Rate	Factor	Factor	Limit		Units		
Release	Detector	(rem/hr)	(cfm)	(sec/m3)	(rem/hr per uCi/cc)	(uCi/cc)	Value	(x) per uCi/cc	Monitor F Lin	-
CNMT	R-12A	1	15,300	1.60E-06	471.73	183.5	1	N/A	183.49	(uCi/cc)
Plant Vent	R-14A	1	77,000	2.70E-06	471.73	21.61	1	N/A	21.61	(uCi/cc)
Air Ejector	R-48	1	600	1.30E-05	471.73	576	1	N/A	576	(uCi/cc)
MS - 1 ARV	R-31/R-32	1	2,565	2.70E-06	471.73	648.6	7.722	(mR/hr)	5008	(mR/hr)
MS - 1 Safety	R-31/R-32	1	5,550	2.70E-06	471.73	299.7	7.722	(mR/hr)	2315	(mR/hr)
MS - 1 ARV	R-31/R-32	5.7078E-05	2,565	2.70E-06	33.56	5.2E-01	7.722	(mR/hr)	4.02E+00	(mR/hr)
MS - 1 Safety	R-31/R-32	5.7078E-05	5,550	2.70E-06	33.56	2.4E-01	7.722	· (mR/hr)	1.86E+00	(mR/hr)

TABLE 11-1 GASEOUS EAL CALCULATION RESULTS

			-		
Release	Detector	ODCM Limit	Units	x2	x200
CNMT 1 fan	R-12	3.71E+06	(cpm)	7.42E+06	7.42E+08
CNMT 2 fan	R-12	2.56E+06	(cpm)	5.12E+06	5.12E+08
Plant Vent	R-14	3.00E+05	(cpm)	6.00E+05	6.00E+07
Air Ejector	R-15	3.20E+05	(cpm)	6.40E+05	6.40E+07
MS - 1 ARV	R-31/R-32	4.02	(mR/hr)	8.04E+00	8.04E+02
MS - 1 Safety	R-31/R-32	1.86	(mR/hr)	3.71E+00	3.71E+02

TABLE 11-2 ODCM DERIVED GASEOUS EAL RESULTS

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. •	Release	Detector	ODCM Limit	Units	x2	x200	
	Liq Radwaste	R-18	1.80E+05	(cpm)	3.60E+05	3.60E+07	
	SFP HX A	R-20A	2.04E+04	(cpm)	4.08E+04	4.08E+06	
·	SFP HX B	R-20B	2.60E+03	(cpm)	5.20E+03	5.20E+05	
·	TB Floor Drains	. , R-21	2.50E+04	(cpm)	5.00E+04	5.00E+06	1
	Hi Cond Waste	R-22	4.60E+04	(cpm)	9.20E+04	9.20E+06	

TABLE 11-3 ODCM DERIVED LIQUID EAL RESULTS

TABLE 11-4 EAL SUMMARY RESULTS SUMMARY TABLE

Release	Monitor	GE	SAE	ALERT	UE	Note	
	R-12	N/A	N/A	N/A	7.4E+6 (cpm)	1 fan operation	
CNMT	R-12	N/A	N/A	N/A	5.1E+6 (cpm)	2 fan operation	
	R-12A	1.8E+2 (uCi/cc)	1.8E+1 (uCi/cc)	1.8E+0 (uCi/cc)	N/A	· · ·	
Diant Mart	R-14	N/A	N/A	N/A	6.0E+5 (cpm)		
Plant Vent	R-14A	2.1E+1 (uCi/cc)	2.1E+0 (uCi/cc)	2.1E-1 (uCi/cc)	N/A		
Ain Flantan	R-15	N/A	N/A	N/A	6.3E+5 (cpm)		
Air Ejector	R-48	5.7E+2 (uCi/cc)	5.7E+1 (uCi/cc)	5.7E+0 (uCi/cc)	N/A		
1 ARV		5.0E+3`(mR/hr)	5.0E+2 (mR/hr)	5.0E+1 (mR/hr)	8.0E+0 (mR/hr)		
1 Safety		2.3E+3 (mR/hr)	2.3E+2 (mR/hr)	2.3E+1 (mR/hr)	3.7E+0 (mR/hr)	· · · ·	
2 Safeties	R-31/R-32	1.1E+3 (mR/hr)	1.1E+2 (mR/hr)	1.1E+1 (mR/hr)	N/A		
3 Safeties		7.7E+2 (mR/hr)	7.7E+1 (mR/hr)	7.7E+0 (mR/hr)	N/A		
4 Safeties		5.7E+2 (mR/hr)	5.7E+1 (mR/hr)	5.7E+0 (mR/hr)	N/A		

.

Release	Monitor	GE	SAE	ALERT	UE
Liq Radwaste	R-18	N/A	N/A	N/A	3.6E+5 (cpm)
SFP HX A	R-20A	N/A	N/A	N/A	4.0E+4 (cpm)
SFP HX B	R-20B	N/A	N/A	N/A	5.2E+3 (cpm)
TB Floor Drains	R-21	N/A	N/A	N/A	5.0E+4 (cpm)
Hi Cond Waste,	R-22	N/A	N/A	N/A	9.2E+4 (cpm)

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12 APPENDIX: AIR IMMERSION TEDE DOSE CONVERSION FACTOR BASIS

This appendix describes the basis for the TEDE dose factors assumed in the calculation of gaseous effluent monitor responses. Calculation DA-RP-08-064 (Reference 6.17) documents the basis for dose conversion factors (DCFs) for use in the emergency plan. They are derived from the EPA Protective Action Guidelines (PAGs) from EPA-400 (Reference 6.14). This is consistent with the approach in NEI 99-03 Rev. 5 (Reference 6.2).

In order to determine a single DCF the isotopic composition of the effluent during an accident must be utilized. In order to do this, DA-RP-08-064 assumes a generic LWR source term and common core release fractions from the basis of the Alternative Source Term (AST). These assumptions are valid for accidental source terms, however this appendix seeks to benchmark those assumptions for the use in EALs. Also, this appendix investigates the nobel gas DCF for RCS source terms in the primary and secondary side.

