Entergy
Nuclear Northeast

James A. FitzPatrick

Emergency Plan

Volume 2
Implementing Procedures

EMERGENCY PLAN IMPLEMENTING PROCEDURES/VOLUME 2
UPDATE LIST

CONTROLLED COPY # 34

Date of Issue: MAY 19, 2003

Procedure Number	Procedure Title	Revision Number	Date of Last Review	Use of Procedure
N/A	TABLE OF CONTENTS	REV. 19	02/98	N/A
IAP-1	EMERGENCY PLAN IMPLEMENTATION CHECKLIST	REV. 29	05/03	Continuous
IAP-2	CLASSIFICATION OF EMERGENCY CONDITIONS	REV. 24	05/03	Continuous
EAP-1.1	OFFSITE NOTIFICATIONS	REV. 47	05/03	Informational
EAP-2	PERSONNEL INJURY	REV. 26	01/03	Informational
EAP-3	FIRE	REV. 23	08/02	Informational
EAP-4	DOSE ASSESSMENT CALCULATIONS	REV. 31	08/02	Reference
EAP-4.1	RELEASE RATE DETERMINATION	REV. 15	01/03	Reference
EAP-5.1	DELETED (02/94)			
EAP-5.2	DELETED (04/91)			
EAP-5.3	ONSITE/OFFSITE DOWNWIND SURVEYS AND ENVIRONMENTAL MONITORING	REV. 9	08/02	Informational
EAP-6	IN-PLANT EMERGENCY SURVEY/ENTRY	REV. 17	05/03	Informational
EAP-7.1	DELETED (02/94)			
EAP-7.2	DELETED (02/94)			
EAP-8	PERSONNEL ACCOUNTABILITY	REV. 61	05/03	Reference
EAP-9	SEARCH AND RESCUE OPERATIONS	REV. 11	05/03	Informational
EAP-10	PROTECTED AREA EVACUATION	REV. 17	05/03	Informational
EAP-11	SITE EVACUATION	REV. 19	05/03	Informational
EAP-12	DOSE ESTIMATED FROM AN ACCIDENTAL RELEASE OF RADIOACTIVE MATERIAL TO LAKE ONTARIO	REV. 11	04/02	Reference
EAP-13	DAMAGE CONTROL	REV. 14	06/02	Informational
EAP-14.1	TECHNICAL SUPPORT CENTER ACTIVATION	REV. 23	05/03	Informational
EAP-14.2	EMERGENCY OPERATIONS FACILITY ACTIVATION	REV. 21	05/03	Informational
EAP-14.5	OPERATIONAL SUPPORT CENTER ACTIVATION AND OPERATION	REV. 14	03/00	Informational

EMERGENCY PLAN IMPLEMENTING PROCEDURES/VOLUME 2
UPDATE LIST

Date of Issue: MAY 19, 2003

Procedure Number	Procedure Title	Revision Number	Date of Last Review	Use of Procedure
EAP-14.6	HABITABILITY OF THE EMERGENCY FACILITIES	REV. 15	05/03	Informational
EAP-15	EMERGENCY RADIATION EXPOSURE CRITERIA AND CONTROL	REV. 11	06/02	Informational
EAP-16	PUBLIC INFORMATION PROCEDURE	REV. 7	05/03	Informational
EAP-16.2	JOINT NEWS CENTER OPERATION	REV. 1	05/03	Informational
EAP-17	EMERGENCY ORGANIZATION STAFFING	REV. 105	05/03	Informational
EAP-18	DELETED (12/93)			
EAP-19	EMERGENCY USE OF POTASSIUM IODINE (KI)	REV. 22	05/03	Informational
EAP-20	POST ACCIDENT SAMPLE, OFFSITE SHIPMENT AND ANALYSIS	REV. 9	06/02	Reference
EAP-21	DELETED (12/85)			
EAP-22	DELETED (02/98)			
EAP-23	EMERGENCY ACCESS CONTROL	REV. 11	06/02	Informational
EAP-24	EOF VEHICLE AND PERSONNEL DECONTAMINATION	REV. 9	06/02	Informational
EAP-25	DELETED (02/94)			

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
EMERGENCY PLAN IMPLEMENTING PROCEDURE

CLASSIFICATION OF EMERGENCY CONDITIONS
IAP-2
REVISION 24

APPROVED BY: _____ DATE: 5/10/03
RESPONSIBLE PROCEDURE OWNER

EFFECTIVE DATE: May 19, 2003

FIRST ISSUE ☐ FULL REVISION ☐ LIMITED REVISION ☒

INFORMATIONAL USE	TSR
ADMINISTRATIVE	CONTROLLED COPY # 34

PERIODIC REVIEW DUE DATE: SEPTEMBER 2006

REVISION SUMMARY SHEET

REV. NO.

24 • In section 8.1.2 & 3 Basis: Added words to clarify "instruction by an adversary" wording in regards to a "insider" security threat.

23 • Made changed to Figure IAP-2.2 JAF EAL TECHNICAL BASES DOCUMENT section 8.1 and to Figure IAP-2.2 - POSTED ATTACHMENT - EMERGENCY ACTION LEVEL TABLE due to NRC order dated 02/25/02.

22 • Revised section 5.0 to reflect the meteorology and release information that is represented in JAF-CALC-MULTI-01162.

21 • Sections 1.1.1.1, 1.2.1 Basis and Basis Reference 3, 1.2.2 Basis and Basis Reference 1, 5.1.2 Basis Reference 4, 5.1 Basis Reference 4, 5.2. Basis Reference 1, 7.1.1 Basis Reference 1, 8.1.1 - entire section, 8.4.4 Basis Reference 1, have been revised to include Emergency Action Levels (EALs) related to the operation of the Independent Spent Fuel Storage Installation (ISFSI). Also added section 1.6.1 and 1.6.2.

TABLE OF CONTENTS

SECTION		PAGE
1.0	**PURPOSE**	4
2.0	**REFERENCES**	4
3.0	**INITIATING EVENTS**	4
4.0	**PROCEDURE**	5
4.1	**CLASSIFICATION**	5
4.2	**Reclassification**	6
5.0	**FIGURES, FORMS AND ATTACHMENTS**	7
	1. FIGURE IAP-2.1 - (POSTED ATTACHMENT) - EMERGENCY ACTION LEVEL TABLES	8
	2. FIGURE IAP-2.2 JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2	10
	3. ATTACHMENT A- FISSION PRODUCT BARRIER LOSS & POTENTIAL LOSS INDICATORS	137
	4. ATTACHMENT B - Word List/Definitions	141

1.0 PURPOSE

The purpose of this document is to provide an explanation and rationale for each of the emergency action levels (EALs) included for the James A. FitzPatrick Nuclear Power Plant (JAFNPP). This document may be utilized by those individuals responsible for implementation of the EALs as a technical reference and aid in EAL interpretation.

2.0 REFERENCES

NUMARC NESP-007, Methodology for Development of Emergency Action Levels

2.1 EPA-400-R-92-001, May 1992, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"

2.2 BWR EAL Binning Document, OSSI 92-402A-3-BWR, Rev. 0, March 1994

2.3 Plant Specific EAL Guideline (PEG), OSSI, Rev. 1, February 25, 1995

2.4 NYPA Verification & Validation Report, OSSI 93-402A-10-JAF, Rev. 0, March 1994

2.5 EAL Matrix, Rev. 1, August 1995

2.6 NRC Letter, Request for Additional Information TAC No. M89913, 2/9/95

2.7 JPN-95-026, Response to NRC Request for Additional Information Regarding Proposed Emergency Action Levels (TAC No. M89913), 5/3/95

2.8 NRC Letter, Emergency Action Level Changes - James A. FitzPatrick Nuclear Power Plant (TAC No. M89913), June 1995

3.0 INITIATING EVENTS

3.1 An unusual occurrence has taken place at or near the station.

4.0 PROCEDURE

NOTE: Emergency conditions are divided into the following classes:

Unusual Event - An Unusual Event is a condition characterized by an event or events that are in process or have occurred which indicate a potential degradation of the level of safety of the plant.

Alert - An Alert is a condition characterized by an event or events which are occurring or have occurred that involve actual or potential substantial degradation of the level of plant safety.

Site Area Emergency - A Site Area Emergency is a condition characterized by events that are in process or have occurred involving actual or probable major failures of plant functions needed for the protection of the public.

General Emergency - A General Emergency is a condition characterized by events that have occurred or are occurring involving actual or imminent substantial core degradation or melting with a potential for loss of containment integrity.

4.1 CLASSIFICATION

4.1.1 The Shift Manager shall use the Emergency Action Level Table and Logic, Figure IAP-2.1, to select event categories related to plant events or conditions.

4.1.2 For each category selected, the Shift Manager should refer to the applicable tab of the Emergency Action Levels Bases Document, Figure IAP-2.2, and review the emergency action levels, and associated information for each emergency class.

4.1.3 Based on results of the review in step 4.1.2, the Shift Manager shall determine the most severe emergency classification and should record this classification and time in Shift Manager's log.

A. The initial classification of an emergency condition shall be made as soon as possible following the event or combination of events to ensure that proper protective and corrective actions are taken. The initial classification of an emergency condition will normally be made by the Shift Manager. It is the primary responsibility of the Shift Manager, however, to act in accordance with applicable Operating Procedures, and Emergency Operating Procedures to assure that automatic plant response and Engineered Safety Features (including the Reactor Protection System) perform in their intended manner. The classification of emergency conditions shall not interfere with this primary responsibility.

B. An event that occurs and ends in a very short period of time, or an event that occurs and goes unnoticed until after the event has occurred, must have proper notifications made. The Emergency Plan should be used as appropriate in these circumstances, however, all required notifications per EAP-1.1 must be completed.

4.1.4 The Shift Manager should initiate IAP-1 EMERGENCY PLAN IMPLEMENTATION.

4.2 **Reclassification**

4.2.1 If reclassification to a higher level is necessary, the Emergency Director (or Shift Manager when performing the Emergency Director functions) shall repeat the classification steps shown above and record in the Shift Manager's log.

4.2.2 De-escalation in an emergency classification would only be needed if the event had been over classified on the basis of its potential, which did not occur or an error in classification. Otherwise, the classification should shift to Recovery or the event be terminated after the emergency phase has been mitigated.

5.0 FIGURES, FORMS AND ATTACHMENTS

1. FIGURE IAP-2.1 - (POSTED ATTACHMENT) - EMERGENCY ACTION LEVEL TABLES

2. FIGURE IAP-2.2 JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3. ATTACHMENT A- FISSION PRODUCT BARRIER LOSS & POTENTIAL LOSS INDICATORS

4. ATTACHMENT B - WORD LIST/DEFINITIONS

FIGURE IAP-2.1 - (POSTED ATTACHMENT) - EMERGENCY ACTION LEVEL TABLES

FIGURE IAP-2.1 Page 1 of 2

This is a colored pull out chart of the EAL's

There are two pages

FIGURE IAP-2.1

EMERGENCY ACTION LEVEL TABLES

FIGURE IAP-2.2 JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

PURPOSE

The purpose of this document is to provide an explanation and rationale for each of the emergency action levels (EALs) included in the EAL Upgrade Program for the James A. FitzPatrick Nuclear Power Plant (JAFNPP). It is also intended to facilitate the review process of the JAFNPP EALs and provide historical documentation for future reference. This document is also intended to be utilized by those individuals responsible for implementation of IAP-2 "Classification of Emergency Conditions" as a technical reference and aid in EAL interpretation.

DISCUSSION

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

Subsequent to the acceptance by the NRC of NUMARC/NESP-007 "Methodology for Development of Emergency Action Levels" as an acceptable alternative to the NUREG 0654 EAL guidance, the four nuclear utilities in the State of New York decided to perform a joint implementation of the new methodology. This upgrade project involved the following plants:

- Nine Mile Point Unit 1 (NMPC)
- Nine Mile Point Unit 2 (NMPC)
- James A. FitzPatrick Nuclear Power Plant (NYPA)
- Indian Point Station 2 (ConEd)
- Indian Point 3 Nuclear Power Station (NYPA)
- R. E. Ginna Nuclear Power Station (RG&E)

While the upgraded EALs are site specific, an objective of the upgrade project was to ensure conformity and consistency between the sites to the extent possible.

The revised EALs were derived from the Initiating Conditions and example EALs given in the JAFNPP Plant-Specific EAL Guideline (PEG). The PEG is the JAFNPP interpretation of the NUMARC methodology for developing EALs. The PEG identifies deletions from the NUMARC methodology by striking out words and phrases that are not applicable to JAFNPP; additions are identified by underlining new words and phrases.

The source of documents for PEG changes from NUMARC methodology are listed in the references section of the PEG.

Many of the EALs derived from the NUMARC methodology are fission product barrier based. That is, the conditions which define the EALs are based upon loss or potential loss of one or more of the three fission product barriers.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

The primary fission product barriers are:

A. Reactor Fuel Cladding: The fuel cladding is comprised of the zirconium tubes which house the ceramic uranium oxide pellets along with the end plugs which are welded into each end of the fuel rods.

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

C. Primary Containment: The primary containment is comprised of the drywell, suppression chamber (torus), the interconnections between the two, and all isolation valves required to maintain primary containment integrity under accident conditions.

Although the secondary containment (reactor building) serves as an effective fission product barrier by minimizing ground level releases, it is not considered as a fission product barrier for the purpose of emergency classification.

The following criteria serves as the bases for event classification related to fission product barrier loss:

Notification of an Unusual Event :

A perceived or actual challenge to a primary fission product barrier.

Alert:

Any loss or any potential loss of either fuel clad or RCS

Site Area Emergency:

Any loss of both fuel clad and RCS
Or
Any potential loss of both fuel clad and RCS
Or
Any potential loss of either fuel clad or RCS with a loss of any additional barrier

General Emergency:

Loss of any two barriers with loss or potential loss of a third

Those EALs which reference one or more of the fission product barrier IC designators (FC, RCS and PC) in the PEG Reference section of the technical bases are derived from the Fission Product Barrier Analysis. The analysis entailed an evaluation of every combination of the plant specific barrier loss/potential loss indicators applied to the above criteria.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

Where possible, the EALs have been made consistent with and utilize the conditions defined in the JAFNPP symptom based Emergency Operating Procedures (EOPs). While the symptoms that drive operator actions specified in the EOPs are not indicative of all possible conditions which warrant emergency classification, they do define the symptoms, independent of initiating events, for which reactor plant safety and/or fission product barrier integrity are threatened. Where these symptoms are clearly representative of one of the PEG Initiating Conditions, they have been utilized as an EAL. This allows for 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.

To the extent possible, the EALs are symptom based. That is, the action level is defined by values of key plant operating parameters which 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. But, 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.

The EALs are grouped into nine categories to simplify their presentation and to promote a rapid understanding by their users. These categories are:

1. Reactor Fuel
2. Reactor Pressure Vessel
3. Primary Containment
4. Secondary Containment
5. Radioactivity Release
6. Electrical Failures
7. Equipment Failures
8. Hazards
9. Other

Categories 1 through 5 are primarily symptom based. The symptoms are indicative of actual or potential degradation of either fission product barriers or personnel safety.

