FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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. 1

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. 1

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 μCi/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. 1

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. 1

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 °F.

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.

3.0 Containment 3.2 Torus Temperature

PEG Reference(s):

SS4.1

Basis Reference(s):

1. JAFNPP EPG/SAG

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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. 1

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. 1

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. 1

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 μCi/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. 1

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 μ 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. 1

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. 1

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. 1

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 μCi/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. 1

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 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. 1

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. 1

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 μCi/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. 1

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 μ Ci/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. 1

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. 1

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. 1

5.0 Radioactivity Release 5.1 Effluent Monitors

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. 1

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. 1

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. 1

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

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. 1

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. 1

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. 1

5.0 Radioactivity Release **5.1 Effluent Monitors**

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.

PEG Reference(s):

AS1.1

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 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. 1

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. 1

5.0 Radioactivity Release **5.1 Effluent Monitors**

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.

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. 1

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. 1

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. 1

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. 1

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

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.

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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. 1

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. 1

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

6.0 Electrical Failures 6.1 Loss of AC Power Sources

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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. 1

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. 1

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 ° 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. 1

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 ° 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. 1

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 ° 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. 1

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. 1

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. 1

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 ° 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. 1

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. 1

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. 1

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. 1

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. 1

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

7.2.3 Alert

Reactor coolant temperature cannot be maintained **< 212 ° F**

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

"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. 1

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. 1

8.0 Hazards 8.1 Security Events

8.1.1 Notification of an Unusual Event

Bomb device or other indication of attempted sabotage discovered within the plant Protected Area or ISFSI.

OR

Any security event, as determined by the Security Shift Supervisor, that represents a potential degradation in the level of the safety of the plant or ISFSI.

NEI IC:

Confirmed security event which indicates a potential degradation in the level of safety of the plant. (HU-4)

Security event as determined from (site-specific) Security Plan and reported by the (site-specific) Security Shift Supervisor. (E-HU2)

Operating Mode Applicability: All

Basis:

This EAL is based on the JAFNPP Security Contingency Plan. Security events which do not represent at least a potential degradation in the level of safety of the plant or ISFSI are reported under 10CFR73.71 or in some cases under 10CFR50.72.

The Plant Protected Area boundary is defined in the Security Plan (Blue Book). The ISFSI storage pad is located in the southwest corner of the plant protected area.

Reference is made to the Security Shift Supervisor because these individuals are the designated personnel qualified and trained to confirm that a security event is occurring or has occurred.

Basis References:

1. JAFNPP Security Contingency Plan
2. FSAR Figure 2.1.4
3. JAFNPP Security Plan

NEI Reference:

1. E-HU2

2. HU-4

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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 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. 1

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. 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. 1

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. 1

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

Basis:

FIGURE IAP-2.2 - JAF EAL TECHNICAL BASES DOCUMENT, Rev. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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. 1

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
RPV water level cannot be restored and maintained above 0 in. (TAF)
Emergency Director Judgment

Loss
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 PAGE 3 OF 4

(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 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	RPV water level cannot be restored and maintained above 0 in. (TAF) Primary containment pressure cannot be maintained < 2.7 psig due to coolant leakage Drywell radiation ≥ 300 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)

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 specifi ed 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.