In order to benchmark the noble gas Effective Dose Equivalent (EDE) DCF after an accident a RADTRAD (Reference 6.15) model of CNMT leakage during a LOCA is used. The RADTRAD model is based on the LOCA calculations in DA-NS-2001-087 (Reference 6.13). The nuclide inventory released to the environment is extracted over time and is converted to a release rate. The isotopic mix is used to calculate the noble gas EDE and compare to DA-RP-080-064. The method of calculating the EDE is shown on page 9 of DA-RP-08-064 and is simply the source-weighted average EDE of the noble gas isotopes.

The RADTRAD model is shown in Section 12.1 below. The EDE dose conversion factors used are shown in Table 12-2 and are the same as those used in Attachment 4 of DA-RP-08-064. The relative composition of the noble gases derived from the RADTRAD results are shown in Table 12-1. Table 12-1 also shows the total EDE DCF. These results are plotted in Figure 12-1 and confirm the reasonableness of the DA-RP-08-064 noble gas EDE DCFs. These calculations are in the LOCA DCF Study worksheet of the CALC-2011-0020 REV000.xlsx spreadsheet.

The DCF used in the EAL calculations is based on the t=0 value from DA-RP-08-064. This is deemed appropriate as it conservatively represents the noble gas mix at the start of the accident. However for other events that don't involve large core damage the noble gas EDE DCF may be different. The RCS noble gases are evaluated to determine the impact on the DCF.

The design basis EPU RCS primary activities are based on CN-REA-04-34 (Reference 6.4) and the secondary steam activities are based on CN-REA-04-57 (Reference 6.5). The results of the calculation are shown in Table 12-3. As can be seen the noble gas EDE DCF is much lower than the t=0 post-LOCA value.

The t=0 noble gas EDE DCF in EPIP-2-4 (Reference 6.12) Attachment 3 is 470 rem/hr per uCi/cc. This is combined with the Committed Effective Dose Equivalent (CEDE) to obtain the TEDE. A noble gas to iodine ratio of 10,000:1 is assumed for this purpose. This is the default value in the Ginna EP dose projection methods and was challenged in NRC inspection report 50-244/89-19 dated 8/4/89. In the report, unresolved issue 50-244/88-14-08 was resolved and it was agreed that the 10,000:1 ratio was appropriate until the actual ratio could be determined from sample analysis. Therefore, the TEDE is calculated as follows:

TEDE = EDE + 1E-4*CEDE = 470 rem/hr per uCi/cc + 1E-4*(1.73E4 rem/hr per uCi/cc)

= 471.73 rem/hr per uCi/cc

where, the CEDE value is taken from DA-RP-08-064.

Based on the above assessment the TEDE DCF of 471.73 rem/hr per uCi/cc is a good assumption for EAL assessments. For assessment of events of lower consequence involving a release of noble gases a TEDE DCF of 42.3 rem/hr per uCi/cc is a good assumption based on RCS activity.

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<u> </u>	Relative Distribution of Noble Gas in CNMT Effluent Post-LOCA											
Nuclide	0.0139	0.0167	0.0194	0.022	0.5083	0.87	1.8083	2	8	24	96	720
Kr-85m	4.42E-02	4.44E-02	4.45E-02	4.47E-02	5.64E-02	6.11E-02	5.80E-02	5.50E-02	4.07E-02	1.16E-02	3.29E-04	0.00E+00
Kr-85	1.91E-03	1.92E-03	1.92E-03	1.93E-03	2.63E-03	3.19E-03	3.57E-03	3.76E-03	4.37E-03	5.56E-03	7.71E-03	3.30E-02
Kr-87	8.44E-02	8.46E-02	8.48E-02	8.49E-02	8.93E-02	7.27E-02	4.65E-02	3.34E-02	1.06E-02	1.99E-04	0.00E+00	0.00E+00
Kr-88	1.19E-01	1.20E-01	1.20E-01	1.20E-01	1.46E-01	1.48E-01	1.28E-01	1.14E-01	6.72E-02	9.44E-03	6.00E-05	0.00E+00
Xe-131m	1.82E-03	1.83E-03	1.84E-03	1.85E-03	2.51E-03	3.04E-03	3.39E-03	3.57E-03	4.12E-03	5.10E-03	6.36E-03	1.29E-02
Xe-133m	1.03E-02	1.04E-02	1.04E-02	1.05E-02	1.41E-02	1.70E-02	1.88E-02	1.96E-02	2.19E-02	2.41E-02	1.93E-02	6.09E-03
Xe-133	3.29E-01	3.31E-01	3.32E-01	3.33E-01	4.52E-01	5.48E-01	6.09E-01	6.39E-01	7.30E-01	8.74E-01	9.57E-01	9.48E-01
Xe-135m	6.25E-02	6.21E-02	6.16E-02	6.13E-02	2.61E-02	4.67E-03	5.17E-04	6.89E-05	3.29E-06	0.00E+00	0.00E+00	0.00E+00
Xe-135	8.34E-02	8.37E-02	8.40E-02	8.43E-02	1.10E-01	1.27E-01	1.31E-01	1.31E-01	1.21E-01	7.00E-02	9.01E-03	1.77E-05-
Xe-138	2.63E-01	2.61E-01	2.58E-01	2.57E-01	1.01E-01	1.57E-02	1.51E-03	1.69E-04	7.24E-06	0.00E+00	0.00E+00	0.00E+00
EDE	424.5	423.5	422.7	421.9	345.2	279.0	230.5	205.0	132.0	45.5	26.3	30.1

TABLE 12-1 NOBLE GAS EFFECTIVE DOSE EQUIVALENT AS A FUNCTION OF TIME POST-ACCIDENT

EDE – units of rem/hr per uCi/cc

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TA	BLE 12-2	EPA-400 NOBLE	GASE EFFECTIVE	DOSE EQUIVALENT FACTORS	1 19 19 4
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Nuclide	EDE (rem/hr per uCi/cc)
Kr-85m	93
Kr-85	1.3
Kr-87	510
Kr-88	1300
Xe-131m	850
Xe-133m	17
Xe-133	20
Xe-135m	250
Xe-135	140
Xe-138	710