Categories 6, 7 and 8 are event based. Electrical Failures are those events associated with losses of either AC or vital DC electrical power. Equipment Failures are abnormal and emergency events associated with vital plant system failures, while Hazards are those non-plant system related events which have affected or may affect plant safety.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

Category 9 provides the Emergency Director (Shift Manager) the latitude to classify and declare emergencies based on plant symptoms or events which in his judgment warrant classification. This judgment includes evaluation of loss or potential loss of one or more fission product barriers warranting emergency classification consistent with the NUMARC barrier loss criteria.

Categories are further divided into one or more subcategories depending on the types and number of plant conditions that dictate emergency classifications. For example, the Reactor Fuel category has five subcategories whose values can be indicative of fuel damage: coolant activity, off-gas activity, containment radiation, other radiation monitors and refueling accidents. An EAL may or may not exist for each sub category at all four classification levels. Similarly, more than one EAL may exist for a sub category in a given emergency classification when appropriate (i. e., no EAL at the General Emergency level but three EALs at the Notification of an Unusual Event level).

For each EAL, the following information is provided:

- Classification: Notification of an Unusual Event, Alert, Site Area Emergency, or General Emergency
- Operating Mode Applicability: One or more of the following plant operating conditions are listed: Power Operation, Startup/Hot Standby, Hot Shutdown, Cold Shutdown, Refuel and Defuel
- EAL: Description of the condition or set of conditions which comprise the EAL
- Basis: Description of the rationale for the EAL
- PEG Reference(s): PEG IC(s) and example EAL(s) from which the EAL is derived
- Basis Reference(s): Source documentation from which the EAL is derived

The identified operating modes are defined as follows:

Power Operations
Reactor is critical and the mode switch is in RUN.

Startup/Hot Standby
The mode switch is in STARTUP/HOT STANDBY.

Hot Shutdown
Mode switch is in SHUTDOWN and reactor coolant temperature is >212 E F.

Cold Shutdown
Mode switch in SHUTDOWN and reactor coolant temperature is # 212 EF.

Refuel
Mode switch in REFUEL.

Defueled
RPV contains no irradiated fuel.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 REACTOR FUEL

The reactor fuel cladding serves as the primary fission product barrier. Over the useful life of a fuel bundle, the integrity of this barrier should remain intact as long as fuel cladding integrity limits are not exceeded.

Should fuel damage occur (breach of the fuel cladding integrity) radioactive fission products are released to the reactor coolant. The magnitude of such a release is dependent upon the extent of the damage as well as the mechanism by which the damage occurred. Once released into the reactor coolant, the highly radioactive fission products can pose significant radiological hazards in plant from reactor coolant process streams. If other fission product barriers were to fail, these radioactive fission products can pose significant offsite radiological consequences.

The following parameters/indicators are indicative of possible fuel failures:

! Coolant Activity: During normal operation, reactor coolant fission product activity is very low. Small concentrations of fission products in the coolant are primarily from either the fission of tramp uranium in the fuel cladding or minor perforations in the cladding itself. Any significant increase from these baseline levels is indicative of fuel failures.

! Off-gas Activity: As with coolant activity, any fuel failures will release fission products to the reactor coolant. Those products which are gaseous or volatile in nature will be carried over with the steam and eventually be detected by the air ejector off-gas radiation monitors.

! Containment Radiation Monitors: Although not a direct indication or measurement of fuel damage, exceeding predetermined limits on containment high range radiation monitors under LOCA conditions is indicative of possible fuel failures. In addition, this indicator is utilized as an indicator of RCS loss and potential containment loss.

! Other Radiation Monitors: Other process and area radiation monitoring systems are specifically designed to provide indication of possible fuel damage such as Area Radiation Monitoring Systems.

! Refueling Accidents: Both area and process radiation monitoring systems. designed to detect fission products during refueling conditions as well as visual observation can be utilized to indicate loss or potential loss of spent fuel cladding integrity .

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.1 Coolant Activity

1.1.1 Notification of an Unusual Event

Coolant activity > **2 ΦCi/gm** I-131 equiva lent

NUMARC IC:

Fuel clad degradation

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This EAL addresses reactor coolant samples exceeding coolant technical specifications for iodine spiking.

PEG Reference(s):

SU4.2

Basis Reference(s):

1. [CTS]Technical Specification 3.6.C [ITS]3.4.6 and [CTS]Radiological Effluent Technical Specifications 3.5 [ITS]3.7.5

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.1 Coolant Activity

1.1.2 Alert

Coolant activity > **300 ΦCi/gm** I-131 equi valent

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost. Therefore, declaration of an Alert is warranted.

PEG Reference(s):

FC1.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.2 Off-gas Activity

1.2.1 Notification of an Unusual Event

off-gas radiation ∃ **hi-hi alarm** for > 15 min.

NUMARC IC:

Fuel clad degradation

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Elevated off-gas radiation activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. The Technical Specification allowable limit is [CTS]500,000 ΦCi/sec [ITS]600,000 ΦCi/sec(recombiner discharge gross noble gases beta and/or gamma). The hi-hi alarm setpoint is set at 50% of the instantaneous release limit. The hi-hi alarm setpoint has been conservatively selected because it is operationally significant and is readily recognizable by Control Room operating staff. 15 minutes is allotted for operator action to reduced the off-gas radiation levels and exclude transient conditions.

The hi-hi off-gas radiation alarm is set at 1000 mR/hr on 17RM-150 A and B.

PEG Reference(s):

SU4.1

Basis Reference(s):

1. PSP-14 Main Steam Line and SJAE Radiation Monitor Calibration

2. AOP-3 High Activity in Reactor Coolant or Off-gas

3. [CTS]Technical Specifications 3.6.C [ITS]3.4.6

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.2 Off-gas Activity

1.2.2 Alert

Off-gas radiation ∃ **10 x hi-hi alarm**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL is to cover other indications that may indicate loss or potential loss of the fuel clad barrier. Air ejector off-gas radiation levels >10 times the nominal hi-hi setpoint is indicative of significant fuel cladding failure and is consistent with the Alert EAL of 300 Φ Ci/gm I-131 equivalent coolant activity. The Technical Specification allowable limit is (CTS)500,000 ΦCi/sec (ITS)600,000 ΦCi/sec (recombiner discharge gross noble gases beta and/or gamma). The hi-hi alarm setpoint is set at 50% of the instantaneous release limit and, therefore, a conservative representation of 10 times Technical Specification release limits. The hi-hi alarm setpoint has been conservatively selected because it is operationally significant and readily recognizable by the Control Room operating staff.

The hi-hi off-gas radiation alarm is set at 1000 mR/hr on 17RM-150A and B. 10 times the hi-hi alarm setpoint is therefore 10,000 mR/hr.

PEG Reference(s):

FC4.1

Basis Reference(s):

1. (CTS)Technical Specification 3.2.D and Radiological Effluent Technical Specifications 3.5 (ITS)3.7.5

2. PSP-14 Main Steam Line and SJAE Radiation Monitor Calibration

3. AOP-3 High Activity in Reactor Coolant or Off-gas

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.3 Containment Radiation

1.3.1 Alert

Drywell radiation ∃ **300 R/hr**

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The drywell radiation reading is a value which indicates the release of reactor coolant to the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i. e., within Technical Specifications) into the drywell atmosphere. The 300 R/hr value is conservatively selected from EAP-44 Figures V-2 thru V-5 based on Case #5 (1/10th of 1% noble gas release) one hour after shutdown. The reading is less than that specified for EAL 1.3.2 because no damage to the fuel clad is assumed. Only leakage from the RCS is assumed in this EAL.

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

RCS3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5

2. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.3 Containment Radiation

1.3.2 Site Area Emergency

Drywell radiation ∃ **3000 R/hr**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 Φ Ci/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed within Technical Specifications (including iodine spiking) and are therefore indicative of fuel damage (approximately 2% - 5% clad failure depending on core inventory and RCS volume). The 3000 R/hr value was conservatively selected from EAP-44 Figures V-2 thru V-5 based on Case #4 (1% noble gas release) one hour after shutdown. The reading is higher than that specified for EAL 1.3.1 and, thus, this EAL indicates a loss of both the fuel clad barrier and the RCS barrier.

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

FC3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5

2. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.3 Containment Radiation

1.3.3 General Emergency

Drywell radiation ∃ **250,000 R/hr**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss, Containment potential loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The drywell radiation reading is a value which indicates significant fuel damage well in excess of that required for loss of the RCS barrier and the fuel clad barrier. NUREG-1228 "Source 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%. The 250,000 R/hr value was conservatively selected from EAP-44 Figures V-2 thru V-5 based on Case #3 (10% noble gas release) one hour after shutdown. A major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure into the reactor coolant has occurred. Regardless of whether the primary 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 and upgrade the emergency classification to a General Emergency.

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

PC3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5

2. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.1 Notification of an Unusual Event

Any sustained ARM reading > **100 x alarm** or offscale hi resulting from an uncontrolled process

NUMARC IC:

Unexpected increase in plant radiation or airborne concentration.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Valid elevated area radiation levels usually have long lead times relative to the potential for radiological release beyond the site boundary, thus impact to public health and safety is very low.

This EAL addresses unplanned increases in radiation levels inside the plant. These radiation levels represent a degradation in the control of radioactive material and a potential degradation in the level of safety of the plant. Area radiation levels above 100 times the alarm setpoint have been selected because they are readily identifiable on ARM instrumentation. The ARM alarm setpoint is considered to be a bounding value above the maximum normal radiation level in an area. Since ARM setpoints are nominally set one decade over normal levels, 100 times the alarm setpoint provides an appropriate threshold for emergency classification. For those ARMS whose upper range limits are less than 100 times the alarm setpoint, a value of offscale high is used. This EAL escalates to an Alert, if the increases impair the level of safe plant operation.

PEG Reference(s):

AU2.4

Basis Reference(s):

1. EOP-5 Secondary Containment Control

2. AOP-53 Loss of Spent Fuel Pool, Reactor Cavity or Equipment Storage Pit Water Level

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.2 Alert

Sustained Refuel Floor Exhaust Radiation Monitors 17RM-456A or B

∃ **hi-hi alarm**

OR

Any sustained refuel floor rad monitor > its Maximum Safe Operating Value, Table 1.1

Table 1.1 Refuel Floor Rad Monitors	
18RM-021-12 Spent Fuel Pool (EPIC Pt. A-1229)	1000mR/hr
18RM-021-14 New Fuel Vault (EPIC Pt. A-1231)	1000 mR/hr
18RM-021-30 Refuel Floor West (EPIC Pt. A-1247)	200,000 mR/hr

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

Sufficient time exists to take corrective actions for these conditions and there is little potential for substantial fuel damage. NUREG/CR-4982 "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82" indicates that even if corrective actions are not taken, no prompt fatalities are predicted and the risk of injury is low. In addition, NRC Information Notice No. 90-08, "KR-85 Hazards from Decayed Fuel" presents the following it its discussion:

"In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel on site, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's Protective Action Guides. Accordingly, it is important to be able to properly survey and monitor for Kr-85 in the event of an accident with decayed spent fuel."

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

Thus, an Alert Classification for this event is appropriate. Escalation, if appropriate, would occur via Emergency Director judgment in EAL Category 9.0.

The basis for the reactor building ventilation monitor setpoint is a spent fuel handling accident and is, therefore, appropriate for this EAL.

Area radiation levels on the refuel floor at or above the Maximum Safe

Operating value are indicative of radiation fields which may limit personnel access. Access to the refuel floor is required in order to visually observe water level in the spent fuel pool. Without access to the refuel floor, it would not be possible to determine the applicability of EAL 1.5.2. Area radiation levels on the refuel floor at or above the Maximum Safe Operating value could also adversely affect equipment whose operation may be needed to assure adequate core cooling or shutdown the reactor.

PEG Reference(s):

AA2.1

Basis Reference(s):

1. NUREG-0818, Emergency Action Levels for Light Water Reactors
2. NUREG/CR-4982, Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82, July 1987
3. NRC Information Notice No. 90-08, KR-85 Hazards from Decayed Fuel
4. EOP-5 Secondary Containment Control
5. OP-32 Area Radiation Monitoring
6. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.3 Alert

Sustained area radiation levels > **15 mR/hr** in either:

Control Room

OR

Central Alarm Station and Secondary Alarm Station (SAS)

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses increased radiation levels that impede necessary access to operating stations requiring continuous occupancy to maintain safe plant operation or perform a safe plant shutdown. Areas requiring continuous occupancy include the Control Room, the central alarm station (CAS) and the secondary alarm station (SAS). The security alarm stations are included in this EAL because of their importance to permitting access to areas required to assure safe plant operations.

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

It is the impaired ability to operate the plant that results in the actual or potential degradation of the level of safety of the plant. The cause 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 EALs may be involved. For example, a dose rate of 15 mR/hr in the Control Room may be a problem in itself.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.3 Alert

However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, a Site Area Emergency or a General Emergency may be indicated by other EAL categories.

This EAL could result in declaration of an Alert at JAFNPP due to a radioactivity release or radiation shine resulting from a major accident at the NMP-1 or NMP-2. Such a declaration would be appropriate if the increase impairs safe plant operation.

This EAL is not intended to apply to anticipated temporary radiation increases due to planned events (e. g., radwaste container movement, depleted resin transfers, etc.).

PEG Reference(s):

AA3.1

Basis Reference(s):

1. GDC 19

2. NUREG-0737, "Clarification of TMI Action Plan Requirements", Section III.D.3

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.4 Alert

Sustained abnormal area radiation levels > **8 R/hr** in any areas, Table 1.2

AND

Access is required for safe operation or shutdown

Table 1.2 Plant Safety Function Areas
• Reactor Building • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Administration Building

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses increased radiation levels in areas requiring infrequent access in order to maintain safe plant operation or perform a safe plant shutdown. Area radiation levels at or above 8 R/hr are indicative of radiation fields which may limit personnel access or adversely affect equipment whose operation may be needed to assure adequate core cooling or shutdown the reactor. This basis of the value is described in NMPC memo File Code NMP31027 "Exposure Guidelines For Unusual/Accident Conditions".

The areas selected are consistent with those listed in other EALs and represent those structures which house systems and equipment necessary for the safe operation and shutdown of the plant.

It is the impaired ability to operate the plant that results in the actual or potential degradation of the level of safety of the plant. The cause 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. For example, a dose rate of 8 R/hr may be a problem in itself.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.4 Other Radiation Monitors

1.4.4 Alert

However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, a Site Area Emergency or a General Emergency may be indicated by other EAL categories.

This EAL could result in declaration of an Alert at JAFNPP due to a radioactivity release or radiation shine resulting from a major accident at the NMP-1 or NMP-2. Such a declaration would be appropriate if the increase impairs safe plant operation.

This EAL is not meant to apply to increases in the containment radiation monitors as these are events which are addressed in other EALs. Nor is it intended to apply to anticipated temporary radiation increases due to planned events (e. g., radwaste container movement, depleted resin transfers, etc.).

PEG Reference(s):

AA3.2

Basis Reference(s):

1. Niagara Mohawk Power Corporation memo File Code NMP31027 "Exposure Guidelines For Unusual/Accident Conditions", Revision 1, 3/18/93

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.5 Refueling Accidents

1.5.1 Notification of an Unusual Event

Spent fuel pool/ reactor cavity water level cannot be restored and maintained above the spent fuel pool low water level alarm

NUMARC IC:

Unexpected increase in plant radiation or airborne concentration.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The above event has a long lead time relative to the potential for radiological release outside the site boundary, thus impact to public health and safety is very low. However, in light of recent industry events, classification as an Notification of an Unusual Event is warranted as a precursor to a more serious event.

