NINE MILE POINT NUCLEAR STATION

EMERGENCY PLAN MAINTENANCE PROCEDURE

EPMP-EPP-0101

REVISION 05

UNIT 1 EMERGENCY CLASSIFICATION TECHNICAL BASES

TECHNICAL SPECIFICATION REQUIRED

Approved by:
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LIST OF EFFECTIVE PAGES

Page No.	Change No.	Page No.	Change No.	Page No.	Change No.
Coversheet	.	22	. . . .	47	. . . .
i	. . . .	23	. . . .	48	. . . .
ii	. . . .	24	. . . .	49	. . . .
iii	. . . .	25	. . . .	50	. . . .
1	. . . .	26	. . . .	51	. . . .
2	. . . .	27	. . . .	52	. . . .
3	. . . .	28	. . . .	53	. . . .
4	. . . .	29	. . . .	54	. . . .
5	. . . .	30	. . . .	55	. . . .
6	. . . .	31	. . . .	56	. . . .
7	. . . .	32	. . . .	57	. . . .
8	. . . .	33	. . . .	58	. . . .
9	. . . .	34	. . . .	59	. . . .
10	. . . .	35	. . . .	60	. . . .
11	. . . .	36	. . . .	61	. . . .
12	. . . .	37	. . . .	62	. . . .
13	. . . .	38	. . . .	63	. . . .
14	. . . .	39	. . . .	64	. . . .
15	. . . .	40	. . . .	65	. . . .
16	. . . .	41	. . . .	66	. . . .
17	. . . .	42	. . . .	67	. . . .
18	. . . .	43	. . . .	68	. . . .
19	. . . .	44	. . . .	69	. . . .
20	. . . .	45	. . . .	70	. . . .
21	. . . .	46	. . . .	71	. . . .

LIST OF EFFECTIVE PAGES

Page No.	Change No.	Page No.	Change No.	Page No.	Change No.
72	. . . .	97	. . . .		
73	. . . .	98	. . . .		
74	. . . .	99	. . . .		
75	. . . .	100	. . . .		
76	. . . .	101	. . . .		
77	. . . .	102	. . . .		
78	. . . .	103	. . . .		
79	. . . .	104	. . . .		
80	. . . .	105	. . . .		
81	. . . .	106	. . . .		
82	. . . .	107	. . . .		
83	. . . .	108	. . . .		
84	. . . .	109	. . . .		
85	. . . .	110	. . . .		
86	. . . .	111	. . . .		
87	. . . .	112	. . . .		
88	. . . .	113	. . . .		
89	. . . .				
90	. . . .				
91	. . . .				
92	. . . .				
93	. . . .				
94	. . . .				
95	. . . .				
96	. . . .				

TABLE OF CONTENTS

SECTION	PAGE
1.0 PURPOSE	1
2.0 PRIMARY RESPONSIBILITY	1
3.0 PROCEDURE	1
3.1 Emergency Preparedness Group	1
4.0 DEFINITIONS	1
5.0 REFERENCES AND COMMITMENTS	2
6.0 RECORD REVIEW AND DISPOSITION	2
ATTACHMENT 1: UNIT 1 EMERGENCY ACTION LEVEL TECHNICAL BASES	3
ATTACHMENT 2: FISSION PRODUCT BARRIER LOSS & POTENTIAL LOSS INDICATORS	103
ATTACHMENT 3: WORD LIST/DEFINITIONS	106

1.0 PURPOSE

To describe the technical bases for the emergency action levels at Unit 1.

2.0 PRIMARY RESPONSIBILITY

2.1 Emergency Preparedness Group

- Monitor/solicit any changes to the technical bases of each emergency action level.
- Assess these changes for potential impact on the emergency action level.
- Maintain the emergency action level technical bases, EPIP-EPP-01, and the Emergency Action Level Matrix/Unit 1.