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TABLE 12-3 NOBLE GAS EFFECTIVE DOSE EQUIVALENT FACTORS FOR RCS RELEASES

		RCS Activi	ty (uCi/gm)	
Nuclide	EDE (rem/hr per uCi/cc)	Primary	Secondary (Steam)	
Kr-85	1.3	8.21E+00	5.60E-07	
Kr-85m	93	1.93E+00	6.50E-09	
Kr-87	[·] 510	1.24E+00	2.20E-08	
Kr-88	1300	3.60E+00	7.70E-09	
Xe-131m	4.9	3.54E+00	3.20E-07	
Xe-133	20	2.71E+02	1.20E-08	
Xe-133m	17	3.84E+00	2.80E-08	
Xe-135	140	9.49E+00	2.60E-08	
Xe-138	720	6.92E-01	3.10E-08	
T	otal	3.04E+02	1.01E-06	
EDE (rem/)	nr per uCi/cc)	42.3	50.1	

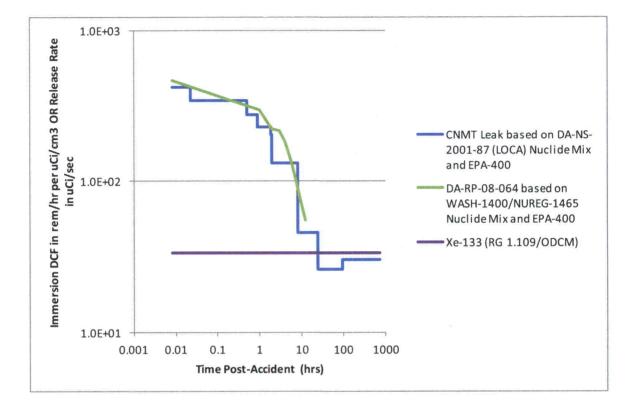


FIGURE 12-1 NOBLE GAS EFFECTIVE DOSE EQUIVALENT AS A FUNCTION OF TIME POST-LOCA

12.1 RADTRAD LOCA CNMT MODEL INPUT FILES

contleak.psf

```
Radtrad 3.03 4/15/2001
Cont Leak
            .
Nuclide Inventory File:
c:\data\shane\work\ginna\rhr flyup issue sept 2010\radtrad\ginna loca63.nif
Plant Power Level:
 1.8110E+03
Compartments:
  4
Compartment 1:
Sprayed
  3
 7.8000E+05
  1
  0
  0
  0
  0
Compartment 2:
Unsprayed
  3
 2.2000E+05
  0
  0
  1
                                                       .
  0
  0
Compartment 3:
Environ
  2
 0.0000E+00
                                                                              · .
  0
  0
  0
  0
  0
                                                                       .
Compartment 4:
Control Rm
  1
 3.6210E+04
  0
  0
                                                                             .
  1
  0
  0
Pathways:
                                                                             ,
  6
Pathway 1:
Sprayed to Unsprayed
  1
  2
  2
Pathway 2:
Unsprayed to Sprayed
  2
  1
```

```
2
Pathway 3:
Sprayed to Environ
 1
  3
  4
Pathway 4:
Unsprayed to Environ
  2
  3
  4
Pathway 5:
Environ to Control Rm
  3
  4
  2
Pathway 6:
Control Rm to Environ
  4
  3
  2
End of Plant Model File
Scenario Description Name:
Plant Model Filename:
Source Term:
 2
     7.8000E-01
  1
    2.2000E-01
  2
c:\data\shane\work\ginna\rhr flyup issue sept 2010\radtrad\ginna.inp
c:\data\shane\work\ginna\rhr flyup issue sept 2010\radtrad\loca.rft
  0.0000E+00
  0
  9.5000E-01 4.8500E-02 1.5000E-03 1.0000E+00
Overlying Pool:
  0
  0.0000E+00
  0
  0
  0
  0
Compartments:
  4
Compartment 1:
 1
  1
  1
  0.0000E+00
  3
  0.0000E+00 0.0000E+00
             3.5000E+00
0.000E+00
  2.2000E-02
  8.7000E-01
              0.0000E+00
  1
  0.0000E+00
  3
 0.0000E+00
             0.0000E+00
             2.0000E+01
 2.2000E-02
  8.7000E-01
             0.0000E+00
 1
 0.0000E+00
 0
 0
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Compartment 2: 1.2000E+04 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 1.3900E-02 9.5000E+01 0.0000E+00 0.0000E+00 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 Compartment 3: Compartment 4: 5.4000E+03 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 1.9400E-02 9.9000E+01 9.4000E+01 9.4000E+01 2.0000E+00 9.9000E+01 9.4000E+01 9.4000E+01 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 Pathways: Pathway 1:
 0.0000E+00
 0.0000E+00
 0.0000E+00
 0.0000E+00
 0.0000E+00

 1.3900E-02
 4.8000E+04
 0.0000E+00
 0.0000E+00
 0.0000E+00

 7.2000E+02
 4.8000E+04
 0.0000E+00
 0.0000E+00
 0.0000E+00
 .

Pathway 2: 0 0 0 0 0 1 3 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 1.3900E-02 4.8000E+04 9.5000E+01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 7.2000E+02 0.0000E+00 0.0000E+00 0 0 . 0 0 0 0 Pathway 3: 0 0 0 0 0 • 0 . 0 0 0 0 1 3 0.0000E+00 2.0000E-01 1.0000E-01 2.4000E+01 7.2000E+02 0.0000E+00 0 Pathway 4: 0 0 0 0 0 0 0 0 0 0 1 3 0.0000E+00 2.0000E-01 2.4000E+01 1.0000E-01 7.2000E+02 0.0000E+00 0 Pathway 5: 0 0 0 0 0 . 1 4 0.0000E+00 2.2000E+03 0.0000E+00 0.0000E+00 0.0000E+00 1.6700E-02 2.5000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 2.5000E+02 0.0000E+00 2.0000E+00 7.2000E+02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

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Pathway 6:					
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1					
4					
0.0000E+00	2.2000E+03	0.0000E+00	0.0000E+00	0.0000E+00 .	1
1.6700E-02	2.5000E+02	0.0000E+00	0.0000E+00	0.0000E+00	. .
2.0000E+00 7.2000E+02	2.5000E+02 0.0000E+00	0.0000E+00 0.0000E+00	0.0000E+00 0.0000E+00	0.0000E+00	
0.2000E+02	0.00005+00	0.00002+00	0.00002+00	0.0000E+00	
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0					
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0 Dose Location:	~ .				
3	5.				•
Location 1:					· ·
EAB					
3					
1					
3 0.0000E+00	2.1700E-04				
2.0000E+00	2.1700E-04 2.1700E-04				
7.2000E+02	0.0000E+00				
1					. •
4					· ·
0.0000E+00	3.4700E-04				
8.0000E+00 2.4000E+01	1.8000E-04 2.3000E-04				
7.2000E+02	0.0000E+00			• *	· .
0	00000100			•••	· ,
Location 2:					· •
LPZ					
3					
1 6					
0.0000E+00	2.5100E-05				
2.0000E+00	2.5100E-05				
8.0000E+00	1./0000 00	•			
2.4000E+01	8.5000E-06				
9.6000E+01	2.9300E-06				
7.2000E+02 1	0.0000E+00			· .	-
4		• •			
0.0000E+00	3.4700E-04				•
8.0000E+00	1.8000E-04				
2.4000E+01	2.3000E-04				
7.2000E+02	0.0000E+00				
0 Jocation 3:					
Control Rm				•	• •
4		· ·			·.
0					

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1
  2
  0.0000E+00
              3.5000E-04
  7.2000E+02 0.0000E+00
  1
  4
  0.0000E+00
              1.0000E+00
  2.4000E+01
              6.0000E-01
  9.6000E+01
             4.0000E-01
  7.2000E+02 0.0000E+00
Effective Volume Location:
  1
  6
             1.7700E-03
  0.0000E+00
  2.0000E+00 1.2500E-03
  8.0000E+00 4.8000E-04
  2.4000E+01 4.2400E-04
             3.6600E-04
  9.6000E+01
  7.2000E+02
             0.0000E+00
Simulation Parameters:
  3
  0.0000E+00
              1.0000E-02
  2.0000E+00 1.0000E-01
  7.2000E+02 0.0000E+00
Output Filename:
C:\Data\Shane\Work\Ginna\2011 EAL Calc Revisions\CALC-2011-XXXX\Scoping\contleak.o0
  1
  1
  1
  0
  0
End of Scenario File
```