The spent fuel pool low water level alarm setpoint is actuated by 19LS-60. 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. Water level restoration instructions are performed in accordance with AOP-53.

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

PEG Reference(s):

AU2.1

Basis Reference(s):

1. AOP-53 Loss of Spent Fuel Pool, Reactor Cavity or Equipment Storage Pit Water Level

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.5 Refueling Accidents

1.5.2 Alert

Report of visual observation of irradiated fuel uncovered

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

Sufficient time exists to take corrective actions for these conditions and there is little potential for substantial fuel damage. NUREG/CR-4982 "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82" indicates that even if corrective actions are not taken, no prompt fatalities are predicted and the risk of injury is low. In addition, NRC Information Notice No. 90-08, "KR-85 Hazards from Decayed Fuel" presents the following it its discussion:

"In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel on site, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's Protective Action Guides. Accordingly, it is important to be able to properly survey and monitor for Kr-85 in the event of an accident with decayed spent fuel."

Thus, an Alert Classification for this event is appropriate. Escalation, if appropriate, would occur by Emergency Director judgment in EAL Category 9.0.

There is no indication that water level in the spent fuel pool has dropped to the level of the fuel other than by visual observation by personnel on the refueling floor. When the fuel transfer canal is directly connected to the spent fuel pool and reactor cavity, there could exist the possibility of uncovering irradiated fuel in the fuel transfer canal. Therefore, this EAL is applicable for conditions in which irradiated fuel is being transferred to and from the RPV and spent fuel pool.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.5 Refueling Accidents

1.5.2 Alert

This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

PEG Reference(s):

AA2.2

Basis Reference(s):

1. NUREG-0818, Emergency Action Levels for Light Water Reactors

2. NUREG/CR-4982, Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82, July 1987

3. NRC Information Notice No. 90-08, KR-85 Hazards from Decayed Fuel

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.6 ISFSI Events

1.6.1 Notification of an Unusual Event

Sustained radiation reading for irradiated spent fuel in dry storage, Table 1.3

TABLE 1.3	
OVERPACK Average Surface Dose Rates	***TRANSFER CASK Average Surface Dose Rates***
>80 mrem/hour (neutron + gamma) on the side	>260 mrem/hour (neutron + gamma) on the side
>20 mrem/hour (neutron + gamma) on the top	>80 mrem/hour (neutron + gamma) on the top
>32 mrem/hour (neutron + gamma) at the inlet and outlet vent ducts	

NEI IC:

Unexpected Increase in ISFSI Radiation.

Operating Mode Applicability: All

Basis:

This EAL addresses the degradation of irradiated spent fuel stored onsite in dry storage casks or transfer casks. These casks are designed to standards identified in 10 CFR Part 72. The dry storage casks are routinely monitored by site Radiation Protection/Health Physics personnel, such that any degradation would be detected. Increases in radiation levels may indicate a potential criticality event. Readings in excess of [*two times ISFSI Technical Specification limits*] are indicative of degradation of the irradiated spent fuel or storage cask confinement boundary.

The JAF ISFSI employs use of HI-STORM 100 System casks for temporary onsite storage of JAF spent nuclear fuel. Degradation of the spent fuel cask radiation shield or degradation of the confinement boundary due to an operational event or environmental phenomena could result in dose rates and/or radionuclide releases that exceed normal doses.

Loss of water within the HI-TRAC transfer cask water jacket reduces shielding effectiveness and may result in dose rates that exceed normal levels. However, the dose rate at 100 meters from the damaged transfer cask is estimated to be less than 1 mrem/hr.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.6 ISFSI Events

1.6.1 Notification of an Unusual Event

Basis References:

1. Holtec International Inc. Report HT-2002444, Revision 0, , HI-STORM Cask System Final Safety Analysis Report, Docket 72-1014.

2. 10CFR72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, October 25, 2000

NEI Reference:

1. E-AU1

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.6 ISFSI Events

1.6.2 Notification of an Unusual Event

Damage or breach of ANY loaded spent fuel cask confinement boundary resulting from natural phenomena events or an accident

OR

Any condition, in the opinion of the Emergency Director, that indicates loss of loaded fuel storage cask confinement boundary.

NEI IC:

Damage to a loaded cask confinement boundary.

Operating Mode Applicability: All

Basis:

An Unusual Event under this EAL is classified 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.

The JAF ISFSI employs use of HI-STORM System casks for temporary onsite storage of JAF spent nuclear fuel. Degradation of the spent fuel cask radiation shield or degradation of the confinement boundary due to an operational event or environmental phenomena could result in dose rates and/or radionuclide releases that exceed normal doses.

The dry storage modules are designed to standards identified in 10 CFR Part 72. The dry storage casks are routinely monitored by site Radiation Protection/Health Physics personnel, such that any degradation would be detected. Increases in area or surface contamination levels may be indicative of degradation of the irradiated spent fuel or storage cask containment boundary.

A tip-over accident or a tornado missile could cause localized damage to the HI-STORM overpack shielding. This could cause overpack surface dose rates in the affected area to increase, but there is not expected to be a noticeable increase in the ISFSI site or controlled area boundary dose rates. Although the Cask System Safety Analysis Report indicates that there are no man-made or natural phenomena that could cause failure of the MPC confinement boundary, this EAL addresses all mechanistically possible events that may occur.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

1.0 Reactor Fuel 1.6 ISFSI Events

1.6.2 Notification of an Unusual Event

Basis References:

1. Holtec International Inc. Report HT-2002444, Revision 0, HI-STORM Cask System Final Safety Analysis Report, Docket 72-1014.

2. 10CFR72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, June 30, 1999

NEI Reference:

1. E-HU1

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 REACTOR PRESSURE VESSEL (RPV)

The reactor pressure vessel provides a volume for the coolant which covers the reactor core. The RPV and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel cladding integrity fail.

There are two RPV parameters which are indicative of conditions which may pose a threat to RPV or fuel cladding integrity:

- RPV Water Level: RPV water level is directly related to the status of adequate core cooling, and therefore fuel cladding integrity. Excessive (> Tech. Spec.) reactor coolant to drywell leakage indications are utilized to indicate potential pipe cracks which may propagate to an extent threatening fuel clad, RPV and primary containment integrity. Conditions under which all attempts at establishing adequate core cooling have failed require primary containment flooding.

- Reactor Power/Reactivity Control: The inability to control reactor power below certain levels can pose a direct threat to reactor fuel, RPV and primary containment integrity.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.1 RPV Water Level

2.1.1 Notification of an Unusual Event

Unidentified drywell leakage > **10 gpm**

OR

Reactor coolant to drywell identified leakage > **25 gpm**

NUMARC IC:

RCS leakage

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The conditions of this EAL may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified drywell leakage was selected because it is observable with normal Control Room indications. Smaller values must be determined through time-consuming surveillance tests (e. g., mass balances). The 25 gpm value for identified reactor coolant to drywell leakage is set at a higher value because of the significance of identified leakage in comparison to unidentified or pressure boundary leakage.

Only operating modes in which there is fuel in the reactor coolant system and the system is pressurized are specified.

PEG Reference(s):

SU5.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.1 RPV Water Level

2.1.2 Site Area Emergency

RPV water level cannot be restored and maintained > **0 in.** (TAF)

NUMARC IC:

Loss of reactor vessel water level has or will uncover fuel in the reactor vessel.

FPB loss/potential loss:

Fuel clad potential loss, RCS loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown, cold shutdown, refuel

Basis:

The RPV water level used in this EAL is the top of active fuel (TAF). This value corresponds to the level which is used to indicate challenge to core cooling and the potential loss of the fuel clad barrier.

Sustained uncovery of the fuel irrespective of the event that causes fuel uncovery is justification alone for declaring a Site Area Emergency. This includes events that could lead to fuel uncovery in any plant operating mode including cold shutdown and refuel. Escalation to a General Emergency occurs through radiological effluence addressed in EAL 1.3.3 for drywell radiation and in the EALs defined for Category 5.0, Radioactivity Release.

The terminology of "cannot be restored and maintained" is intended to be consistent with the interpretation that:

"The value of the identified parameter(s) is/is not able to be returned to above/below specified limits. This determination includes making an evaluation that considers both current and future systems performance in relation to the current value and trend of the parameter(s).

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.1 RPV Water Level

2.1.2 Site Area Emergency

Neither implies that the parameter must actually exceed the limit before the classification is made nor that the classification must be made before the limit is reached. Does not imply any specific time interval but does not permit prolonged operation beyond a limit without making the specified classification."

This definition would require the emergency classification be made prior to water level dropping below TAF if, based on an evaluation of the current trend of RPV water level and in consideration of current and future injection system performance, that RPV water level will not likely be restored and maintained above TAF. This definition, however, also provides the latitude, based on that same evaluation, not to declare the SAE for those situations in which the RPV water level transiently drops below TAF in the process of RPV water level restoration.

PEG Reference(s):

SS5.1

FC2.1

RCS4.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.1 RPV Water Level

2.1.3 General Emergency

Primary Containment Flooding required

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss, Containment potential loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The condition in this EAL represents imminent melt sequences which, if not corrected, could lead to RPV failure and increased potential for primary containment failure. If the EOPs have been ineffective in restoring RPV water level, loss of the fuel clad barrier is imminent. Therefore, declaration of a General Emergency is appropriate when Primary Containment Flooding is required.

PEG Reference(s):

PC4.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.1 Alert

Any RPS setpoint has been exceeded

AND

Automatic scram fails to result in a control rod pattern which assures reactor shutdown under all conditions without boron

NUMARC IC:

Failure of Reactor Protection system instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection system setpoint has been exceeded and manual trip was successful while in power operations or hot standby

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby

Basis:

This condition indicates failure of the automatic protection system to scram the reactor to the extent that reactor shutdown cannot be assured under all conditions without boron.

If a manual scram does not result in reactor power being reduced below the APRM downscale setpoint (2.5%) or torus temperature exceeds the Boron Injection Inititiation Temperature, escalation to a Site Area Emergency is required. A manual scram is any set of actions by the reactor operators at the reactor control console which causes control rods to be rapidly inserted into the core and brings the reactor subcritical including manual scram push buttons, ARI and mode switch.

In determining whether to declare an emergency based on this EAL the following guidance is provided by NUMARC:

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.1 Alert

Regarding the occurrence of an event in which the EAL is reached with no adverse consequences:

"If an emergency condition no longer exists, there is no reason to declare an emergency. The NRC shall be notified after discovery within 1 hour, meeting 10CFR50.72 reporting criteria. State and local authorities should also be notified as soon as practical, or in accordance with arrangements made in advance."

PEG Reference(s):

SA2.1

Basis Reference(s):

1. JAFNPP EPG/SAG

2. "Methodology for Development of Emergency Action Levels" NUMARC/NESP-007 Revision 2 - Questions and Answers, June 1993

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.2 Site Area Emergency

Any RPS setpoint has been exceeded

AND

Automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown under all conditions without boron

AND Either:

Reactor power > **2.5%**

OR

Torus temperature > Boron Injection Initiation Temperature

NUMARC IC:

Failure of Reactor Protection system instrumentation to complete or initiate an automatic reactor trip once a Reactor Protection system setpoint has been exceeded and manual scram trip was not successful.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby

Basis:

This condition indicates failure of the automatic and/or manual protection system to scram the reactor to the extent which precludes the reactor being made shutdown under all conditions without boron. Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that lead to imminent loss or potential loss of both fuel clad and primary containment.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.2 Site Area Emergency

The failure of automatic initiation of a reactor scram followed by unsuccessful manual initiation actions which can be rapidly taken at the reactor control console does not, by itself, lead to imminent loss of either fuel clad or primary containment barriers. It is the continued criticality under conditions requiring a reactor scram along with the continued addition of heat to containment which poses the imminent threat to primary containment or fuel clad barriers. In accordance with the EOPs, SLC is initiated based on heat addition to containment in excess of safety system capability under failure to scram conditions.

An immediate manual scram is any set of actions by the reactor operator at the reactor control console which causes control rods to be rapidly inserted into the core and brings the reactor subcritical including manual scram push buttons, ARI and mode switch.

PEG Reference(s):

SS2.1

Basis Reference(s):

1. JAFNPP EPG/SAG

2. "Methodology for Development of Emergency Action Levels" NUMARC/NESP-007 Revision 2 - Questions and Answers, June 1993

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.3 General Emergency

Any RPS setpoint has been exceeded

AND

Automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown under all conditions without boron

AND Either:

RPV water level cannot be restored and maintained > **-19 in.**

OR

Torus temperature and RPV pressure cannot be maintained < **HCTL**

NUMARC IC:

Failure of the Reactor Protection System to complete an automatic trip and manual trip was not successful and there is indication of an extreme challenge to the ability to cool the core.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby

Basis:

Under the conditions of this EAL, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed.

An extreme challenge to the ability to cool the core is indicated when RPV water level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level (-19 in.). This RPV water level is used in the EPG/SAG to define the lowest RPV water level in a failure-to-scram event above which adequate core cooling can be maintained. This situation could be precursor for a core melt sequence.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

2.0 Reactor Pressure Vessel 2.2 Reactor Power / Reactivity Control

2.2.3 General Emergency

An extreme challenge to the primary containment is indicated when the inability to remove heat during the early stages of this sequence results in heatup of the containment. The Heat Capacity Temperature Limit (HCTL) is a measure of the maximum heat load which the primary containment can withstand. This situation could be precursor for a core melt sequence.

In this situation, core degradation can occur rapidly For this reason, the General Emergency declaration is intended to be anticipatory of the loss of two fission product barriers and a potential loss of a third thus permitting the maximum offsite intervention time.

An immediate manual scram is any set of actions by the reactor operator at the reactor control console which causes control rods to be rapidly inserted into the core and brings the reactor subcritical including manual scram push buttons, ARI and mode switch.

PEG Reference(s):

SG2.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 PRIMARY CONTAINMENT (PC)

The primary containment structure is a pressure suppression system. It forms a fission product barrier designed to limit the release of radioactive fission products generated from any postulated accident so as to preclude exceeding offsite exposure limits.

The primary containment structure is a low leakage pressure suppression system housing the reactor pressure vessel (RPV), the reactor coolant recirculation piping and other branch connections of the reactor primary system. The primary containment is equipped with isolation valves for most systems which penetrate the containment boundary. These valves automatically actuate to isolate systems under emergency conditions.

There are four primary containment parameters which are indicative of conditions which may pose a threat to primary containment integrity or indicate degradation of RPV or reactor fuel integrity.

- Primary Containment Pressure: Excessive primary containment pressure is also indicative of either primary system leaks into containment or loss of containment cooling function. Primary containment pressures at or above specified limits pose a direct threat to primary containment integrity and the pressure suppression function.
- Torus Temperature: Excessive torus water temperatures can result in a loss of the pressure suppression capability of containment and thus be indicative of severely degraded RPV and containment conditions.
- Combustible Gas Concentrations: The existence of combustible gas concentrations in containment pose a severe threat to containment integrity and are indicative of severely degraded reactor core and/or RPV conditions.
- Containment Isolation Status: The existence of an unisolable steam line break outside containment constitutes a loss of containment integrity as well as a loss of RCS boundary. Should a loss of fuel cladding integrity occur, the potential for release of large amounts of radioactive materials to the environment exists.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment 3.1 Containment Pressure

3.1.1 Alert

Primary containment pressure cannot be maintained < **2.7 psig** due to coolant leakage

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The drywell pressure value is the drywell high pressure scram setpoint and is indicative of a LOCA event. The term "cannot be maintained below" is intended to be consistent with the conditions specified in the Primary Containment Control EOP indicative of a high energy release into containment for which normal containment cooling systems are insufficient.