3.0 PROCEDURE

3.1 Emergency Preparedness Group

3.1.1 Maintain a matrix of technical bases references for each emergency action level.

3.1.2 Evaluate each technical bases reference change for impact on the affected emergency action level.

3.1.3 Modify EPIP-EPP-01, Emergency Action Level (EAL) Matrix/Unit 1 and Attachment 1 of this procedure, as needed.

4.0 DEFINITIONS

See Attachment 3.

5.0 REFERENCES AND COMMITMENTS

5.1 Technical Specifications

None

5.2 Licensee Documentation

Nine Mile Point Site Emergency Plan

5.3 Standards, Regulations and Codes

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

5.4 Policies, Programs and Procedures

EPIP-EPP-01, Classification of Emergency Condition at Unit 1

5.5 Supplemental References

Nine Mile Point Unit 1 Plant-Specific EAL Guideline

5.6 Commitments

Sequence Number	Commitment Number	Description
1	C1	NCTS 504473 NRC order dated 2/25/02

6.0 RECORD REVIEW AND DISPOSITION

6.1 The following records generated by this procedure as a result of an actual declared emergency shall be maintained by Records Management for the Permanent Plant File in accordance with NIP-RMG-01, Records Management:

- None

6.2 The following records generated by this procedure that are not the result of an actual declared emergency are not required for retention in the Permanent Plant File:

- None

ATTACHMENT 1: UNIT 1 EMERGENCY ACTION LEVEL TECHNICAL BASES

PURPOSE

The purpose of this document is to provide an explanation and rationale for each of the emergency action levels (EALs) included in the EAL Upgrade Program for Nine Mile Point 1 (NMP-1). It is also intended to facilitate the review process of the NMP-1 EALs and provide historical documentation for future reference. This document is also intended to be utilized by those individuals responsible for implementation of EPIP-EPP-01 "Classification of Emergency Conditions Unit 1" as a technical reference and aid in EAL interpretation.

DISCUSSION

EALs are the plant-specific indications, conditions or instrument readings which are utilized to classify emergency conditions defined in the NMP-1 Emergency Plan.

The revised EALs were derived from the Initiating Conditions and example EALs given in the NMP-1 Plant-Specific EAL Guideline (PEG). The PEG is the NMP-1 plant interpretation of the NUMARC methodology for developing EALs.

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

The primary fission product barriers are:

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

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

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

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

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

Unusual Event:

Any loss or potential loss of containment

Alert:

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

Site Area Emergency:

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

General Emergency:

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

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

Where possible, the EALs have been made consistent with and utilize the conditions defined in the NMP-1 symptom based Emergency Operating Procedures (EOPs). While the symptoms that drive operator actions specified in the EOPs are not indicative of all possible conditions which warrant emergency classification, they do define the symptoms, independent of initiating events, for which reactor plant safety and/or fission product barrier integrity are threatened. Where these symptoms are clearly representative of one of the PEG Initiating Conditions, they have been utilized as an EAL. This allows for rapid classification of emergency situations based on plant conditions without the need for additional evaluation or event diagnosis. Although some of the EALs presented here are based on conditions defined in the EOPs, classification of emergencies using these EALs is not dependent upon EOP entry or execution. The EALs can be utilized independently or in conjunction with the EOPs.

To the extent possible, the EALs are symptom based. That is, the action level is defined by values of key plant operating parameters which identify emergency or potential emergency conditions. This approach is appropriate because it allows the full scope of variations in the types of events to be classified as emergencies. But, a purely symptom based approach is not sufficient to address all events for which emergency classification is appropriate. Particular events to which no predetermined symptoms can be ascribed have also been utilized as EALs since they may be indicative of potentially more serious conditions not yet fully realized.

DISCUSSION (Cont)

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

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

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

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

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

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

DISCUSSION (Cont)

For each EAL, the following information is provided:

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

The identified operating modes are defined as follows:

Power Operations

Reactor is critical and the mode switch is in RUN.

Startup/Hot Standby

This mode is subsumed in the Power Operations mode.

Hot Shutdown

Mode switch is in SHUTDOWN or REFUEL and reactor coolant temperature is >212 °F.