LOCA.RFT

Release Fract		2		
	5-2001-087, R			Table 4
Duration (h)	: Design Ba	sis Accident		
0.0083	0.5000E+00	0.1300E+01	0.0000E+00	0.0000E+00
Noble Gases:				
0.0	0.5000E-01	0.9500E+00	0.0000E+00	0.0000E+00
Iodine:				
0.0	0.5000E-01	0.3500E+00	0.0000E+00	0.0000E+00
Cesium:				
0.0	0.5000E-01	0.2500E+00	0.0000E+00	0.0000E+00
Tellurium:				
0.0	0.0000E+00	0.5000E-01	0.0000E+00	0.0000E+00
Strontium:				
0.0	0.0000E+00	0.2000E-01	0.0000E+00	0.0000E+00
Barium:				
0.0	0.0000E+00	0.2000E-01	0.0000E+00	0.0000E+00
Ruthenium:				
0.0	0.0000E+00	0.2500E-02	0.0000E+00	0.0000E+00
Cerium:				
0.0	0.0000E+00	0.5000E-03	0.0000E+00	0.0000E+00
Lanthanum:				
0.0	0.0000E+00	0.2000E-03	0.0000E+00	0.0000E+00
Non-Radioact	iAerosols (k	g):		
0.0	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
End of Relea	se File			

Ginna LOCA63.nif

```
Nuclide Inventory Name: Ginna LOCA
Calc DA-NS-2002-037, R1
Power Level:
 1.0
Nuclides:
 63
Nuclide 001:
Co-60
  7
  0.1663401096E+09
 0.6000E+02
 1.980E+02
 none
       0.0000E+00
         0.0000E+00
none
none
        0.0000E+00
 Nuclide 002:
 Kr-85m
 1
  0.1612800000E+05
 0.8500E+02
 7.51E+03
Kr-85 0.2100E+00
none 0.0000E+00
        0.0000E+00
none
Nuclide 003:
Kr-85
  1
 0.3382974720E+09
 0.8500E+02
 3.23E+02
none 0.0000E+00
none
         0.0000E+00
         0.0000E+00
none
Nuclide 004:
Kr-87
 1
 0.4578000000E+04
 0.8700E+02
 1.447E+04

        Rb-87
        0.1000E+01

        none
        0.0000E+00

        none
        0.0000E+00

Nuclide 005:
Kr-88
 1
 0.1022400000E+05
 0.8800E+02
 2.032E+04
Rb-88 0.1000E+01
none 0.0000E+00
         0.0000E+00
none
Nuclide 006:
Xe-131m
 1
 1.028E+06
 0.1310E+03
 3.087E+02
none 0.0000E+00
        0.0000E+00
none
none
         0.0000E+00
```

Page 29

Nuclide 007: Xe-133m 1 1.89E+05 0.1330E+03 1.750E+03 Xe-133 1.0 none 0.0000E+00 none 0.0000E+00 Nuclide 008: Xe-133 1 0.4531680000E+06 0.1330E+03 5.577E+04 none 0.0000E+00 0.0000E+00 0.0000E+00 none none Nuclide 009: Xe-135m 1 917.4 0.1350E+03 1.126E+04 Xe-135 0.9999E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 010: Xe-135 1 0.3272400000E+05 0.1350E+03 1.414E+04 Cs-135 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 011: Xe-138: 1 8.502E+2 0.138E+03 4.754E+04 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none Nuclide 012: I-131 2 0.6946560000E+06 0.1310E+03 2.805E+04 Xe-131m 0.1100E-01 none 0.0000E+00 0.0000E+00 none Nuclide 013: I-132 2 0.828000000E+04 0.1320E+03 4.147E+04 none 0.0000E+00 0.0000E+00 none none 0.0000E+00