PEG Reference(s):

RCS2.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment 3.1 Containment Pressure

3.1.2 Site Area Emergency

Primary containment pressure cannot be maintained **< 2.7 psig**

AND

Coolant activity **> 300 ΦCi/gm**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The drywell pressure value is the drywell high pressure scram setpoint and is indicative of a LOCA event. The term "cannot be maintained below" is intended to be consistent with the conditions specified in the Primary Containment Control EOP indicative of a high energy release into containment for which normal containment cooling systems are insufficient.

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost.

The combination of these conditions represents a loss of two fission product barriers and, therefore, declaration of a Site Area Emergency is warranted.

PEG Reference(s):

FC1.1

RCS2.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment **3.1 Containment Pressure**

3.1.3 General Emergency

Primary containment venting is required due to **PCPL**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Loss of primary containment is indicated when proximity to the Primary Containment Pressure Limit (PCPL) requires venting irrespective of the offsite radioactivity release rate. To reach the PCPL, primary containment pressure must exceed that predicted in any plant design basis accident analysis. A loss of the RCS barrier must have occurred with a potential loss of the fuel clad barrier.

PEG Reference(s):

PC1.3

PC2.2

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment 3.2 Torus Temperature

3.2.1 Site Area Emergency

Torus temperature and RPV pressure cannot be maintained < **HCTL** (non-ATWS)

NUMARC IC:

Complete loss of function needed to achieve or maintain hot shutdown with reactor coolant > 212 EF.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL addresses complete loss of functions, including ultimate heat sink, required for hot shutdown with the reactor at pressure and temperature. Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted.

Functions required for hot shutdown consist of the ability to achieve reactor shutdown and to discharge decay heat energy from the reactor to the ultimate heat sink. Inability to remove decay heat energy is reflected in an increase in suppression pool temperature. Elevated suppression pool temperature is addressed by the Heat Capacity Temperature Limit (HCTL). The HCTL is a function of RPV pressure and suppression pool temperature. If RPV pressure and suppression pool temperature cannot be maintained below the HCTL, the ultimate heat sink is threatened and declaration of a Site Area Emergency is warranted.

"non-ATWS" has been added parenthetically to discriminate from General Emergency EAL 2.2.4.

PEG Reference(s):

SS4.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment **3.3 Combustible Gas Concentration**

3.3.1 Site Area Emergency

∃ **4%** H_2 exists in DW or torus

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss

Mode Applicability:

All

Basis:

A 4% hydrogen concentration is generally considered the lower boundary of the range in which localized deflagrations may occur. To generate such a concentration of combustible gas, loss of both the fuel clad and RCS barriers must have occurred. Therefore, declaration of a Site Area Emergency is warranted.

If hydrogen concentrations increase in conjunction with the presence of oxygen to global deflagration levels (i.e. ∃ 6% hydrogen and ∃ 5% oxygen), venting of the containment irrespective of the offsite radioactive release rate would be required as well as declaration of a General Emergency.

PEG Reference(s):

SS5.2

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment 3.3 Combustible Gas Concentration

3.3.2 General Emergency

Primary containment venting is required due to combustible gas concentrations

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss, RCS loss, Containment loss

Mode Applicability:

All

Basis:

6% hydrogen concentration in the presence of 5% oxygen concentration is the lowest concentration at which a deflagration inside of the primary containment could occur. When hydrogen and oxygen concentrations reach or exceed combustible limits, imminent loss of the containment barrier exists. To generate such levels of combustible gas, loss of the fuel clad and RCS barriers must have occurred. Venting of the containment irrespective of the offsite radioactive release rate is required for this condition.

PEG Reference(s):

PC1.4

PC2.2

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment 3.4 Containment Isolation Status

3.4.1 Site Area Emergency

Any steam line or RWCU isolation failure resulting in a release pathway outside primary containment, Table 3.1

Table 3.1 Steam Lines
MSLs
HPCI
RCIC

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL covers containment isolation failures allowing a direct flow path to the environment such as failure of both MSIVs to close with open valves downstream to the turbine or to the condenser. A release pathway outside primary containment exists when steam flow is not prevented by downstream isolations. In the case of a failure of both isolation valves to close but in which no downstream flowpath exists, declaration under this EAL would not be required. The conditions of this EAL represent the loss of both the RCS barrier and the primary containment barrier and thus justifies declaration of a Site Area Emergency.

PEG Reference(s):

PC2.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment **3.4 Containment Isolation Status**

3.4.2 General Emergency

Any steam line or RWCU isolation failure resulting in a release pathway outside primary containment, Table 3.1

AND any:

- Coolant activity > **300 ΦCi/gm** I-131 equi valent
- RPV water level < **0 in.** (TAF)
- DW radiation > **3000 R/hr**

Table 3.1 Steam Lines
MSLs
HPCI
RCIC

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss/potential loss, RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The conditions of this EAL include the containment isolation failures allowing a direct flow path to the environment. A release pathway outside primary containment exists when steam flow is not prevented by downstream isolations. In the case of a failure of both isolation valves to close but in which no downstream flowpath exists, declaration under this EAL would not be required. Containment isolation failures which result in a release pathway outside primary containment are the basis for declaration of Site Area Emergency in EAL 3.5.1.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

3.0 Containment **3.4 Containment Isolation Status**

When isolation failures are accompanied by elevated coolant activity, RPV water level below TAF, or high drywell radiation, declaration of a General Emergency is appropriate due to loss of the primary containment barrier, RCS barrier, and loss or potential loss of the fuel clad barrier.

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost.

The RPV water level used in this EAL is the top of active fuel (TAF). This value corresponds to the level which is used in EOPs to indicate challenge to core cooling and loss of the fuel clad barrier. This is the minimum water level to assure core cooling without further degradation of the clad. Severe core damage can occur and reactor coolant system pressure boundary integrity may not be assured if RPV water level is not maintained above TAF.

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 Φ Ci/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed within Technical Specifications (including iodine spiking) and are therefore indicative of fuel damage (approximately 2% - 5% clad failure depending on core inventory and RCS volume).

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

PC2.1 and FC1.1

PC2.1 and FC2.1

PC2.1 and FC3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5
2. JAFNPP EPG/SAG
3. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 SECONDARY CONTAINMENT (SC)

The secondary containment is comprised of the reactor building and associated ventilation, isolation and effluent systems. The secondary containment serves as an effective fission product barrier and is designed to minimize any ground level release of radioactive materials which might result from a serious accident.

The reactor building provides secondary containment during reactor operation and serves as primary containment when the reactor is shutdown and the drywell is open, as during refueling. Because the secondary containment is an integral part of the complete containment system, conditions which pose a threat to vital equipment located in the secondary containment are classifiable as emergencies.

There are two secondary containment parameters which are indicative of conditions which may pose a threat to secondary containment integrity or equipment located in secondary containment or are indicative of a direct release by a primary system into secondary containment:

- Secondary Containment Temperatures: Abnormally high secondary containment area temperatures can also pose a threat to the operability of vital equipment located inside secondary containment including RPV water level instrumentation. High area temperatures may limit personnel accessibility to vital areas. High area temperatures may also be indicative of either primary system discharges into secondary containment or fires.

- Secondary Containment Area Radiation Levels: Abnormally high area radiation levels in secondary containment, although not necessarily posing a threat to equipment operability, may pose a threat to personnel safety and the ability to operate vital equipment due to a lack of accessibility. Abnormally high area radiation levels may also be the result of a primary system discharging into the secondary containment and be indicative of precursors to significant radioactivity release to the environment.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.1 Reactor Building Temperature

4.1.1 Site Area Emergency

Primary system is discharging outside PC

AND

RB area temperatures are > maximum safe operating levels in two or more areas, EOP-5

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The presence of elevated area temperatures in the secondary containment may be indicative of an unisolable primary system leakage outside the primary containment. These conditions represent a loss of the containment barrier and a potential loss of the RCS barrier.

PEG Reference(s):

PC2.3

RCS1.3

Basis Reference(s):

1. JAFNPP EPG/SAG

2. F-EOP-5

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.1 Reactor Building Temperature

4.1.2 General Emergency

Primary system is discharging outside PC

AND

RB area temperatures are > maximum safe operating levels in two or more areas, EOP-5

AND any:

- Coolant activity > **300 ΦCi/gm** I-131 equi valent
- RPV water level **< 0 in.** (TAF)
- DW radiation **> 3000 R/hr**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss/potential loss, RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The presence of elevated area temperatures in the secondary containment may be indicative of an unisolable primary system leakage outside the primary containment. These conditions represent a loss of the containment barrier and a potential loss of the RCS barrier.

When secondary containment area temperatures are accompanied by elevated coolant activity, RPV water level below TAF, or high drywell radiation, declaration of a General Emergency is appropriate due to loss of the primary containment barrier, RCS barrier, and loss or potential loss of the fuel clad barrier.

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.1 Reactor Building Temperature

The RPV water level used in this EAL is the top of active fuel (TAF). This value corresponds to the level which is used in EOPs to indicate challenge to core cooling and potential loss of the fuel clad barrier. This is the minimum desired water level to assure long-term core cooling without further degradation of the clad. Severe core damage can occur and reactor coolant system pressure boundary integrity may not be assured if RPV water level is not maintained above TAF.

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 ΦCi/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant activity concentrations of this magnitude are several times larger than the maximum concentrations allowed within Technical Specifications (including iodine spiking) and are therefore indicative of fuel damage (approximately 2% - 5% clad failure depending on core inventory and RCS volume).

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

PC2.3 and FC1.1

PC2.3 and FC2.1

PC2.3 and FC3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5
2. JAFNPP EPG/SAG
3. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"
4. F-EOP-5

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.2 Reactor Building Radiation Level

4.2.1 Site Area Emergency

Primary system is discharging outside PC

AND

RB area radiation levels are > maximum safe operating levels in two or more areas, EOP-5

NUMARC IC:

N/A

FPB loss/potential loss:

RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The presence of elevated area radiation levels in the secondary containment may be indicative of an unisolable primary system leakage outside the primary containment. These conditions represent a loss of the containment barrier and a potential loss of the RCS barrier.

PEG Reference(s):

PC2.3

RCS1.3

Basis Reference(s):

1. JAFNPP EPG/SAG

2. F-EOP-5

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.2 Reactor Building Radiation Level

4.2.2 General Emergency

Primary system is discharging outside PC

AND

RB area radiation levels are > maximum safe operating levels in two or more areas, EOP-5

AND any:

- Coolant activity > **300 ΦCi/gm** I-131 equi valent
- RPV water level < **0 in.** (TAF)
- DW radiation > **3000 R/hr**

NUMARC IC:

N/A

FPB loss/potential loss:

Fuel clad loss/potential loss, RCS loss, Containment loss

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The presence of elevated area radiation levels in the secondary containment may be indicative of an unisolable primary system leakage outside the primary containment. These conditions represent a loss of the containment barrier and a potential loss of the RCS barrier.

When secondary containment radiation levels are accompanied by elevated coolant activity, RPV water level below TAF, or high drywell radiation, declaration of a General Emergency is appropriate due to loss of the primary containment barrier, RCS barrier, and loss or potential loss of the fuel clad barrier.

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

4.0 Secondary Containment 4.2 Reactor Building Radiation Level

4.2.2 General Emergency

This amount of coolant activity is well above that expected for iodine spikes and corresponds to about 2% to 5% fuel clad damage. When reactor coolant activity reaches this level, significant clad heating has occurred and thus the fuel clad barrier is considered lost.

The RPV water level used in this EAL is the top of active fuel (TAF). This value corresponds to the level which is used to indicate challenge to core cooling and loss of the fuel clad barrier.

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μCi/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant activity concentrations of this magnitude are several times larger than the maximum concentrations allowed within Technical Specifications (including iodine spiking) and are therefore indicative of fuel damage (approximately 2% - 5% clad failure depending on core inventory and RCS volume).

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell radiation monitors are 17-RE-104 A or B.

PEG Reference(s):

PC2.3 and FC1.1

PC2.3 and FC2.1

PC2.3 and FC3.1

Basis Reference(s):

1. EAP-44 Core Damage Estimation Figures V-2 thru V-5

2. JAFNPP EPG/SAG

3. Calculation SL-4370, Sargent & Lundy, May 1985 "High Range Containment Monitor Response to Post Accident Fission Product Barrier Releases - JAFNPP"

4. F-EOP-5

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 RADIOACTIVITY RELEASE

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

There are two basic indications of radioactivity release rates which warrant emergency classifications.

- Effluent Monitors: Direct indication of effluent radiation monitoring systems provides a rapid assessment mechanism to determine releases in excess of classifiable limits.

- Dose Projection and/or Environmental Measurements: Projected offsite doses (based on effluent monitor readings) or actual offsite field measurements indicating doses or dose rates above classifiable limits.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.1 Notification of an Unusual Event

A valid reading from an unplanned release on any monitors Table 5.1 column "NUE" for > 60 min. unless sample analysis can confirm release rates < 2 x technical specifications within this time period.

Table 5.1 Effluent Monitor Classification Thresholds

Low Range Monitors				
Monitor	GE	SAE	Alert	NUE
STACK	See Hi Range	See Hi Range	see Hi range	∃5E5 cps
RX BLDG EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
REFUEL FLR EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
TURB BLDG EXH	See Hi Range	See Hi Range	∃9.9E5 cpm	∃5E4 cpm
RADW BLDG EXH	See Hi Range	See Hi Range	∃9.9E5 cpm	∃2E4 cpm
SW EFF	N/A	N/A	∃40,000 cps	∃400 cps
RADW EFF	N/A	N/A	∃200 x hi-hi trip	∃2 x hi-hi trip
High Range Monitors				
Monitor	GE	SAE	Alert	NUE
STACK	∃11,600 mR/hr	∃1160 mR/hr	∃116 mR/hr	N/A
TURB BLDG EXH	∃12 mR/hr*	∃1.2 mR/hr*	N/A	N/A
RADW BLDG	∃33 mR/hr*	∃3.3 mR/hr*	N/A	N/A

* with its corresponding low range monitors upscale

NUMARC IC:

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological Technical Specifications for 60 minutes or longer.

FPB loss/potential loss:

N/A

Mode Applicability:

All

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.1 Notification of an Unusual Event

Basis:

Valid means that a radiation monitor reading has been confirmed by the operators to be correct. Unplanned releases in excess of two times the site technical specifications 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 Notification of an Unusual Event emergency class) is not the primary concern; 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 T/S for 30 minutes does not exceed this initiating condition. Further, the Emergency Director should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes.

Monitor indications are calculated on the basis of the methodology of the site Offsite Dose Calculation Manual (ODCM) using annual average meteorology.

The basis for these values are represented in JAF-CALC-MULTI-01162. Actual meteorology and release information provide a better indication and should be used when possible. Either dose assessment vales using a predictive model or actual field reading provide the best information for use.