Cold Shutdown

Mode switch in SHUTDOWN or REFUEL and reactor coolant temperature is ≤212 °F.

Refuel

Mode switch in REFUEL and reactor coolant temperature ≤212°F.

Defueled

RPV contains no irradiated fuel.

1.0 REACTOR FUEL

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

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

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

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

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

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

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

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

1.0 REACTOR FUEL

1.1 Coolant Activity

1.1.1 Unusual Event

Coolant activity > **25 µCi/gm** I-131 equivalent

NUMARC IC:

Fuel clad degradation

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

PEG Reference(s):

SU4.2

Bases Reference(s):

1. Radiological Technical Specifications, Appendix A to Facility Operating License No. DPR-63, Article 3.2.4.a

1.1.2 Alert

Coolant activity > **300 µCi/gm** I-131 equivalent

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss

1.1.2 **(Cont)**

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

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

PEG Reference(s):

FC1.1

Basis Reference(s):

1. General Electric NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions

1.2 Off-gas Activity

1.2.1 Unusual Event

Valid offgas radiation ≥ **hi-hi alarm**

NUMARC IC:

Fuel clad degradation

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power operation, Hot shutdown

Basis:

Elevated offgas radiation activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. This offgas radiation level corresponds to the Technical Specification allowable limit of 500,000 μCi/sec (recombiner discharge gross noble gases beta and/or gamma). The hi-hi alarm setpoint has been conservatively selected because it is operationally significant and is readily recognizable by Control Room operating staff. The system isolates when both RN-12A and 12B alarm.

1.2.1 **(Cont)**

The hi-hi offgas radiation alarm is nominally set in accordance with the Offsite Dose Calculation Manual.

PEG Reference(s):

SU4.1

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 66, Article 3.6.15.c

2. N1-ARP-H1, annunciator H1-2-7

1.2.2 **Alert**

Valid offgas radiation $\geq$ **10 x hi-hi alarm**

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

This EAL is to cover other indications that may indicate loss or potential loss of the fuel clad barrier. Air ejector offgas radiation levels >10 times the nominal hi-hi setpoint is indicative of significant fuel cladding failure and is consistent with the Alert EAL of 300 μCi/gm I-131 equivalent coolant activity. The hi-hi offgas radiation level corresponds to the Technical Specification allowable limit of 500,000 μCi/sec (recombiner discharge gross noble gases beta and/or gamma). The hi-hi alarm setpoint has been conservatively selected because it is operationally significant and is readily recognized by Control Room operating staff.

The hi-hi offgas radiation alarm is nominally set at 1500 mRem/hr on RN-12A/B. 10 times the hi-hi alarm setpoint is therefore 15,000 mRem/hr.

PEG Reference (s):

FC4.1

Basis Reference (s):

1. N1-ARP-H1, annunciator H1-2-7

1.3 Containment Radiation

1.3.1 Alert

Drywell radiation ≥ **20 R/hr**

NUMARC:

N/A

FPB Loss/Potential Loss:

RCS Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

The drywell radiation reading is a value which indicates the release of reactor coolant to the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with normal operating concentrations (i. e., within Technical Specifications) into the drywell atmosphere. The reading is less than that specified for EAL 1.3.2 because no damage to the fuel clad is assumed. Only leakage from the RCS is assumed in this EAL.

The calculation referenced resulted in an EAL value of 24 R/hr. However, a value of 20 R/h was selected as it is observable on existing instrumentation.

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

RCS3.1

Basis Reference(s):

1. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

2. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

3. Calculation 1H21C003, Rev. 0

1.3.2 Site Area Emergency

Drywell radiation ≥ **3000 R/hr**

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss, RCS Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μCi/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant concentrations of this magnitude are several times larger than the maximum concentrations allowed within Technical Specifications (including iodine spiking) and are therefore indicative of fuel damage (approximately 2% - 5% clad failure depending on core inventory and RCS volume). The reading is higher than that specified for EAL 1.3.1 and, thus, this EAL indicates a loss of both the fuel clad barrier and the RCS barrier.