Nuclide 014: I-133 2 0.7488000000E+05 0.1330E+03 5.687E+04 Xe-133m 0.2900E-01 Xe-133 0.9700E+00 none 0.0000E+00 Nuclide 015: I-134 2 0.3156000000E+04 0.1340E+03 6.295E+04 none 0.0000E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 016: I-135 2 0.2379600000E+05 0.1350E+03 5.367E+04 Xe-135m 0.1500E+00 Xe-135 0.8500E+00 none 0.0000E+00 Nuclide 017: Cs-134 3 0.6507177120E+08 0.1340E+03 6.074E+03 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none Nuclide 018: Cs-136 3 0.1131840000E+07 0.1360E+03 1.789E+03 none 0.0000E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 019: Cs-137 3 0.9467280000E+09 0.1370E+03 3.479E+03 0.0000E+00 none 0.0000E+00 none 0.0000E+00 none Nuclide 020: Rb-86 3 0.1612224000E+07 0.8600E+02 7.178E+01 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none

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Nuclide 021: Te-127m 4 0.9417600000E+07 0.1270E+03 3.876E+02 Te-127 0.9800E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 022: Te-127 4 0.3366000000E+05 0.1270E+03 2.982E+03 none 0.0000E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 023: Te-129m 4 0.2903040000E+07 0.1290E+03 1.314E+03 Te-129 0.6500E+00 I-129 0.3500E+00 none 0.0000E+00 Nuclide 024: Te-129 4 0.4176000000E+04 0.1290E+03 8.945E+03 I-129 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 025: Te-131m 4 0.108000000E+06 0.1310E+03 . 4.042E+03 Te-131 0.2200E+00 I-131 0.7800E+00 0.0000E+00 none Nuclide 026: Te-132 4 0.2815200000E+06 0.1320E+03 3.987E+04 I-132 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 027: Sb-127 4 0.3326400000E+06 0.1270E+03 3.009E+03 Te-127m 0.1800E+00 Te-127 0.8200E+00 none 0.0000E+00 Nuclide 028: Sb-129 4 0.1555200000E+05 0.1290E+03 9.001E+03 Te-129m 0.2200E+00 Te-129 0.7700E+00 0.0000E+00 none Nuclide 029: Sr-89 5 0.4363200000E+07 0.8900E+02 2.733E+04 none 0.0000E+00 none 0.0000E+00 0.0000E+00 none Nuclide 030: Sr-90 5 0.9189573120E+09 0.9000E+02 2.557E+03 Y-90 0.1000E+01 0.0000E+00 none none 0.0000E+00 Nuclide 031: Sr-91 5 0.342000000E+05 0.9100E+02 3.424E+04 Y-91m 0.5800E+00 Y-91 0.4200E+00 0.0000E+00 none Nuclide 032: Sr-92 5 0.9756000000E+04 0.9200E+02 3.700E+04 Y-92 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 033: Ba-139 6 0.4962000000E+04 0.1390E+03 5.141E+04 none 0.0000E+00 0.0000E+00 none none 0.0000E+00 Nuclide 034: Ba-140 6 0.1100736000E+07 0.1400E+03 4.936E+04 La-140 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 035: Ru-103 7 0.3393792000E+07 0.1030E+03 4.257E+04 Rh-103m 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 036: Ru-105 7 0.1598400000E+05 0.1050E+03 2.888E+04 Rh-105 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 037: Ru-106 7 0.3181248000E+08 0.1060E+03 1.441E+04 Rh-106 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 038: Rh-105 7 0.1272960000E+06 0.1050E+03 2.584E+04 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none Nuclide 039: Mo-99 7 0.2376000000E+06 0.9900E+02 5.340E+04 Tc-99m 0.8800E+00 Tc-99 0.1200E+00 none 0.0000E+00 Nuclide 040: Tc-99m 7 0.2167200000E+05 0.9900E+02 4.688E+04 Tc-99 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 041: Ce-141 8 0.2808086400E+07 0.1410E+03 4.682E+04 none 0.0000E+00 0.0000E+00 none none 0.0000E+00

Nuclide 042: Ce-143 8 0.1188000000E+06 0.1430E+03 4.357E+04 Pr-143 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 043: Ce-144 8 0.2456352000E+08 0.1440E+03 3.567E+04 Pr-144m 0.1800E-01 Pr-144 0.9800E+00 0.0000E+00 none Nuclide 044: Pu-238 8 0.2768863824E+10 0.2380E+03 1.231E+02 U-234 0.1000E+01 0.0000E+00 none none 0.0000E+00 Nuclide 045: Pu-239 8 0.7594336440E+12 0.2390E+03 1.022E+01 U-235 0.1000E+01 0.0000E+00 none 0.0000E+00 none Nuclide 046: Pu-240 8 0.2062920312E+12 0.2400E+03 1.541E+01 U-236 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 047: Pu-241 8 0.4544294400E+09 0.2410E+03 3.396E+03 U-237 0.2400E-04 Am-241 0.1000E+01 none 0.0000E+00 Nuclide 048: Np-239 8 0.2034720000E+06 0.2390E+03 5.798E+05 Pu-239 0.1000E+01 none 0.0000E+00 none 0.0000E+00

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Nuclide 049: Y-90 9 0.2304000000E+06 0.9000E+02 2.673E+03 0.0000E+00 none 0.0000E+00 none none 0.0000E+00 Nuclide 050: Y-91 9 0.5055264000E+07 0.9100E+02 3.523E+04 none 0.0000E+00 none 0.0000E+00 0.0000E+00 none Nuclide 051: Y-92 9 0.1274400000E+05 0.9200E+02 3.716E+4 none 0.0000E+00 0.0000E+00 0.0000E+00 none none Nuclide 052: Y-93 9 0.3636000000E+05 0.9300E+02 4.268E+04 Zr-93 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 053: Nb-95 9 0.3036960000E+07 0.9500E+02 4.782E+04 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none Nuclide 054: Zr-95 9 0.5527872000E+07 0.9500E+02 4.749E+04 Nb-95m 0.780E-02 Nb-95 0.992E+00 none 0.0000E+00 Nuclide 055: Zr-97 9 0.6084000000E+05 0.9700E+02 4.743E+04 Nb-97m 0.9470E+00 Nb-97 0.5300E-01 none 0.0000E+00