Two times the monitors alarm setpoints have been selected for use in this EAL. The alarm setpoints for the listed monitors are conservatively set to ensure Technical Specification radioactivity release limits are not exceeded. Instrumentation that may be used to assess this EAL is listed below:

RadWaste Effluent Radiation Monitor: 17RM-350

Service Water Radiation Monitor: 17RM-351

Turbine Bldg. Exhaust Radiation Monitor: 17RM-431

Turbine Bldg. Exhaust Radiation Monitor: 17RM-432

Reactor Bldg. Vent Radiation Monitors: 17RM-452A/B

Refuel Floor Vent Duct Radiation Monitors: 17RM-456A/B

RadWaste Bldg. Vent Exhaust Radiation Monitors: 17RM-458A/B

Stack Gas Radiation Monitors: 17RM-50A/B

RBCLC process monitors are not included in this EAL. These monitors detect radiation in the closed cooling water loop. Any leaks into Service Water via heat exchangers would be detected by the Service Water monitors. Therefore, the Service Water radiation monitor adequately detects offsite radioactivity releases from this system.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.1 Notification of an Unusual Event

PEG Reference(s):

AU1.1

Basis Reference(s):

1. OP-31 Process Radiation Monitoring Systems
2. CDP-15 Offsite Dose Calculation Manual
3. JAF-CALC-MULTI-01162.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.2 Alert

A valid reading from an unplanned release on any monitors Table 5.1 column "Alert" for > 15 min. unless dose assessment can confirm releases are below Table 5.2 column "Alert" within this time period.

Table 5.1 Effluent Monitor Classification Thresholds				
Low Range Monitors				
Monitor	GE	SAE	Alert	NUE
STACK	see Hi Range	see Hi Range	see Hi range	∃5E5 cps
RX BLDG EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
REFUEL FLR EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
TURB BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃5E4 cpm
RADW BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃2E4 cpm
SW EFF	N/A	N/A	∃40,000 cps	∃400 cps
RADW EFF	N/A	N/A	∃200 x hi-hi trip	∃2 x hi-hi trip
High Range Monitors				
Monitor	GE	SAE	Alert	NUE
STACK	∃11,600 mR/hr	∃1160 mR/hr	∃116 mR/hr	N/A
TURB BLDG EXH	∃12 mR/hr*	∃1.2 mR/hr*	N/A	N/A
RADW BLDG	∃33 mR/hr*	∃3.3 mR/hr*	N/A	N/A

*with its corresponding low range monitors upscale

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds			
	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.2 Alert

NUMARC IC:

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times radiological Technical Specifications for 15 minutes or longer.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Valid means that a radiation monitor reading has been confirmed by the operators to be correct. This event escalates from the Notification of an Unusual Event by increasing the magnitude of the release by a factor of 100 over the Notification of an Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr basis of the 10CFR20 non-occupational MPC limits for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary dose rate would be 10 mR/hr. The required release duration was reduced to 15 minutes in recognition of the increased severity.

The values for the gaseous effluent radiation monitors are based upon not exceeding 10 mR/hr at the site boundary as a result of the release. The values are derived from JAF-CALC-MULTI-01162. Since the calculated monitor readings for the Reactor, Turbine and RadWaste Building normal range monitors are in excess of the instruments upper range (1E6) but at the very bottom of the corresponding high range instrument, an indication of 9.9E5 cpm on the normal range has been conservatively utilized.

Instrumentation that may be used to assess this EAL is listed below:

RadWaste Effluent Radiation Monitor: 17RM-350
Service Water Radiation Monitor: 17RM-351
Turbine Bldg. Exhaust Radiation Monitor: 17RM-431
Turbine Bldg. Exhaust Radiation Monitor: 17RM-432
Reactor Bldg. Vent Radiation Monitors: 17RM-452A/B
Refuel Floor Vent Duct Radiation Monitors: 17RM-456A/B
RadWaste Bldg. Vent Exhaust Radiation Monitors: 17RM-458A/B
Stack High Range Effluent Monitors: 17RM-53A/B

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release 5.1 Effluent Monitors

5.1.2 Alert

RBCLC process monitors are not included in this EAL. These monitors detect radiation in the closed cooling water loop. Any leaks into Service Water via heat exchangers would be detected by the Service Water monitors. Therefore, the Service Water radiation monitor adequately detects offsite radioactivity releases from this system.

The basis for these values are represented in JAF-CALC-MULTI-01162. Actual meteorology and release information provide a better indication and should be used when possible. Either dose assessment vales using a predictive model or actual field reading provide the best information for use.

PEG Reference(s):

AA1.1

Basis Reference(s):

1. JAF-CALC-MULTI-01162
2. OP-31 Process Radiation Monitoring Systems
3. CDP-15 Offsite Dose Calculation Manual
4. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.3 Site Area Emergency

A valid reading from an unplanned release on any monitors Table 5.1 column "SAE" for > 15 min. unless dose assessment can confirm releases are below Table 5.2 column "SAE" within this time period.

Table 5.1 Effluent Monitor Classification Thresholds

Low Range Monitors

Monitor	GE	SAE	Alert	NUE
STACK	see Hi Range	see Hi Range	see Hi range	∃5E5 cps
RX BLDG EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
REFUEL FLR EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
TURB BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃5E4 cpm
RADW BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃2E4 cpm
SW EFF	N/A	N/A	∃40,000 cps	∃400 cps
RADW EFF	N/A	N/A	∃200 x hi-hi trip	∃2 x hi-hi trip

High Range Monitors

Monitor	GE	SAE	Alert	NUE
STACK	∃11,600 mR/hr	∃1160 mR/hr	∃116 mR/hr	N/A
TURB BLDG EXH	∃12 mR/hr*	∃1.2 mR/hr*	N/A	N/A
RADW BLDG	∃33 mR/hr*	∃3.3 mR/hr*	N/A	N/A

*with its corresponding low range monitors upscale

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds

	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

NUMARC IC:

Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem CDE Thyroid for the actual or projected duration of the release.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.3 Site Area Emergency

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Valid means that a radiation monitor reading has been confirmed by the operators to be correct. The SAE values of Table 5.1 are based on the boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 100 mR whole body or 500 mR child thyroid for the actual or projected duration of the release. The 100 mR integrated dose is based on the proposed 10CFR20 annual average population exposure. The 500 mR integrated child thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for whole body thyroid.

These values provide a desirable gradient (one order of magnitude) between the Alert, Site Area Emergency, and General Emergency classifications. It is deemed that exposures less than this limit are not consistent with the Site Area Emergency class description.

Integrated doses are generally not monitored in real-time. In establishing this emergency action level, a duration of one hour is assumed based on site boundary doses for either whole body or child thyroid, whichever is more limiting (depends on source term assumptions).

The FSAR source terms applicable to each monitored pathway are used in conjunction with annual average meteorology in determining indications for the monitors on that pathway.

The values specified in this EAL were derived from JAF-CALC-MULTI-01162. Because of the proximity of the calculated values to the monitor's bottom range, the Turbine Building and RadWaste Building values also specify that the corresponding normal range monitors indicate upscale to preclude declaration based upon signal noise.

The basis for these values are represented in JAF-CALC-MULTI-01162. Actual meteorology and release information provide a better indication and should be used when possible. Either dose assessment vales using a predictive model or actual field reading provide the best information for use.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.3 Site Area Emergency

PEG Reference(s):

AS1.1

Basis Reference(s):

1. JAF-CALC-MULTI-01162
2. OP-31 Process Radiation Monitoring Systems
3. CDP-15 Offsite Dose Calculation Manual
4. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.4 General Emergency

A valid reading from an unplanned release on any monitors Table 5.1 column "GE" for > 15 min. unless dose assessment can confirm releases are below Table 5.2 column "GE" within this time period.

Table 5.1 Effluent Monitor Classification Thresholds

Low Range Monitors

Monitor	GE	SAE	Alert	NUE
STACK	see Hi Range	see Hi Range	see Hi range	∃5E5 cps
RX BLDG EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
REFUEL FLR EXH	N/A	N/A	∃9.9E5 cpm	∃2E4 cpm
TURB BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃5E4 cpm
RADW BLDG EXH	see Hi Range	see Hi Range	∃9.9E5 cpm	∃2E4 cpm
SW EFF	N/A	N/A	∃40,000 cps	∃400 cps
RADW EFF	N/A	N/A	∃200 x hi-hi trip	∃2 x hi-hi trip

High Range Monitors

Monitor	GE	SAE	Alert	NUE
STACK	∃11,600 mR/hr	∃1160 mR/hr	∃116 mR/hr	N/A
TURB BLDG EXH	∃12 mR/hr*	∃1.2 mR/hr*	N/A	N/A
RADW BLDG	∃33 mR/hr*	∃3.3 mR/hr*	N/A	N/A

*with its corresponding low range monitors upscale

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds

	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

NUMARC IC:

Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mRem TEDE or 5000 mRem CDE Thyroid for the actual or projected duration of the release using actual meteorology.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.4 General Emergency

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Valid means that a radiation monitor reading has been confirmed by the operators to be correct. The GE values of Table 5.1 are based on the boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 1000 mR whole body or 5000 mR child thyroid for the actual or projected duration of the release. The 1000 mR whole body and the 5000 mR child thyroid integrated dose are based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 rem whole body or 5 rem child thyroid. This is consistent with the emergency class description for a General Emergency. This level constitutes the upper level of the desirable gradient for the Site Area Emergency. Actual meteorology is specifically identified since it gives the most accurate dose assessment. Actual meteorology (including forecasts) should be used whenever possible.

Integrated doses are generally not monitored in real-time. In establishing this emergency action level, a duration of one hour is assumed based on a site boundary doses for either whole body or child thyroid, whichever is more limiting (depends on source term assumptions).

The FSAR source terms applicable to each monitored pathway are used in conjunction with annual average meteorology in determining indications for the monitors on that pathway.

The values specified in this EAL were derived from JAF-CALC-MULTI-01162. Because of the proximity of the calculated values to the monitor's bottom range, the Turbine Building and RadWaste Building values also specify that the corresponding normal range monitors indicate upscale to preclude declaration based upon signal noise.

The basis for these values are represented in JAF-CALC-MULTI-01162. Actual meteorology and release information provide a better indication and should be used when possible. Either dose assessment vales using a predictive model or actual field reading provide the best information for use.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Effluent Monitors**

5.1.4 General Emergency

PEG Reference(s):

AG1.1

Basis Reference(s):

1. JAF-CALC-MULTI-01162
2. OP-31 Process Radiation Monitoring Systems
3. CDP-15 Offsite Dose Calculation Manual
4. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.1 Dose Projections/Environmental Measurements**

5.2.1 Notification of an Unusual Event

Confirmed sample analyses for gaseous or liquid release rates > **2 x** technical specifications limits for > 60 min.

NUMARC IC:

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds two times the radiological Technical Specifications for 60 minutes or longer.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Confirmed sample analyses in excess of two times the site technical specifications 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 Notification of an Unusual Event emergency class) is not the primary concern; 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 T/S for 30 minutes does not exceed this initiating condition. Further, the Emergency Director should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes.

PEG Reference(s):

AU1.2

Basis Reference(s):

1. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.2 Dose Projections/Environmental Measurements**

5.2.2 Alert

Confirmed sample analyses for gaseous or liquid release rates > **200 x** technical specifications limits for > 15 min.

NUMARC IC:

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times radiological Technical Specifications for 15 minutes or longer.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Confirmed sample analyses in excess of two hundred times the site technical specifications that continue for 15 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. This event escalates from the Notification of an Unusual Event by increasing the magnitude of the release by a factor of 100 over the Notification of an Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr basis of the 10CFR20 non-occupational MPC limits for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary dose rate would be 10 mR/hr. The required release duration was reduced to 15 minutes in recognition of the increased severity.

PEG Reference(s):

AA1.2

Basis Reference(s):

1. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.2 Dose Projections/Environmental Measurements**

5.2.3 Alert

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 5.2 column "Alert" at the site boundary or beyond.

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds

	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

NUMARC IC:

Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times radiological Technical Specifications for 15 minutes or longer.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Offsite integrated doses in excess of 10 mR TEDE or dose rates in excess of 10 mR/hr TEDE represent an uncontrolled situation and hence, a potential degradation in the level of safety. This event escalates from the Notification of an Unusual Event by increasing the magnitude of the release by a factor of 100 over the Notification of an Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr basis of 10CFR20 for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary dose rate would be 10 mR/hr.

As previously stated, the 10 mR/hr value is based on a proration of 200 times the 500 mR/yr basis of 10CFR20, rounded down to 10 mR/hr.

PEG Reference(s):

AA1.2

Basis Reference(s):

Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.2 Dose Projections/Environmental Measurements**

5.2.4 Site Area Emergency

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 5.2 column "SAE" at the site boundary or beyond.

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds

	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

NUMARC IC:

Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mRem TEDE or 500 mRem CDE Thyroid for the actual or projected duration of the release.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The 100 mR integrated TEDE dose in this EAL is based on the proposed 10CFR20 annual average population exposure. This value also provides a desirable gradient (one order of magnitude) between the Alert, Site Area Emergency, and General Emergency classes. It is deemed that exposures less than this limit are not consistent with the Site Area Emergency class description. The 500 mR integrated CDE thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for whole body thyroid. In establishing the dose rate emergency action levels, a duration of one hour is assumed. Therefore, the dose rate EALs are based on a site boundary dose rate of 100 mR/hr TEDE or 500 mR/hr CDE thyroid, whichever is more limiting.

PEG Reference(s):

AS1.3

AS1.4

Basis Reference(s):

1. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

5.0 Radioactivity Release **5.2 Dose Projections/Environmental Measurements**

5.2.5 General Emergency

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 5.2 column "GE" at the site boundary or beyond.

Table 5.2 Dose Projection / Env. Measurement Classification Thresholds

	GE	SAE	Alert
TEDE	1000 mRem	100 mRem	10 mRem
CDE Thyroid	5000 mRem	500 mRem	N/A
External exposure rate	1000 mRem/hr	100 mRem/hr	10 mRem/hr
Thyroid exposure rate (for 1 hr. of inhalation)	5000 mRem/hr	500 mRem/hr	N/A

NUMARC IC:

Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mRem TEDE or 5000 mRem CDE Thyroid for the actual or projected duration of the release using actual meteorology.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The General Emergency values of Table 5.2 are based on the boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 1000 mR TEDE or 5000 mR CDE thyroid for the actual or projected duration of the release. The 1000 mR TEDE and the 5000 mR CDE thyroid integrated dose are based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 rem TEDE or 5 rem CDE thyroid. This is consistent with the emergency class description for a General Emergency. This level constitutes the upper level of the desirable gradient for the Site Area Emergency. Actual meteorology is specifically identified since it gives the most accurate dose assessment. Actual meteorology (including forecasts) should be used whenever possible. In establishing the dose rate emergency action levels, a duration of one hour is assumed. Therefore, the dose rate EALs are based on a site boundary dose rate of 1000 mR/hr TEDE or 5000 mR/hr CDE thyroid, whichever is more limiting.

PEG Reference(s):

AG1.3

AG1.4

Basis Reference(s):

1. Facility Operating License No. DPR-59, Technical Specifications

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 ELECTRICAL FAILURES

Loss of vital 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.