The calculation referenced resulted in an EAL value of 3090 R/hr. However, a value of 3000 R/hr was selected as it is observable on existing instrumentation.

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

FC3.1

1.3.2 **(Cont)**

Basis Reference(s):

1. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

2. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

3. Calculation 1H21C003, Rev. 0

1.3.3 **General Emergency**

Drywell radiation ≥ **4.0E6 R/hr**

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss, RCS Loss, Containment Potential Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

The drywell radiation reading is a value which indicates significant fuel damage well in excess of that required for loss of the RCS barrier and the fuel clad barrier. NUREG-1228 "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents" states that such readings do not exist when the amount of clad damage is less than 20%. A major release of radioactivity requiring offsite protective actions from core damage is not possible unless a major failure into the reactor coolant has occurred. Regardless of whether the primary containment barrier itself is challenged, this amount of activity in containment could have severe consequences if released. It is, therefore, prudent to treat this as a potential loss of the containment barrier and upgrade the emergency classification to a General Emergency.

The calculation referenced resulted in an EAL value of 3.9E6 R/hr. However, a value of 4.0E6 R/hr was selected as it is observable on existing instrumentation.

1.3.3 **(Cont)**

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

PC3.1

Basis Reference(s):

1. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

2. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

3. Calculation 1H21C003, Rev. 0

1.4 Other Radiation Monitors

1.4.1 Unusual Event

Any sustained ARM reading > **100 x alarm** (OP-50A) or offscale hi resulting from an uncontrolled process

NUMARC IC:

Unexpected increase in plant radiation or airborne concentration.

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

1.4.1 **(Cont)**

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

PEG Reference(s):

AU2.4

Basis Reference(s):

1. N1-EOP-5/6, Secondary Containment Control / Radioactivity Release Control

2. OP-50A, Area Radiation Monitoring System, Attachments 2 and 3

1.4.2 **Alert**

Sustained RB Vent Monitor RN07A5 or B5 > **5 mR/hr**
OR
Any sustained refuel floor rad monitor > **8.0 R/hr** or offscale hi, Table 1.

Table 1
Refuel Floor Rad Monitors

West End of Shield Wall, RB 340 (#18)
Rx Bldg. - East Wall El 340' (#25)
Refuel Bridge (high range) (Process Mon.)
Refuel Bridge (low range) (#29)

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

1.4.2 **(Cont)**

Basis:

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

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

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

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

The basis for the reactor building ventilation monitor setpoint (5 mR/hr) is a spent fuel handling accident and is, therefore, appropriate for this EAL.

Area radiation levels on the refuel floor at or above the Maximum Safe Operating value (8.0 R/hr) are indicative of radiation fields which may limit personnel access. Access to the refuel floor is required in order to visually observe water level in the spent fuel pool. Without access to the refuel floor, it would not be possible to determine the applicability of EAL 1.5.2. For those radiation monitors whose upper range limits are less than 8.0 R/hr, a value of offscale high is used.

PEG Reference(s):

AA2.1

Bases Reference(s):

1. NUREG-0818, Emergency Action Levels for Light Water Reactors
2. NUREG/CR-4982, Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82, July 1987
3. NRC Information Notice No. 90-08, KR-85 Hazards from Decayed Fuel
4. N1-ARP-L1, annunciator L1-4-3
5. Niagara Mohawk Power Corporation Memo File Code NMP31027, Exposure Guidelines for Unusual/Accident Conditions

1.4.3 **Alert**

Sustained area radiation levels > **15 mR/hr** in either:
Control Room
OR
Central Alarm Station (CAS) and Secondary Alarm Station (SAS)

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

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

It is the impaired ability to operate the plant that results in the actual or potential degradation of the level of safety of the plant. The cause or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EALs may be involved. For example, a dose rate of 15 mR/hr in the Control Room may be a problem in itself. However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, a Site Area Emergency or a General Emergency may be indicated by other EAL categories.