Nuclide 056: La-140 9 0.1449792000E+06 0.1400E+03 5.113E+04 none 0.0000E+00 0.0000E+00 none 0.0000E+00 none Nuclide 057: La-141 9 0.1414800000E+05 0.1410E+03 4.611E+04 Ce-141 0.1000E+01 none 0.0000E+00 none 0.0000E+00 Nuclide 058: La-142 9 0.5550000000E+04 0.1420E+03 4.539E+04 none 0.0000E+00 0.0000E+00 none none 0.0000E+00 Nuclide 059: Nd-147 9 0.9486720000E+06 0.1470E+03 1.872E+04 Pm-147 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 060: Pr-143 9 0.1171584000E+07 0.1430E+03 4.274E+04 none 0.0000E+00 none 0.0000E+00 none 0.0000E+00 Nuclide 061: Am-241 9 0.1363919472E+11 0.2410E+03 4.169E+00 Np-237 0.1000E+01 none 0.0000E+00 0.0000E+00 none Nuclide 062: Cm-242 9 0.1406592000E+08 0,2420E+03 9,663E+02 Pu-238 0.1000E+01 none 0.0000E+00 none 0.0000E+00

Nuclide 063: Cm-244 9 0.571508136E+9 0.2440E+03 1.137E+02 Pu-240 0.1000E+01 none 0.0000E+00 none 0.0000E+00 End of Nuclear Inventory File

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Dose Conversion Factors from FGRs 11 & 12 Worst Lung Clearance Class for CEDE - nuclides consistent with DA-NS-2002-037, R1 Co-58 and 60 are omitted 9 ORGANS DEFINED IN THIS FILE: GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN(FGR) 63 NUCLIDES DEFINED IN THIS FILE: Co-60 Kr-85m Kr-85 Kr-87 Kr-88 Xe-131m Xe-133m Xe-133 Xe-135m Xe-135 Xe-138 I-131 I-132 I-133 I-134 I-135 Cs-134 Cs-136 Cs-137 Actually Ba-137m for EDE Rb-86 Te-127m Te-127 Te-129m Te-129 Te-131m Te-132 Sb-127 Sb-129 Sr-89 Sr-90 Sr-91 Sr-92 Ba-139

Ba-140 Ru-103 Ru-105 Ru-106 Rh-105 Mo-99 Tc-99m Ce-141 Ce-143 Ce-144	÷.,				· .			·
Pu-238 Pu-239 Pu-240								
Pu-241 Np-239 Y-90 Y-91	. *							:-
Y-92 Y-93 Nb-95			• •			٦		
Zr-95 Zr-97 La-140 La-141 add	led							
La-142 Nd-147 Pr-143 Am-241							• <u>.</u>	
Cm-241 Cm-242 Cm-244	CLOUDSHINE	GROUND	GROUND	GROUND	INHALED	INHALED	, INGESTION	
		-		-				
Co-60	•	SHINE OHR	SHINE /DA:	Y SHINE RAT	TE ACUTE	CHRONIC		
Co-60 GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR) Kr-85m	1.390E-13 1.240E-13 1.230E-13 1.780E-13 1.270E-13 1.200E-13 1.260E-13	7.056E-11 6.739E-11 6.537E-11 6.710E-11 8.956E-11 6.480E-11 6.508E-11 6.768E-11 7.948E-11	1.480E-09 1.413E-09 1.371E-09 1.407E-09 1.879E-09 1.359E-09 1.365E-09 1.419E-09	2.450E-15 2.340E-15 2.270E-15 2.330E-15 3.110E-15 2.250E-15 2.260E-15 2.350E-15	-1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00	4.760E-09 1.840E-08 3.450E-07 1.720E-08 1.350E-08 1.620E-08 3.600E-08 5.910E-08	1.100E-09 8.770E-10 1.320E-09 9.390E-10 7.880E-10 4.970E-09 2.770E-09	, , ,
GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR)	1.390E-13 1.240E-13 1.230E-13 1.780E-13 1.270E-13 1.200E-13 1.260E-13	7.056E-11 6.739E-11 6.537E-11 6.710E-11 8.956E-11 6.480E-11 6.768E-11 7.948E-11 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	1.480E-09 1.413E-09 1.371E-09 1.407E-09 1.879E-09 1.359E-09 1.365E-09 1.419E-09	2.450E-15 2.340E-15 2.270E-15 2.330E-15 3.110E-15 2.250E-15 2.260E-15 2.350E-15	-1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00 -1.000E+00	4.760E-09 1.840E-08 3.450E-07 1.720E-08 1.350E-08 1.620E-08 3.600E-08 5.910E-08	1.100E-09 8.770E-10 1.320E-09 9.390E-10 7.880E-10 4.970E-09 2.770E-09 0.000E+00	, , , ,

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GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	4.120E-14		0.0	0.0	0.0	0.0	0.0
EFFECTIVE	4.120E-14 0.0				0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kr-88	0.0	0 0	0.0	0.0	0.0	0.0	0.0
GONADS		0.0			0.0		
BREAST	0.0	0.0	0.0	0.0		0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.020E-13		0.0	0.0	0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Xe-131m							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	3.890E-16	0.0	0.0	0.0	0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Xe-133m							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0 `	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.370E-15		0.0	0.0	0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Xe-133							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.560E-15		0.0	0.0	0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Xe-135m	0.0	0.0	0.0	0.0	0.0	0.0	
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0				
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.040E-14		0.0	0.0	0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Xe-135		•		0 0	0.0	0.0	0 0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN(FGR) Xe-138	0.0 0.0 0.0 1.190E-14 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR) I-131	0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.770E-14 0.0	0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	• • • • • •
GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR) I-132	0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.820E-14 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 8.890E-09 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	•
GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR)	0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.120E-13 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.030E-10 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
I-133 GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN (FGR) I-134	0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.940E-14 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 1.580E-09 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
GONADS BREAST LUNGS RED MARR BONE SUR THYROID REMAINDER EFFECTIVE SKIN(FGR) I-135	0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.300E-13 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 3.550E-11 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
GONADS BREAST LUNGS RED MARR BONE SUR THYROID	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 .0.0	· .