The events of this category have been grouped into the following two loss of electrical power types:

! Loss of AC Power Sources: This category includes losses of onsite and/or offsite AC power sources including station blackout events.

! Loss of DC Power Sources: This category involves total losses of vital plant 125 V DC power sources.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.1 Loss of AC Power Sources

6.1.1 Notification of an Unusual Event

Loss of power for >15 min. to all:

! Reserve Station Transformer T-2

! Reserve Station Transformer T-3

AND

If T-4 is being back fed from Station Main Transformer T-1A/T-1B then,

! Station Service Transformer

NUMARC IC:

Loss of all offsite power to essential busses for greater than 15 minutes.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

Prolonged loss of all offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power (station blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Backfeeding of the station transformer has been included to allow for those conditions in which maintenance is being performed on the station reserve transformers or 115 kv system. It is recognized that this is not a readily available source of emergency power under emergency conditions and should only be taken credit for those conditions under which backfeeding has already been established.

PEG Reference(s):

SU1.1

Basis Reference(s):

1. OP-44 115 kv system
2. OP-45 345 kv system
3. OP-45A Backfeeding Normal Station Service Transformer
4. OP-46A 4160 V & 600 V Normal AC Power Distribution
5. OP-22 Diesel Generator Emergency Power

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

6.1.2 Alert

Loss of all vital bus AC power for >15 min.

NUMARC IC:

Loss of all offsite power and loss of all onsite AC power to essential busses during cold shutdown, refueling or defueled mode.

FPB loss/potential loss:

N/A

Mode Applicability:

Cold shutdown, Refuel, Defuel

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power. This EAL is indicated by:

Loss of power for > 15 min. to all:

! Reserve Station Transformer T-2

! Reserve Station Transformer T-3

AND

If T-4 is being back fed from Station Main Transformer T-1A/T-1B then,

! Station Service Transformer

AND

failure of all DGs to power any vital bus

AND

failure to restore power to 10500 or 10600 in # 15 min.

When in cold shutdown, refueling, or defueled mode this event is classified as an Alert. This is because of the significantly reduced decay heat, lower temperature and pressure, thus increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL. Escalating to the Site Area Emergency, if appropriate, is by Abnormal Rad Levels/Radiological Effluent, or Emergency Director Judgment ICs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

Backfeeding of the normal station transformer has been included to allow for those conditions in which maintenance is being performed on the station reserve transformers or 115 kv system. It is recognized that this is not a readily available source of emergency power under emergency conditions and should only be taken credit for those conditions under which backfeeding has already been established.

PEG Reference(s):

SA1.1

Basis Reference(s):

1. OP-44 115 kv system
2. OP-45 345 kv system
3. OP-45A Backfeeding Normal Station Service Transformer
4. OP-46A 4160 V & 600 V Normal AC Power Distribution
5. OP-22 Diesel Generator Emergency Power

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

6.1.3 Alert

Available vital bus AC power reduced to only one of the following sources for >15 min.:

! Reserve Station Transformer T-2
! Reserve Station Transformer T-3
! Station Service Transformer T-4
! EDG A (10500)
! EDG B (10600)
! EDG C (10500)
! EDG D (10600)

NUMARC IC:

AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout with reactor coolant > 212 E F.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

The condition indicated by this EAL is the degradation of the offsite power with a concurrent failure of all but one emergency generator to supply power to its emergency buss. Another related condition could be the loss of all offsite power and loss of all onsite emergency diesels with emergency busses being fed from the unit main generator, or the loss of all onsite emergency diesels with only one train of emergency busses being fed from offsite power. The subsequent loss of this single power source would escalate the event to a Site Area Emergency.

PEG Reference(s):

SA5.1

Basis Reference(s):

1. OP-44 115 kv system
2. OP-45 345 kv system
3. OP-45A Backfeeding Normal Station Service Transformer
4. OP-46A 4160 V & 600 V Normal AC Power Distribution
5. OP-22 Diesel Generator Emergency Power

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

6.1.4 Site Area Emergency

Loss of all vital bus AC power for >15 min.

NUMARC IC:

Loss of all offsite power and loss of all onsite AC power to essential busses with reactor coolant > 212 E F.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power. This EAL is indicated by:

Loss of power to Reserve Station Transformer T-2 and T-3 and Station Service Transformer T-4 fed from the main generator

AND

failure of all DGs to power any vital bus

AND

failure to restore power to 10500 or 10600 in # 15 min.

Prolonged loss of all AC power will cause core uncovery and loss of containment integrity, thus this event can escalate to a General Emergency. The time duration selected, 15 minutes, excludes transient or momentary power losses.

PEG Reference(s):

SS1.1

Basis Reference(s):

1. OP-44 115 kv system
2. OP-45 345 kv system
3. OP-45A Backfeeding Normal Station Service Transformer
4. OP-46A 4160 V & 600 V Normal AC Power Distribution
5. OP-22 Diesel Generator Emergency Power

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

6.1.5 General Emergency

Loss of all vital bus AC power

AND either:

Power restoration to any emergency bus is not likely in # **4 hrs**

OR

RPV water level cannot be restored and maintained > **0 in.** (TAF)

NUMARC IC:

Prolonged loss of all offsite power and prolonged loss of all onsite AC power with reactor coolant > 212 E F.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power. Prolonged loss of all AC power will lead to loss of fuel clad, RCS, and containment. Although this EAL may be viewed as redundant to the RPV Water Level EALs, its inclusion is necessary to better assure timely recognition and emergency response.

This EAL is specified to assure that in the unlikely event of prolonged station blackout, timely recognition of the seriousness of the event occurs and that declaration of a General Emergency occurs as early as is appropriate, based on a reasonable assessment of the event trajectory.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

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, the Emergency Director should declare a General Emergency based on two major considerations:

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.1 Loss of AC Power Sources

6.1.5 General Emergency

1. Are there any present indications that core cooling is already degraded to the point that Loss or Potential Loss of fission product barriers is imminent?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on fission product barrier monitoring with particular emphasis on Emergency Director judgment as it relates to imminent loss or potential loss of fission product barriers and degraded ability to monitor fission product barriers.

The time to restore AC power is based on site blackout coping analysis performed in conformance with 10CFR50.63 and Regulatory Guide 1.155, "Station Blackout", with appropriate allowance for offsite emergency response.

PEG Reference(s):

SG1.1

Basis Reference(s):

1. OP-44 115 kv system

2. OP-45 345 kv system

3. OP-45A Backfeeding Normal Station Service Transformer

4. OP-46A 4160 V & 600 V Normal AC Power Distribution

5. OP-22 Diesel Generator Emergency Power

6. Misc. Calculation JAF-CALC-89-012 "Determination of Required SBO Coping Duration Per NUMARC 8700" Rev. 0 3/28/93

7. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.2 Loss of DC Power Sources

6.2.1 Notification of an Unusual Event

< 105 vdc on 71-BCB-2A and B for >15 min. due to unplanned activities.

NUMARC IC:

Unplanned loss of required DC power during cold shutdown or refueling mode for greater than 15 minutes.

FPB loss/potential loss:

N/A

Mode Applicability:

Cold shutdown, Refuel

Basis:

The purpose of this EAL is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during cold shutdown or refueling operations. This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

The bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate loads.

PEG Reference(s):

SU7.1

Basis Reference(s):

1. OP-43A 125 V DC Power System
2. AOP-45 Loss of DC Power System 'A'
3. AOP-46 Loss of DC Power System 'B'

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

6.0 Electrical Failures 6.2 Loss of DC Power Sources

6.2.2 Site Area Emergency

< 105 vdc on 71-BCB-2A and B for > 15 min.

NUMARC IC:

Loss of all vital DC power with reactor coolant > 212 E F.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. Escalation to a General Emergency would occur by other EAL categories. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

The bus voltage is based on the minimum bus voltage necessary for the operation of safety related equipment. This voltage value incorporates a margin of at least 15 minutes of operation before the onset of inability to operate loads.

PEG Reference(s):

SS3.1

Basis Reference(s):

1. OP-43A 125 V DC Power System

2. AOP-45 Loss of DC Power System 'A'

3. AOP-46 Loss of DC Power System 'B'

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 EQUIPMENT FAILURES

Numerous plant system related equipment failure events which warrant emergency classification, based upon their potential to pose actual or potential threats to plant safety, have been identified in this category.

The events of this category have been grouped into the following event types:

! Technical Specifications: Only one EAL falls under this event type related to the failure of the plant to be brought to the required plant operating condition required by technical specifications.

! System Failures or Control Room Evacuation: This category includes events which are indicative of losses of operability of safety systems such as ECCS, isolation functions, Control Room habitability or cold and hot shutdown capabilities.

! Loss of Indication, Alarm, or Communication Capability: Certain events which degrade the plant operators ability to effectively assess plant conditions or communicate with essential personnel within or external to the plant warrant emergency classification. Under this event type are losses of annunciators and/or communication equipment.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures 7.1 Technical Specifications

7.1.1 Notification of an Unusual Event

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

NUMARC IC:

Inability to reach required shutdown within Technical Specification Limits.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specification requires a one hour report under 10CFR50.72 (b) non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate Notification of an Unusual Event is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. Declaration of an Notification of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed. Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other EALs.

PEG Reference(s):

SU2.1

Basis Reference(s):

1. [CTS]Technical Specifications Section 3.0.A and 3.0.B [ITS]3.01 and 3.02

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.2 System Failures or Control Room Evacuation**

7.2.1 Notification of an Unusual Event

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

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

Power Operation, startup/hot standby, hot shutdown

Basis:

This EAL is intended to address main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual fires and flammable gas build up are appropriately classified through other EALs. This EAL is consistent with the definition of an Notification of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment.

PEG Reference(s):

HU1.6

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.2 System Failures or Control Room Evacuation**

7.2.2 Alert

Control Room evacuation per AOP-43, "Shutdown from Outside the Control Room"

NUMARC IC:

Control room evacuation has been initiated.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

With the Control Room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other Emergency Operations Center is necessary. Inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency.

PEG Reference(s):

HA5.1

Basis Reference(s):

1. AOP-43 Shutdown from Outside the Control Room

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.2 System Failures or Control Room Evacuation**

7.2.3 Alert

Reactor coolant temperature cannot be maintained < 212 EF

NUMARC IC:

Inability to maintain plant in cold shutdown.

FPB loss/potential loss:

N/A

Mode Applicability:

Cold shutdown, refuel

Basis:

This EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes. Escalation to Site Area Emergency or General Emergency would be through other EALs.

A reactor coolant temperature increase that approaches or exceeds the cold shutdown technical specification limit warrants declaration of an Alert irrespective of the availability of technical specification required functions to maintain cold shutdown. The concern of this EAL is the loss of ability to maintain the plant in cold shutdown which is defined by reactor coolant temperature and not the operability of equipment which supports removal of heat from the reactor.

PEG Reference(s):

SA3.1

Basis Reference(s):

1. AOP-30 Loss of Shutdown Cooling

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.2 System Failures or Control Room Evacuation**

7.2.4 Site Area Emergency

Control Room evacuation

AND

Plant control cannot be established per AOP-43, "Shutdown from Outside the Control Room" in # 30 min.

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL indicates that expeditious transfer of safety systems has not occurred but fission product barrier damage may not yet be indicated. The time interval for transfer is based on analysis or assessments as to how quickly control must be reestablished without core uncovering and/or core damage. In cold shutdown and refueling modes, operator concern is directed toward maintaining core cooling such as is discussed in Generic Letter 88-17, "Loss of Decay Heat Removal." In power operation, hot standby, and hot shutdown modes, operator concern is primarily directed toward monitoring and controlling plant parameters dictated by the AOPs and thereby assuring fission product barrier integrity.

PEG Reference(s):

HS2.1

Basis Reference(s):

1. Generic Letter 88-17, "Loss of Decay Heat Removal"
2. AOP-43 "Shutdown from Outside the Control Room"
3. AOP-30 "Loss of Shutdown Cooling"
4. Appendix R

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.1 Notification of an Unusual Event

Unplanned loss of safety system annunciators or indicators on all of the following panels for > 15 min.:

! 09-3
! 09-4
! 09-5
! 09-6
! 09-7
! 09-8
! 09-75

AND

Increased surveillance is required for safe plant operation

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL recognizes the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment. Recognition of the availability of computer based indication equipment is considered (EPIC).

"Unplanned" loss of annunciators or indicators excludes scheduled maintenance and testing activities.

It is not intended that plant personnel perform a detailed count of the instrumentation lost but the use of the value as a judgment by the Shift Manager as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Manager that additional operating personnel will be required to provide increased monitoring of system operation to safely operate the plant.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures 7.3 Loss of Indications/Alarm/ Communication Capability

7.3.1 Notification of an Unusual Event

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 a specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by their specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10CFR50.72. If the shutdown is not in compliance with the Technical Specification action, the Notification of an Unusual Event is based on EAL 7.1.1, Inability to Reach Required Shutdown Within Technical Specification Limits.

Annunciators or indicators for this EAL must include those identified in the Abnormal Operating procedures, in the Emergency Operating Procedures, and in other EALs (e. g., area, process, and/or effluent rad monitors, etc.).

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

Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, this EAL is not applicable during these modes of operation.

This Notification of an Unusual Event will be escalated to an Alert if a transient is in progress during the loss of annunciation or indication.

PEG Reference(s):

SU3.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.2 Notification of an Unusual Event

Unplanned loss of all communications capability affecting the ability to either:

Perform routine onsite operations

OR

Notify offsite agencies or personnel

NUMARC IC:

Unplanned loss of all onsite or offsite communications capabilities.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The purpose of this EAL is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10CFR50.72.

The onsite communications loss must encompass the loss of all means of routine communications. A list of available onsite communications systems which may be utilized for onsite communications is provided in Table 7.1.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.2 Notification of an Unusual Event

Table 7.1 Communications Systems

Systems	Online	Offsite
Page/Party System (Gaitronics)	X	
Sound Powered Phones	X	
Control Room/Portable Unit Radios	X	
Plant Telephone System	X	
RECS		X
Dedicated Phone Lines including NRC		X
Health Physics Network and FTS 2001		X
Offsite Radio Systems		X

The offsite communications loss must encompass the loss of all means of communications with offsite authorities. A list of available offsite communications systems which may be utilized for offsite communications is provided in Table 7.1. This EAL is intended to be used only when extraordinary means are being utilized to make communications possible (relaying of information from radio transmissions, individuals being sent to offsite locations, etc.).

PEG Reference(s):

SU6.1

Basis Reference(s):

1. JAFNPP Emergency Plan Section 7 "Emergency Facilities and Equipment"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.3 Alert

Unplanned loss of safety system annunciators or indicators on all of the following panels for > 15 min.:

! 09-3
! 09-4
! 09-5
! 09-6
! 09-7
! 09-8
! 09-75

AND

Increased surveillance is required for safe plant operation

AND either:

Plant transient in progress

OR

EPIC is unavailable

NUMARC IC:

Unplanned loss of most or all safety system annunciation or indication in control room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators are unavailable.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL recognizes the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a transient. Recognition of the availability of computer based indication equipment is considered (SPDS, plant computer, etc.).

"Unplanned" loss of annunciators or indicators does not include scheduled maintenance and testing activities.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.3 Alert

It is not intended that plant personnel perform a detailed count of the instrumentation lost but the use of judgment by the Shift Manager as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Manager that additional operating personnel will be required to provide increased monitoring of system operation to safely operate the plant.