1.4.3 (Cont)

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

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

PEG Reference(s):

AA3.1

Basis Reference(s):

1. GDC 19

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

1.4.4 Alert

Sustained area radiation levels > **8 R/hr** in any areas, Table 2
AND
Access is required for safe operation or shutdown

Table 2
Plant Safety Function Areas

Reactor Building
Turbine Building
Screen and Pump House
Off Gas Building

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

1.4.4 **(Cont)**

Basis:

This EAL addresses increased radiation levels in areas requiring infrequent access in order to maintain safe plant operation or perform a safe plant shutdown. Area radiation levels at or above 8 R/hr are indicative of radiation fields which may limit personnel access. This bases of the value is described in NMPC memo File Code NMP31027 "Exposure Guidelines For Unusual/Accident Conditions". The areas selected are consistent with those listed in other EALs and represent those structures which house systems and equipment necessary for the safe operation and shutdown of the plant.

It is the impaired ability to operate the plant that results in the actual or potential degradation of the level of safety of the plant. The cause or magnitude of the increase in radiation levels is not a concern of this EAL. The Emergency Director must consider the source or cause of the increased radiation levels and determine if any other EAL may be involved. For example, a dose rate of 8 R/hr may be a problem in itself. However, the increase may also be indicative of high dose rates in the containment due to a LOCA. In this latter case, a Site Area Emergency or a General Emergency may be indicated by other EAL categories.

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

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

PEG Reference(s):

AA3.2

Basis Reference(s):

Niagara Mohawk Power Corporation Memo File Code NMP 31027, Exposure Guidelines for Unusual/Accident Conditions

1.5 Refueling Accidents

1.5.1 Unusual Event

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

NUMARC IC:

Unexpected increase in plant radiation or airborne concentration.

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

The spent fuel pool low water level alarm setpoint is actuated by LS-26C which alarms at El 338' 0". The definition of "... cannot be restored and maintained above ..." allows the operator to visually observe the low water level condition, if possible, and to attempt water level restoration instructions as long as water level remains above the top of irradiated fuel. Water level restoration instructions are performed in accordance with procedure N1-SOP-20, Loss of SFP/Rx Cavity Level/Decay Heat Removal.

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

PEG Reference(s):

AU2.1

Basis Reference(s):

None

1.5.2 **Alert**

Imminent report of actual visual observation of irradiated fuel uncovered

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

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

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

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

There is no indication that water level in the spent fuel pool has dropped to the level of the fuel other than by visual observation by personnel on the refueling floor. When the fuel transfer canal is directly connected to the spent fuel pool and reactor cavity, there could exist the possibility of uncovering irradiated fuel in the fuel transfer canal. Therefore, this EAL is applicable for conditions in which irradiated fuel is being transferred to and from the RPV and spent fuel pool. N1-SOP-20, Loss of SFP/Rx Cavity Level/Decay Heat Removal, provides appropriate instructions to report a visual observation of irradiated fuel uncovery.

1.5.2 **(Cont)**

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

PEG Reference(s):

AA2.2

Basis Reference(s):

1. NUREG-0818, Emergency Action Levels for Light Water Reactors
2. NUREG/CR-4982, Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82, July 1987
3. NRC Information Notice No. 90-08, KR-85 Hazards from Decayed Fuel
4. N1-SOP-20, Loss of SFP/Rx Cavity Level/Decay Heat Removal

2.0 REACTOR PRESSURE VESSEL (RPV)

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

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

- RPV Water Level: RPV water level is directly related to the status of adequate core cooling, and therefore fuel cladding integrity. Excessive (> Tech. Spec.) reactor coolant to drywell leakage indications are utilized to indicate potential pipe cracks which may propagate to an extent threatening fuel clad, RPV and primary containment integrity. Conditions under which all attempts at establishing adequate core cooling have failed require primary containment flooding.
- Reactor Power/Reactivity Control: The inability to control reactor power below certain levels can pose a direct threat to reactor fuel, RPV and primary containment integrity.