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REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.980E-14	0.0	0.0	0.0	0.0	3.320E-10	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cs-134							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.570E-14		0.0	0.0	0.0	1.250E-08	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cs-136	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GONADS BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.060E-13		0.0	0.0	0.0	1.980E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cs-137							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.880E-14		0.0	0.0	0.0	8.630E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rb-86	0.0	0 0	0 0	οò	0 0	0.0	0.0
GONADS	0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0	0.0
BREAST	0.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	4.810E-15		0.0	0.0	0.0	1.790E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Te-127m							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0:0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.470E-16		0.0	0.0	0.0	5.810E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Te-127	0 0	0 0	0.0	0.0	0.0	0.0	0.0
GONADS BREAST	0.0 0.0 ·	0.0 0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.420E-16		0.0	0.0	0.0	8.600E-11	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	.0.0	0.0

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Te-129m							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0.	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.550E-15		0.0	0.0	0.0.	6.470E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Te-129							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR		0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.750E-15		0.0	0.0	0.0	2.420E-11	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Te-131m							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.010E-14		0.0	0.0	0.0	1.730E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Te-132							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0.	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.030E-14		0.0	0.0	0.0	2.550E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sb-127							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	3.330E-14		0.0	0.0	0.0	1.630E-09	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sb-129	0.0	0 0	0 0 [.]	0 0	0.0	• •	
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.140E-14		0.0	0.0	0.0	1.740E-10	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sr-89 GONADS	0.0	0.0	0.0	0.0	0 0	0 0	0 0
BREAST	0.0	0.0	0.0		0.0	0.0	0.0
DURADI	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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1.0000	0.0		<u> </u>	0.0	<u> </u>	0.0	0 0
LUNGS RED MARR	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.730E-17		0.0	0.0	0.0	1.120E-08	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sr-90							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0 7.530E-18	0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 3.510E-07	0.0 0.0
EFFECTIVE SKIN(FGR)	0.0	0.0 0.0	0.0	0.0	0.0	0.0	0.0
Sr-91	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0.	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	3.450E-14		0.0	0.0	0.0	4.490E-10	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sr-92 GONADS	0 0	0 0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0 0.0	0.0 0.0	0.0 0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	6.790E-14	0.0	0.0	0.0	0.0	2.180E-10	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ba-139							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0 0.0
RED MARR BONE SUR	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.170E-15		0.0	0.0	0.0	4.640E-11	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ba-140					•	•	
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0.	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR THYROID	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	8.580E-15		0.0	0.0	0.0	1.010E-09	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ru-103							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR BONE SUR	0.0	0.0 0.0	0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0
DONE 20K	0.0	0.0	0.0	0.0	0.0	0.0	0.0

THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	2.250E-14		0.0	0.0	0.0	2.420E-09		
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Ru-105								
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	•
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	3.810E-14		0.0	0.0	0.0	1.230E-10	0.0	
SKIN(FGR)	0.0	0.0	0.0	0.0				
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Ru-106								
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	•
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	0.0	0.0	0.0	0.0	0.0	1.290E-07		
	0.0							
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0 <	• •
Rh-105	0 0			~ ~				
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	•
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	3.720E-15		0.0	0.0	0.0	2.580E-10		
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Mo-99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	0 0	0 0	0 0	· ·		<u> </u>		•
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	7.280E-15	0.0	0.0	0.0	0.0	1.070E-09		
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Tc-99m					010	0.0	0.0	
GONADS	0.0	0.0	0.0	0.0	0.0	0 0	0 0	
BREAST						0.0	0.0	
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0.	0.0	
THYROID	0.0	0.0	0.0.	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	5.890E-15	0.0	0.0	0.0	0.0	8.800E-12		· .
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Ce-141			0.0	0.0		0.0	0.0	
GONADS	0.0	0 0	0.0 .	0 0	0 0	0 0	0 0	
		0.0		0.0	0.0	0.0	0.0	
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	· .
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	3.430E-15	0.0	0.0	0.0	0.0	2.420E-09		

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SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ce-143							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.290E-14		0.0	0.0	0.0	9.160E-10	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ce-144							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	8.530E-16		0.0	0.0	0.0	1.010E-07	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pu-238	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			0.0			0.0	0.0
BONE SUR THYROID	0.0	0.0	0.0	0.0	0.0 0.0	0.0	0.0
	0.0			0.0			0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	
EFFECTIVE	4.880E-18		0.0	0.0	0.0	1.060E-04	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pu-239		0 0	0.0	0 0	0 0	0.0	0 0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	4.240E-18		0.0	0.0	0.0	1.160E-04	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pu-240					<u> </u>		0.0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	4.750E-18		0.0	0.0	0.0	1.160E-04	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pu-241						•	
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0.	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.250E-20		0.0	0.0	0.0	2.230E-06	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Np-239							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

. .

BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	7.690E-15		0.0				
				0.0	0.0	6.780E-10	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-90	<u> </u>						I
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0.	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.900E-16	0.0	0.0	0.0	0.0	2.280E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-91							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0		
	-					0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR		.0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	2.600E-16		0.0	0.0	0.0	1.320E-08	0.0
SKIN(FGR)	0.0	0.0.	0.0	0.0	0.0	0.0	0.0
Y-92							
GONADS	0.0	0.0	0.0	0.0 .	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.300E-14		0.0	0.0	0.0	2.110E-10	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Y-93	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0 .			
					0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	4.800E-15		0.0	0.0 /	0.0	5.820E-10	
SKIN(FGR)	0.0	0.0	0.0 .	0.0	0.0	0.0	0.0
Nb-95							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0.	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0.	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	3.740E-14		0.0	0.0	0.0	1.570E-09	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr-95				0.0	U .U	0.0	v.v
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
				J • J	0.0	0.0	U.U

BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	00	0.0	0.0
EFFECTIVE	3.600E-14		0.0	0.0	0.0	6.390E-09	0.0
SKIN (FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zr-97	•••						
GONADS	0.0	0.0	0.0	0.0	0.0 '	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR					0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0			
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	9.020E-15		0.0	0.0	0.0	1.170E-09	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
La-140							
GONADS	0.0	0.0	0.0.	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0.	0.0	0.0
EFFECTIVE	1.170E-13	0.0	0.0	0.0	0.0	1.310E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
La-141							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER			0.0	0.0	0.0	1.57E-10	0.0
EFFECTIVE	2.390E-15				0.0	0.0	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
La-142	0.0	0 0	0 0 ·	0 0	0 0	0 0	0 0
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	1.440E-13		0.0	0.0	0.0	6.840E-11	
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nd-147							
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0.	0.0	0.0
EFFECTIVE	6.190E-15		0.0	0.0	0.0	1.850E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pr-143		• • •					
GONADS	0.0.	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0		0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR			0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0				0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0		0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0

EFFECTIVE	2.100E-17	0.0	0.0	0.0	0.0	2.190E-09	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Am-241				× •.			
GONADS	0.0	0.0	0.0	0.0	0.0 .	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0 .	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0 ·	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	8.180E-16	0.0	0.0	0.0	0.0	1.200E-04	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cm-242					:		
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0 '	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EFFECTIVE	5.690E-18	0.0	0.0	0.0	0.0	4.670E-06	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cm-244				• • •	. **	•	
GONADS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BREAST	0.0	0.0	.0.0	0.0	0.0	00	0.0
LUNGS	0.0	0.0	0.0	0.0	0.0	0.0 '	0.0
RED MARR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BONE SUR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
THYROID	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REMAINDER	0.0	0.0	0.0	.0.0	0.0	0.0	0.0
EFFECTIVE	4.910E-18	0.0	0.0	0.0	0.0	6.700E-05	0.0
SKIN(FGR)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		•		· · ·		•	

ATTACHMENT 1, DESIGN VERIFICATION REPORT (FOR INFORMATION ONLY)

Doc Type being verified:		Design Change	Calculation	Specification						
Document No.:		CALC-2011-0020	Rev.:	000						
Exter	nt of Design Verificatio	n (Briefly describe):		<u> </u>	<u> </u>					
Checked inputs, spreadsheet, and RADTRAD input and output.										
Method of Design Verification: Qualification Testing Alternate Calculations Applicability of Proven Design										
Resu	Results of Design Verification: □ Fully acceptable with no issues identified ☑ Fully acceptable based on the following issues identified and resolved:									
No.	Verifier's Comment		Preparer's Resp (Indicate if not r		Verifier Concurs? (Yes/No)					
1	Table 4-1 – Plant vent flow rate is cited as 77,000 cfm per EPIP-2-4. EPIP-2-4 indicates plant vent flow rate of 77,844 cfm normal and 71,289 cfm emergency. EPIP- 2-3 cites 76,000 cfm. Use of slightly higher flow rate produces no change in EAL within the number of significant digits specified. Use of the emergency flow rate results in a slightly less conservative (higher) EAL.		This value is left unchanged. It is made an assumption. The reason is because there are several values for the actual flow rate. DA-RP-2001-017 states the design flow rate is 75,000 cfm, however flow test acceptance criterion is greater than 80,000 cfm. Apparently the EPIPs use best- estimate values. Rather than try to use a single value from reference, the value of 77,000 cfm is used to encompass the variability.		Y					
2	assumed to apply to , no discussion is provid section.	1 5 - Plant vent X/Q is ARV and MSSVs, but ded in the assumption	Added Assumpt		Y					
3	indicates 2565 cfm (flow rate rather than 2 cfm (333,000 cfh) flow (4 available) rather that	in 5615 cfm.	EPIP-2-3 value the conversion There appears the conversion and calculation	have been updated.	Y					
4	fans is 2.68E6 cpm rat		The calculation =500/(294*0.00 .000000055*755 This may be an calculation is th setpoint no char	00016*0 50000) on page 11. error in P-9. Since the e basis for the ODCM	Y					
5	Reference 6.1 – provi (9807).	ide a revision number	Corrected.		Y					

Lead Design Verifier: J. R. Massarı Name		Signature	<u> </u>
Engineering Man	ager (if required): N/A	(
Discipline Design	Verifiers if required: N/A	~	
Discipline	Name	Signature	
(USE ADDITION Check if Design F	AL SHEETS AS REQUIRED)		
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, ,			
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			$w_{i} \in \mathbb{R}^{n \times 2} \times \mathbb{R}^{n \times 2}$
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		e a Line di e	

Doc #:

CALC-2011-0020 Rev 000

J. R. MASSARI

ATTACHMENT 2, DESIGN VERIFICATION CHECKLIST (FOR INFORMATION ONLY)

Lead Design Verifier's Name:

The following questions are required to be addressed based on Constellation Nuclear Generation commitment to ANSI/ASME NQA-1-1994 for design verification activities. This checklist is intended to assist when using the Design Review method of design verification to ensure relevant items are addressed in the verification effort. Each "No" answer will require correction or resolution by the originator of the document being verified prior to full acceptance by the design verifier(s).

			Review Check		
		Yes	No	N/A	
1.	Were the design inputs correctly selected?	x			
2.	Are assumptions necessary to perform the design activity adequately described and reasonable?	x			
	Where necessary, are the assumptions identified for subsequent re- verifications when the detailed design activities are completed?			x	
3.	Was an appropriate design method used?	x			
4.	Were the design inputs correctly incorporated into the design?	x			
5.	Is the design output reasonable compared to design inputs?	x			
6.	Are the necessary design input and verification requirements for interfacing organizations specified in the design documents or in supporting procedures or instructions?			x	

ATTACHMENT (5)

EAL WALLCHART

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D-01

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D-02