It is further recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10CFR50.72.

Annunciators or indicators for this EAL includes those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e. g., area, process, and/or effluent rad monitors, etc.).

"Significant transient" includes response to automatic or manually initiated functions such as scrams, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% or greater.

If both a major portion of the annunciation system and all computer monitoring are unavailable to the extent that the additional operating personnel are required to monitor indications, the Alert is required.

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

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress.

PEG Reference(s):

SA4.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.4 Site Area Emergency

Loss of annunciators or indicators on all of the following panels:

! 09-3
! 09-4
! 09-5
! 09-6
! 09-7
! 09-8
! 09-75

AND

EPIC is unavailable

AND

Indications to monitor all RPV and primary containment EOP parameters are lost

AND

Plant transient is in progress

NUMARC IC:

Inability to monitor a significant transient in progress.

FPB loss/potential loss:

N/A

Mode Applicability:

Power operation, startup/hot standby, hot shutdown

Basis:

This EAL recognizes the inability of the Control Room staff to monitor the plant response to a transient. A Site Area Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public.

Annunciators for this EAL should be limited to include those identified in the Abnormal Operating Procedures, in the Emergency Operating Procedures, and in other EALs (e. g., rad monitors, etc.).

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

7.0 Equipment Failures **7.3 Loss of Indications/Alarm/ Communication Capability**

7.3.4 Site Area Emergency

"Significant transient" includes response to automatic or manually initiated functions such as scrams, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% or greater.

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 and in a coolable geometry, to remove heat from the core, to maintain the reactor coolant system intact, and to maintain containment intact.

"Planned" actions are excluded from this EAL 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.

PEG Reference(s):

SS6.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards

Hazards are those non-plant system related events which can directly or indirectly impact plant operation or reactor plant and personnel safety.

The events of this category have been grouped into the following types:

! Security Threats: This category includes unauthorized entry attempts into the Protected Area as well as bomb threats and sabotage attempts. Also addressed are actual security compromises threatening loss of physical control of the plant.

! Fire or Explosion: Fires can pose significant hazards to personnel and reactor safety. Appropriate for classification are certain fires within the site Protected Area or which may affect operability of vital equipment.

! Man-made Events: Man-made events are those non-naturally occurring events which can cause damage to plant facilities such as aircraft crashes, missile impacts, toxic or flammable gas leaks or explosions from whatever source.

! Natural Events: Events such as hurricanes, earthquakes or tornadoes which have potential to cause damage to plant structures or equipment significant enough to threaten personnel or plant safety.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards **8.1 Security Threats**

8.1.1 Unusual Event Bomb device or other indication of attempted sabotage discovered within plant Protected Area or ISFSI OR Notification of any credible site specific security threat by the Security Shift Supervisor or outside agency (NRC, military or law enforcement)

NEI IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL is based on the James A. FitzPatrick Safeguards Contingency Plans. Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10CFR73.71 or in some cases under 10CFR50.72.

The plant Protected Area boundary and ISFSI are within the security isolation zone and is defined in the security plan. Bomb devices discovered within the plant Vital Area would result in EAL escalation.

Intrusion into the plant Protected Area by a hostile force would result in escalation to an Alert.

The second condition is included to ensure the appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made through the use of information found in the Safeguards Contingency Plan. Only the plant or site to which the specific threat is made need declare the Unusual Event. Threats made that are not plant specific or ambiguous to a specific plant (ex. "The Nine Mile Point site") may be conservatively interpreted to include all of the plants on site. This would result in an emergency classification at more than one plant. Guidance in these instances should be provided directly by the individual site security departments and their sources. A higher initial classification could be made based upon the nature and timing of the threat and potential consequences. Consideration shall be given to upgrading the emergency response in accordance with the Safeguards Contingency Plan and Emergency Plan.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.1 Security Threats

PEG Reference(s):

1. HU4.1
2. HU4.2

Basis Reference(s):

1. FitzPatrick Nuclear Power Plant Safeguards Contingency Plan
2. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02
3. NRC order dated 2/25/02

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards **8.1 Security Threats**

8.1.2 Alert

Intrusion into plant Protected Area by an adversary

OR

Any security event which represents an actual substantial degradation of the level of safety of the plant.

NUMARC IC:

Security event in a plant protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the Notification of an Unusual Event. For the purposes of this EAL, the intrusion by an adversary inside the Protected Area boundary can be considered a significant security threat. "Intrusion by an adversary" includes those situations where the adversary maybe an employee or other "insider" threat. Intrusion into a vital area by an adversary will escalate this event to a Site Area Emergency.

PEG Reference(s):

HA4.1

HA4.2

Basis Reference(s):

1. JAFNPP Security Contingency Plan
2. FSAR Figure 2.1-4
3. JAFNPP Security Plan

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.1 Security Threats

8.1.3 Site Area Emergency

Intrusion into a plant security vital area by an adversary

OR

Any security event which represents actual or likely failures of plant systems needed to protect the public.

NUMARC IC:

Security event in a plant vital area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the Alert in that an adversary has progressed from the Protected Area to a security vital area. "Intrusion by an adversary" includes those situations where the adversary maybe an employee or other "insider" threat. Security vital areas include:

! Pump Room for RHR/ESW Cooling Water
! Cable Tunnels
! Battery Room
! Cable Spreading Room
! Diesel Generator Room
! Electrical Switchgear Room
! Relay Room
! Control Room
! Remote Safe Shutdown Panel for MSIV/ADS No. 25ASP-4.5
! Reactor Building
! Central Alarm Station - Security Building
! Emergency Security Generator Room - Security Building

PEG Reference(s):

HS1.1
HS1.2

Basis Reference(s):

1. FSAR Figure 2.1-4
2. JAFNPP Security Plan

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.1 Security Threats

8.1.4 General Emergency

Security event which results in:

Loss of plant control from the Control Room

OR

Loss of remote shutdown capability

NUMARC IC:

Security event resulting in loss of ability to reach and maintain cold shutdown.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL encompasses conditions under which unauthorized personnel have taken physical control of vital areas required to reach and maintain safe shutdown.

PEG Reference(s):

HG1.1

HG1.2

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.2 Fire or Explosion

8.2.1 Notification of an Unusual Event

Confirmed fire in or contiguous to any plant area, Table 8.2 or Table 8.3, not extinguished in # 15 min. of Control Room notification

Table 8.2 Plant Areas
• Stack • Radwaste/Track Bay • Reactor Track Bay • Boiler House • Security Building • CAS Building • #2 Oil Storage Shack • H2 Storage Facility • CAD N2 Storage Building •

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:

Fire within protected area boundary not extinguished within 15 minutes of detection.

FPB loss/potential loss:

N/A

Mode Applicability:

All

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.2 Fire or Explosion

8.2.1 Notification of an Unusual Event

Basis:

The purpose of this EAL is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. This excludes such items as fires within administration buildings, waste-basket fires, and other small fires of no safety consequence.

PEG Reference(s):

HU2.1

Basis Reference(s):

1. FSAR Section 12.3

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.2 Fire or Explosion

8.2.2 Alert

Fire, or explosion, or high energy steam break in any plant area, Table 8.2 or Table 8.3, which results in damage to plant equipment or structures needed for safe plant operation

Table 8.2 Plant Areas
• Stack • Radwaste/Track Bay • Reactor Track Bay • Boiler House • Security Building • CAS Building • #2 Oil Storage Shack • H2 Storage Facility • CAD N2 Storage Building

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.2 Fire or Explosion

8.2.2 Alert

Basis:

The listed areas contain functions and systems required for the safe shutdown of the plant. The JAFNPP safe shutdown analysis was consulted for equipment and plant areas required for the applicable mode.

With regard to explosions, only those explosions of sufficient force to damage permanent structures or equipment required for safe operation within the identified plant areas should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, including high energy steam break that potentially imparts significant energy to nearby structures and materials. No attempt is made in this EAL to assess the actual magnitude of the damage. The declaration of an Alert and the activation of the TSC will provide the Emergency Director with the resources needed to perform damage assessments. The Emergency Director also needs to consider any security aspects of the explosions.

PEG Reference(s):

HA2.1

Basis Reference(s):

1. FSAR Section 12.3

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.3 Man-Made Events

8.3.1 Notification of an Unusual Event

Vehicle crash into or projectile which impacts plant structures or systems within Protected Area boundary

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The Protected Area boundary is within the security isolation zone and is defined in the Site Security Plan (blue book).

This EAL addresses such items as plane, helicopter, train, car, truck, or barge crash, or impact of other projectiles that may potentially damage plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant vital area, the event may be escalated to Alert.

PEG Reference(s):

HU1.4

Basis Reference(s):

1. JAFNPP Site Security Plan

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.3 Man-Made Events

8.3.2 Notification of an Unusual Event

Report by plant personnel of an explosion within Protected Area boundary resulting in visible damage to permanent structures or equipment

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

The Protected Area boundary is within the security isolation zone and is defined in the site security plan.

For this EAL, only those explosions of sufficient force to damage permanent structures or equipment within the Protected Area should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near by structures and materials. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the explosion with reports of evidence of damage (e. g., deformation, scorching) is sufficient for declaration. The Emergency Director also needs to consider any security aspects of the explosion.

PEG Reference(s):

HU1.5

Basis Reference(s):

1. JAFNPP Site Security Plan

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.3 Man-Made Events

8.3.3 Notification of an Unusual Event

Report or detection of toxic or flammable gases that could enter or have entered within the Protected Area boundary in amounts that could affect the health of plant personnel or safe plant operation

OR

Report by local, county or state officials for potential evacuation of site personnel based on offsite event

NUMARC IC:

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

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL is based on releases in concentrations within the site boundary that will affect the health of plant personnel or affecting the safe operation of the plant with the plant being within the evacuation area of an offsite event (i. e., tanker truck accident releasing toxic gases, etc.). The evacuation area is as determined from the DOT Evacuation Tables for Selected Hazardous Materials, in the DOT Emergency Response Guide for Hazardous Materials.

Should an explosion occur within a specified plant area, an Alert would be declared based on EAL 8.2.2

PEG Reference(s):

HU3.1

HU3.2

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.3 Man-Made Events

8.3.4 Alert

Vehicle crash or projectile impact which precludes personnel access to or damages equipment in plant vital areas, Table 8.3

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:

Natural and destructive phenomena affecting the plant vital area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. 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.

This EAL addresses such items as plane, helicopter, train, car, truck, or barge crash, or impact of other projectiles into a plant vital area.

PEG Reference(s):

HA1.5

Basis Reference(s):

1. JAFNPP Site Security Plan

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.3 Man-Made Events

8.3.5 Alert

Report or detection of toxic or flammable gases within a plant vital area, Table 8.3, in concentrations that will be life threatening to plant personnel or preclude access to equipment needed for safe plant operation

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:

Release of toxic or flammable gases within a facility structure which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL is based on gases that have entered a plant structure precluding access to equipment necessary for the safe operation of the plant. This EAL applies to buildings and areas contiguous to plant vital areas or other significant buildings or areas. The intent of this EAL is not to include buildings (i. e., warehouses) or other areas that are not contiguous or immediately adjacent to plant vital areas. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred.

PEG Reference(s):

HA3.1

HA3.2

Basis Reference(s):

1. FSAR Section 12.3

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.1 Notification of an Unusual Event

Earthquake felt inplant based upon a consensus of Control Room Operators on duty

AND either:

JAFNPP seismic activity alarm (EPIC A-124) actuated

OR

Confirmation of earthquake received on NMP-1 or NMP-2 seismic instrumentation

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

JAFNPP seismic instrumentation actuates at 0.01 g.

Damage to some portions of the site may occur but it should not affect ability of safety functions to operate. Methods of detection can be based on instrumentation validated by a reliable source, operator assessment, or indication received from NMP-1 or JAFNPP instrumentation. 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 inventory 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 0.01 g."

PEG Reference(s):

HU1.1

Basis Reference(s):

1. AOP-14 Earthquake
2. EPRI document, "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.2 Notification of an Unusual Event

Report by plant personnel of tornado striking within plant Protected Area boundary

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

The JAFNPP Protected Area boundary is illustrated in FSAR Figure 2.1-4.

PEG Reference(s):

HU1.2

Basis Reference(s):

1. AOP-13 Hurricanes, Tornadoes, and High Winds
2. FSAR Figure 2.1-4

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.3 Notification of an Unusual Event

Lake water level > **248 ft**

OR

ESW intake bay water level < **237 ft**

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This covers high and low lake water level conditions that could be precursors of more serious events. The high lake level is based upon the maximum attainable controlled lake water level as specified in the FSAR. The low level is based on ESW intake bay water level and corresponds to the design minimum lake level.

PEG Reference(s):

HU1.7

Basis Reference(s):

1. FSAR Section 2.4.3.5
2. Safety Evaluation JAF-SE-93-034 "Evaluation of Maximum and Minimum Water Levels at Screenwell for Safe Operation of Class I Equipment"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.4 Alert

Earthquake felt inplant based upon a consensus of Control Room Operators on duty

AND

JAFNPP seismic activity alarm (EPIC A-124) actuated

AND

Confirmation of seismic event > **0.08 g** by NMP-2

NUMARC IC:

Natural and destructive phenomena affecting the plant vital area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. 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.

This EAL is based on the FSAR design operating basis earthquake of 0.08 g. Seismic events of this magnitude can cause damage to plant safety functions.

PEG Reference(s):

HA1.1

Basis Reference(s):

1. AOP-14 Earthquake
2. FSAR Section 12.4.6.1
3. FSAR Section 12.3
4. FSAR Section 2.4.3.7

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.5 Alert

Sustained winds > **90 mph**
OR
Tornado strikes a plant vital area, Table 8.3

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:
Natural and destructive phenomena affecting the plant vital area.

FPB loss/potential loss:
N/A

Mode Applicability:
All

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. 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.

This EAL is based on the FSAR design basis of 90 mph. Wind loads of this magnitude can cause damage to safety functions.

The JAFNPP Protected Area boundary is illustrated in FSAR Figure 2.1-4.

PEG Reference(s):

HA1.2

Basis Reference(s):

1. FSAR Section 12.4.6.1
2. FSAR Section 12.3
3. FSAR Section 2.4.3.7
4. EAP-42 Obtaining Meteorological Data
5. FSAR Figure 2.1-4

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.6 Alert

Any natural event which results in a report of visible structural damage or assessment by Control Room personnel of actual damage to equipment needed for safe plant operation, Table 8.3, Plant Vital Areas

Table 8.3 Plant Vital Areas Needed For Safe Plant Operation
• Reactor Building • Control Room/Relay Room/Cable Spreading Room • Turbine Building • Screenwell/Pumphouse • Diesel Generator Building • Battery Room/Battery Room Corridor

NUMARC IC:

Natural and destructive phenomena affecting the plant vital area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to levels beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. 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.

This EAL specifies areas in which structures containing systems and functions required for safe shutdown of the plant are located.

PEG Reference(s):

HA1.3

Basis Reference(s):

1. FSAR Figure 2.1-4

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

8.0 Hazards 8.4 Natural Events

8.4.7 Alert

Lake water level > **255 ft**

OR

ESW intake bay water level < **235 ft**

NUMARC IC:

Natural and destructive phenomena affecting the plant vital area.

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to plant safety systems. 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.