2.1 RPV Water Level

2.1.1 Unusual Event

Unidentified drywell leakage ≥ **10 gpm**
OR
Reactor coolant to drywell identified leakage > **25 gpm**

2.1.1 **(Cont)**

NUMARC IC:

RCS leakage

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

The conditions of this EAL may be a precursor of more serious conditions and, as a result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified drywell leakage was selected because it is observable with normal Control Room indications and is consistent with the Technical Specification threshold for leaks beyond which increased risk of crack propagation exists. The 25 gpm value for identified reactor coolant to drywell leakage is set at a higher value because of the significance of identified leakage in comparison to unidentified or pressure boundary leakage.

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

PEG Reference(s):

SU5.1

Basis Reference(s):

None

2.1.2 <u>Site Area Emergency</u>

RPV water level cannot be restored and maintained > **-84 in.** (TAF)

NUMARC IC:

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

FPB Loss/Potential Loss:

Fuel Clad Potential Loss, RCS Loss

2.1.2 **(Cont)**

Mode Applicability:

Power Operation, Hot Shutdown, Cold Shutdown, Refuel

Basis:

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

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

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

> "The value of the identified parameter(s) is/is not able to be returned to above/below specified limits. This determination includes making an evaluation that considers both current and future 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 classification is made nor that the classification must be made before the limit is reached. Does not imply any specific time interval but does not permit prolonged operation beyond a limit without making the specified classification."

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

2.1.2 **(Cont)**

PEG Reference(s):

SS5.1
FC2.1
RCS4.1

Bases Reference(s):

1. N1-EOP-2, Level Control

2. N1-SAP-2, RPV/Containment/Radioactivity Release Control

2.1.3 **General Emergency**

Drywell Flooding required

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss, RCS Loss, Containment Potential Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

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

PEG Reference(s):

PC4.1

Basis Reference(s):

1. N1-SAP-1, Primary Containment Flooding

2.2 Reactor Power / Reactivity Control

2.2.1 Alert

Any RPS scram setpoint has been exceeded
AND
Automatic scram fails to result in a control rod pattern which assures reactor shutdown under all conditions without boron.

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation

Basis:

This condition indicates a failure of the Reactor Protection System to scram the reactor automatically, and maintain it in a shutdown under all conditions without boron. This is consistent with the entry conditions into N1-EOP-03, "Failure to Scram".

If a manual scram does not result in reactor power being reduced below the APRM downscale setpoint (6%) or torus temperature exceeds the Boron Injection Initiation Temperature (110°F) escalation to a Site Area Emergency is required. A manual scram is any set of actions by the reactor operators at the reactor control console which causes control rods to be rapidly inserted into the core and brings the reactor subcritical including manual scram push buttons, ARI and mode switch.

2.2.1 **(Cont)**

PEG Reference(s):

SA2.1

Basis Reference(s):

1. N1-EOP-3, Failure to Scram
2. "Methodology for Development of Emergency Action Levels" NUMARC/NESP-007 Rev 2-Questions and Answers, June 1993

2.2.2 **Site Area Emergency**

Any RPS scram setpoint has been exceeded
AND
Automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown under all conditions without boron.
AND Either:
Reactor power >6%
OR
Torus temperature >110°F

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation

Basis:

This condition indicates failure of the Reactor Protection System to shut down the reactor (automatically or manually) and maintain it shutdown under all conditions without boron. Under these conditions, the reactor is producing more heat than can be removed using available safety systems. A Site Area Emergency is indicated because conditions exist leading to imminent or potential loss of both the fuel clad and the primary containment.

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

2.2.2 **(Cont)**

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

PEG Reference(s):

SS2.1

Basis Reference(s):

1. N1-EOP-3, Failure to Scram
2. "Methodology for Development of Emergency Action Level" NUMARC/NESP-007 Revision 2 - Questions and Answers, June 1993

2.2.3 General Emergency

Any RPS scram setpoint has been exceeded
AND
Automatic and manual scrams fail to result in a control rod pattern which assures reactor shutdown under all conditions without boron
AND Either:
RPV water level cannot be restored and maintained > Minimum Steam Cooling RPV Water Level
OR
Torus temperature and RPV pressure cannot be maintained < HCTL.

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation

Basis:

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

2.2.3 **(Cont)**

An extreme challenge to the ability to cool the core is indicated when RPV water level cannot be restored and maintained above the Minimum Steam Cooling RPV Water Level. This RPV water level is used to define the lowest RPV water level in a failure-to-scram event above which adequate core cooling can be maintained without sufficient steam cooling flow. This situation could be precursor for a core melt sequence.

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

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

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

PEG Reference(s):

SG2.1

Basis Reference(s):

1. N1-EOP-3, Failure to Scram

2. N1-EOP-9, Steam Cooling

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.

3.0 **(Cont)**

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.

3.1 Containment Pressure

3.1.1 Alert

Drywell pressure cannot be maintained < **3.5 psig** due to coolant leakage

NUMARC IC:

N/A

FPB Loss/Potential Loss:

RCS Loss

Mode Applicability:

Power Operation, Hot Shutdown

3.1.1 **(Cont)**

Basis:

The primary containment 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. N1-ARP-F1, annunciator 1-5
2. N1-ARP-F4, annunciator 1-4
3. N1-EOP-4, Primary Containment Control

3.1.2 <u>Site Area Emergency</u>

Drywell pressure cannot be maintained < **3.5 psig**
AND
Coolant activity > **300 μCi/gm I - 131 equivalent**

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss, RCS Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

The primary containment 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.

3.1.2 **(Cont)**

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

Bases Reference(s):

1. N1-ARP-F1, annunciator 1-5

2. N1-ARP-F4, annunciator 1-4

3. General Electric NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions

4. N1-EOP-4, Primary Containment Control

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, 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 bases accident analysis. A loss of the RCS barrier must have occurred with a potential loss of the fuel clad barrier.

3.1.3 **(Cont)**

PEG Reference(s):

PC1.3
PC2.2

Bases Reference(s):

1. N1-EOP-4, Primary Containment

2. N1-SAP-2, RPV/Containment/Radioactivity Release Control

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, 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 torus temperature. Elevated torus temperature is addressed by the Heat Capacity Temperature Limit (HCTL). The HCTL is a function of RPV pressure and torus water temperature. If RPV pressure and torus temperature cannot be maintained below the HCTL, primary containment integrity is challenged and declaration of a Site Area Emergency is warranted.

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

3.2.1 **(Cont)**

PEG Reference(s):

SS4.1

Basis Reference(s):

1. Nine Mile Point Nuclear Station Unit 1 Appendix 'R' Review Safe Shutdown Analysis, Figure V-1

   Addresses: "Hot Shutdown Systems"
   "Functional Perf. Criteria Req. for Station Shutdown"

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:

Power Operation, Hot Shutdown

Basis:

This 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 and declaration of a General Emergency would be required.

3.3.1 **(Cont)**

PEG Reference(s):

SS5.2

Basis Reference(s):

1. N1-EOP-4.2, Hydrogen Control

2. N1-SAP-2, RPV/Containment/Radioactivity Release Control

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. This EAL is not applicable for venting performed due to hydrogen and oxygen concentrations below the deflagration limits.

PEG Reference(s):

PC1.4
PC2.2

Basis Reference(s):

1. N1-EOP-4.2, Hydrogen Control

2. N1-SAP-2, RPV/Containment/Radioactivity Release Control

3.4 Containment Isolation Status

3.4.1 Site Area Emergency

MSL, EC steam line or Reactor Water Clean-up Isolation failure

AND

A release pathway, outside normal process system flowpaths from the unisolable system, exists outside primary containment.