This EAL covers high and low lake water level conditions that exceed levels which threaten vital equipment. The high lake level is based upon the revised design flood level for the screenwell interior walls and gates. The low ESW intake bay water level corresponds to the top of the ESW and RHR Service Water pump suctions.

PEG Reference(s):

HA1.7

Basis Reference(s):

1. FSAR Section 2.4.3.5
2. Safety Evaluation JAF-SE-93-034 "Evaluation of Maximum and Minimum Water Levels at Screenwell for Safe Operation of Class I Equipment"

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 OTHER

The EALs defined in categories 1.0 through 8.0 specify the predetermined symptoms or events which are indicative of emergency or potential emergency conditions, and which 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 Shift Manager or Emergency Director the latitude to classify emergency conditions consistent with the established classification criteria, based upon their judgment.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.1 Notification of an Unusual Event

Any event, as determined by the Shift Manager or Emergency Director, that could lead to or has led to a potential degradation of the level of safety of the plant.

NUMARC IC:

Emergency Director Judgment

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Notification of an Unusual Event emergency class.

From a broad perspective, one area that may warrant Emergency Director judgment is related to likely or actual breakdown of site specific event mitigating actions. Examples to consider include inadequate emergency response procedures, transient response either unexpected or not understood, failure or unavailability of emergency systems during an accident in excess of that assumed in accident analysis, or insufficient availability of equipment and/or support personnel. Another example to consider would be exceeding a plant safety limit as defined in Technical Specifications.

PEG Reference(s):

HU5.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.2 Notification of an Unusual Event

Any event, as determined by the Shift Manager or Emergency Director, that could lead to or has led to a loss or potential loss of containment, Attachment A.

Loss of containment indicators may include a rapid unexplained decrease following initial increase in containment pressure

NUMARC IC:

N/A

FPB loss/potential loss:

Containment loss/potential loss

Mode Applicability:

Power operations, Startup/Hot standby, Hot Shutdown

Basis:

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the containment barrier is lost or potentially lost. In addition, the inability to monitor the barrier should also be incorporated in this EAL as a factor in Emergency Director judgment that the barrier may be considered lost or potentially lost.

PEG Reference(s):

PC6.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.3 Alert

Any event, as determined by the Shift Manager or Emergency Director, that could cause or has caused actual substantial degradation of the level of safety of the plant.

NUMARC IC:

Emergency Director Judgment

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

PEG Reference(s):

HA6.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.4 Alert

Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to a loss or potential loss of either fuel clad or RCS barrier, Attachment A.

NUMARC IC:

N/A

FPB loss/potential loss:

Loss or potential loss of either fuel clad or RCS barrier

Mode Applicability:

Power operations, Startup/Hot standby, Hot Shutdown

Basis:

This EAL addresses any other factors that are to be used by the Emergency Director in determining whether the fuel clad or RCS barriers are lost or potentially lost. In addition, the inability to monitor the barriers should also be considered in this EAL as a factor in Emergency Director judgment that the barriers may be considered lost or potentially lost.

PEG Reference(s):

FC5.1

RCS6.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.5 Site Area Emergency

As determined by the Shift Manager or Emergency Director, events are in progress which indicate actual or likely failures of plant systems needed to protect the public. Any releases are not expected to result in exposures which exceed EPA PAGs.

NUMARC IC:

Emergency Director Judgment

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

PEG Reference(s):

HS3.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.6 Site Area Emergency

Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to either:

Loss or potential loss of both fuel clad and RCS barrier, Attachment A

OR

Loss or potential loss of either fuel clad or RCS barrier in conjunction with a loss of containment, Attachment A

Loss of containment indicators may include a rapid unexplained decrease following initial increase in containment pressure

NUMARC IC:

N/A

FPB loss/potential loss:

Loss or potential loss of both fuel clad and RCS barrier

OR

Loss or potential loss of either fuel clad or RCS barrier in conjunction with a loss of containment

Mode Applicability:

Power operations, Startup/Hot standby, Hot Shutdown

Basis:

This EAL addresses unanticipated conditions affecting fission product barriers which are not addressed explicitly elsewhere. Declaration of an emergency is warranted because conditions exist which are believed by the Emergency Director to fall under the emergency class description for Site Area Emergency.

Rapid unexplained loss of pressure (i. e., not attributable to drywell spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity. Drywell pressure should increase as a result of mass and energy release into containment from a LOCA. Thus, drywell pressure not increasing under these conditions indicates a loss of containment integrity.

PEG Reference(s):

FC5.1
RCS6.1
PC6.1
PC1.1
PC1.2

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.7 General Emergency

As determined by the Shift Manager or Emergency Director, events are in progress which indicate actual or imminent core damage and the potential for a large release of radioactive material in excess of EPA PAGs outside the site boundary.

NUMARC IC:

Emergency Director Judgment

FPB loss/potential loss:

N/A

Mode Applicability:

All

Basis:

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

Releases can reasonably be expected to exceed EPA PAG plume exposure levels outside the site boundary.

PEG Reference(s):

HG2.1

Basis Reference(s):

None

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 2

9.0 Other

9.1.8 General Emergency

Any event, as determined by the Shift Manager or Emergency Director, that could lead or has led to a loss of any two fission product barriers and loss or potential loss of the third, Attachment A.

Loss of containment indicators may include a rapid unexplained decrease following initial increase in containment pressure

NUMARC IC:

N/A

FPB loss/potential loss:

Loss of any two fission product barriers and loss or potential loss of the third

Mode Applicability:

Power operations, Startup/Hot standby, Hot Shutdown

Basis:

This EAL addresses unanticipated conditions affecting fission product barriers which are not addressed explicitly elsewhere. Declaration of an emergency is warranted because conditions exist which are believed by the Emergency Director to fall under the emergency class description for the General Emergency class.

Rapid unexplained loss of pressure (i. e., not attributable to drywell spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity. Drywell pressure should increase as a result of mass and energy release into containment from a LOCA. Thus, drywell pressure not increasing under these conditions indicates a loss of containment integrity.

PEG Reference(s):

FC5.1
RCS6.1
PC6.1
PC1.1
PC1.2

Basis Reference(s):

None

ATTACHMENT A

FISSION PRODUCT BARRIER LOSS & POTENTIAL LOSS INDICATORS

ATTACHMENT A, FISSION PRODUCT BARRIER LOSS AND POTENTIAL LOSS INDICATORS

Fission Product Barrier Loss / Potential Loss Matrix

(Those thresholds for which loss or potential is determined to be imminent, classify as though the threshold(s) has been exceeded)

Fuel Cladding

Potential Loss	Loss
RPV water level cannot be restored and maintained above 0 in. (TAF) Emergency Director Judgment	RPV water level cannot be restored and maintained above 0 in. (TAF) Coolant activity > 300 μCi/gm I-131 equivalent Offgas radiation ≥ 10 x hi-hi alarm Drywell radiation ≥ 3000 R/hr Emergency Director Judgment

ATTACHMENT A, FISSION PRODUCT BARRIER LOSS AND POTENTIAL LOSS INDICATORS

Fission Product Barrier Loss / Potential Loss Matrix

(Those thresholds for which loss or potential is determined to be imminent, classify as though the threshold(s) has been exceeded)

RCS

Potential Loss	Loss
RCS leakage greater than 50 gpm inside the drywell	RPV water level cannot be restored and maintained above 0 in. (TAF)
Primary system is discharging outside PC AND RB area radiation levels are > maximum safe operating levels in two or more areas, EOP-5	Primary containment pressure cannot be maintained < 2.7 psig due to coolant leakage
Primary system is discharging outside PC AND RB area temperatures are > maximum safe operating levels in two or more areas, EOP-5	Drywell radiation ≥ 300 R/hr
Emergency Director Judgment	Emergency Director Judgment

ATTACHMENT A, FISSION PRODUCT BARRIER LOSS AND POTENTIAL LOSS INDICATORS

Fission Product Barrier Loss / Potential Loss Matrix

(Those thresholds for which loss or potential is determined to be imminent, classify as though the threshold(s) has been exceeded)

Containment

Potential Loss	Loss
Drywell radiation > 250,000 R/hr Emergency Director Judgment	Primary containment venting is required due to **PCPL** Primary containment venting is required due to combustible gas concentrations Any steam line (MSL, HPCI, RICI) or RWCU isolation failure resulting in a release pathway outside primary containment Primary system is discharging outside PC AND RB area radiation levels are > maximum safe operating levels in two or more areas, EOP-5 Primary system is discharging outside PC AND RB area temperatures are > maximum safe operating levels in two or more areas, EOP-5 Emergency Director Judgment Loss of containment indication may include rapid unexplained decrease following initial increase in containment pressure

ATTACHMENT B

WORD LIST/DEFINITIONS

ATTACHMENT B - Word List/Definitions

Actuate

To put into operation; to move to action; commonly used to refer to automated, multi-faceted operations. "Actuate ECCS".

Adequate Core Cooling

Heat removal from the reactor sufficient to prevent rupturing the fuel clad.

Adversary

As applied to security EALs, an individual whose intent is to commit sabotage, disrupt Station operations or otherwise commit a crime on station property.

Alert

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

Available

The state or condition of being ready and able to be used (placed into operation) to accomplish the stated (or implied) action or function. As applied to a system, this requires the operability of necessary support systems (electrical power supplies, cooling water, lubrication, etc.).

Can/Cannot be determined (</>)

The current value or status of an identified parameter relative to that specified can/cannot be ascertained using all available indications (direct and indirect, singly or in combination).

Can/Cannot be maintained above/below (</>)

The value of the identified parameter(s) is/is not able to be kept above/below specified limits. This determination includes making an evaluation that considers both current and future system performance in relation to the current value and trend of the parameter(s). Neither implies that the parameter must actually exceed the limit before the action is taken nor that the action must be taken before the limit is reached.

ATTACHMENT B - Word List/Definitions

Can/Cannot be restored above/below (</>)

The value of the identified parameter(s) is/is not able to be returned to above/below specified limits. This determination includes making an evaluation that considers both current and future systems performance in relation to the current value and trend of the parameter(s). Neither implies that the parameter must actually exceed the limit before the classification is made nor that the classification must be made before the limit is reached. Does not imply any specific time interval but does not permit prolonged operation beyond a limit without making the specified classification.

As applied to loss of electrical power sources (ex.: Power cannot be restored to any vital bus in # **4 hrs**) the specified power source cannot be returned to service within the specified time. This determination includes making an evaluation that considers both current and future restoration capabilities. Implies that the declaration should be made as soon as the determination is made that the power source cannot be restored within the specified time.

Close

To position a valve or damper so as to prevent flow of the process fluid.

To make an electrical connection to supply power.

Confirm / Confirmation

To validate, through visual observation or physical inspection, that an assumed condition is as expected or required, without taking action to alter the "as found" configuration.

Contiguous

Being in actual contact; touching along a boundary or at a point

Control

Take action, as necessary, to maintain the value of a specified parameter within applicable limits; to fix or adjust the time, amount, or rate of; to regulate or restrict.

Decrease

To become progressively less in size, amount, number, or intensity.

Discharge

Removal of a fluid/gas from a volume or system.

ATTACHMENT B - Word List/Definitions

Drywell

That component of the BWR primary containment which houses the RPV and associated piping.

Enter

To go into.

Establish

To perform actions necessary to meet a stated condition. "Establish communication with the Control Room."

Evacuate

To remove the contents of; to remove personnel from an area.

Exceeds

To go or be beyond a stated or implied limit, measure, or degree.

Exist

To have being with respect to understood limitations or conditions.

Failure

A state of inability to perform a normal function.

General Emergency

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

If

Logic term which indicates that taking the action prescribed is contingent upon the current existence of the stated condition(s). If the identified conditions do not exist, the prescribed action is not to be taken and execution of operator actions must proceed promptly in accordance with subsequent instructions.

Increase

To become progressively greater in size, amount, number or intensity.

ATTACHMENT B - Word List/Definitions

Indicate

To point out or point to; to display the value of a process variable; to be a sign or symbol.

Initiate

The act of placing equipment or a system into service, either manually or automatically. Activation of a function or protective feature (i.e. initiate a manual scram).

Injection

The act of forcing a fluid into a volume or vessel.

Inoperable

Not able to perform it's intended function

Intrusion

The act of entering without authorization

Loss

Failure of operability or lack of access to.

Maintain

Take action, as necessary, to keep the value of the specified parameter within the applicable limits.

Maximum Safe Operating (parameter)

The highest value of the identified operating parameter beyond which, required personnel access or continued operation of equipment important to safety cannot be assured.

Monitor

Observe and evaluate at a frequency sufficient to remain apprised of the value, trend, and rate of change of the specified parameter.

Notify

To give notice of or report the occurrence of; to make known to; to inform specified personnel; to advise; to communicate; to contact; to relay.

ATTACHMENT B - Word List/Definitions

Open

To position a valve or damper so as to allow flow of the process fluid.

To break an electrical connection which removes a power supply from an electrical device.

To make available for entry or passage by turning back, removing, or clearing away.

Operable

Able to perform it's intended function

Perform

To carry out an action; to accomplish; to affect; to reach an objective.

Primary Containment

The airtight volume immediately adjacent to and surrounding the RPV; for Mark I plants, the drywell, vent systems and torus.

Primary System

The pipes, valves, and other equipment which connect directly to the RPV or reactor coolant system such that a reduction in RPV pressure will effect a decrease in the steam or water being discharged through an unisolated break in the system.

Remove

To change the location or position of.

Report

To describe as being in a specific state.

Require

To demand as necessary or essential.

Restore

Take the appropriate action requires to return the value of an identified parameter to within applicable limits.

ATTACHMENT B - Word List/Definitions

Rise

Describes an increase in a parameter as the result of an operator or automatic action.

Sample

To perform an analysis on a specified media to determine its properties.

Scram

To take action to cause shutdown of the reactor by rapidly inserting a control rod or control rods (BWR).

Screenwell/Pumphouse

That structure which is comprised of the intake structure, discharge canal, Circulating Water Pumps, Service Water Pumps, Emergency Service Water Pumps and Fire Water Pumps.

Secondary Containment

The airtight volume immediately adjacent to or surrounding the primary containment in a BWR plant.

Shut down

To perform operations necessary to cause equipment to cease or suspend operation; to stop. "Shut down unnecessary equipment."

Shutdown

As applied to the BWR reactor, subcritical with reactor power below the heating range.

Site Area Emergency

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels except near the site boundary.

Suppression pool

The volume of water in a BWR plant intended to condense steam discharged from a primary system break inside the drywell.

Sustained

Prolonged. Not intermittent or of transitory nature

ATTACHMENT B - Word List/Definitions

Trip

To de-energize a pump or fan motor; to position a breaker so as to interrupt or prevent the flow of current in the associated circuit; to manually activate a semi-automatic feature.

Uncontrolled

An evolution lacking control but is not the result of operator action.

Unplanned

Not as an expected result of deliberate action.

Until

Indicates that the associated prescribed action is to proceed only so long as the identified condition does not exist.

Notification of an Unusual Event

Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Valid

Supported or corroborated on a sound basis.

Vent

To open an effluent (exhaust) flowpath from an enclosed volume; to reduce pressure in an enclosed volume.

Verify

To confirm a condition and take action to establish that condition if required. "Verify reactor trip, verify SI pumps running."

Vital Area

Any plant area which contains vital equipment.