NUMARC IC:

N/A

FPB Loss/Potential Loss:

RCS Loss, Containment Loss

Mode Applicability:

Power Operation, Hot Shutdown

Basis:

This EAL covers 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. 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

3.4.2 General Emergency

MSL, EC steam line isolation failure or Reactor Water Clean-up isolation failure

AND

A release pathway, outside normal process system flowpaths from the unisolable system, exists outside primary containment

AND any:
- Coolant activity > **300 μCi/gm** I-131 equivalent
- RPV water level < **-84 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, 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 bases for declaration of Site Area Emergency in EAL 3.4.1.

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.

3.4.2 (Cont)

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

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μCi/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant 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 High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

PC2.1 and FC1.1
PC2.1 and FC2.1
PC2.1 and FC3.1

3.4.2 **(Cont)**

Basis Reference(s):

1. General Electric NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions

2. N1-EOP-2, Level Control

3. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

4. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

5. Calculation 1H21C003, Rev 0

6. N1-SAP-2, RPV/Containment/Radioactivity Release Control

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 a direct release 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.

4.1 Reactor Building Temperature

4.1.1 Site Area Emergency

Primary system is discharging outside PC
AND
RB general area temperatures are > 135°F in two or more areas,
N1-EOP-5

NUMARC IC:

N/A

FPB Loss/Potential Loss:

RCS Loss, Containment Loss

Mode Applicability:

Power Operation, 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. N1-EOP-5, Secondary Containment

4.1.2 General Emergency

Primary system is discharging outside PC
AND
RB general area temperatures are >135°F in two or more areas, N1-EOP-5

AND any:
- Coolant activity > 300 μCi/gm I-131 equivalent
- RPV water level < -84 in. (TAF)
- DW radiation > 3000 R/hr

4.1.2 **(Cont)**

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Fuel Clad Loss/Potential Loss, RCS Loss, Containment Loss

Mode Applicability:

Power Operation, 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.

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. 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 μCi/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).

4.1.2 **(Cont)**

It is important to recognize that the radiation monitor may be sensitive to shine from the RPV or RCS piping. Drywell High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

PC2.3 and FC1.1
PC2.3 and FC2.1
PC2.3 and FC3.1

Basis Reference(s):

1. N1-EOP-5, Secondary Containment

2. General Electric NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions

3. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

4. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

5. Calculation 1H21C003, Rev 0

4.2 <u>Reactor Building Radiation Level</u>

4.2.1 <u>Site Area Emergency</u>

Primary system is discharging outside PC
AND
RB area radiation levels are > 8.0 R/hr in two or more areas, N1-EOP-5

NUMARC IC:

N/A

FPB Loss/Potential Loss:

RCS Loss, Containment Loss

Mode Applicability:

Power Operation, Hot Shutdown

4.2.1 **(Cont)**

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. N1-EOP-5, Secondary Containment

4.2.2 General Emergency

Primary system is discharging outside PC
AND
RB area radiation levels are > 8.0 R/hr in two or more areas, N1-EOP-5
AND any:

- Coolant activity > **300 μCi/gm** I-131 equivalent
- RPV water level < **-84** 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, 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.

4.2.2 **(Cont)**

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 to indicate challenge to core cooling and loss of the fuel clad barrier.

The drywell radiation reading is a value which indicates the release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. The reading is calculated assuming the instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of 300 μCi/gm dose equivalent I-131 into the drywell atmosphere. Reactor coolant 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 High Range Radiation Monitors have a range of 0 to E8 R/hr on recorder RR 201.7-36C pen 1 and 2. They are installed in the following drywell locations:

RAm 201.7-36 Az 340°, El 263' 6"

RAm 201.7-37 Az 310°, EL 301' 0"

PEG Reference(s):

PC2.3 and FC1.1
PC2.3 and FC2.1
PC2.3 and FC3.1

4.2.2 **(Cont)**

Basis Reference(s):

1. N1-EOP-5, Secondary Containment

2. General Electric NEDO-22215, Procedures for the Determination of the Extent of Core Damage Under Accident Conditions

3. N1-RG197-EIL1, Important Design Features of Regulatory Guide 1.97 Instruments

4. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 72, 76, Table 3.6.11-1

5. Calculation 1H21C003, Rev 0

6. N1-SAP-2, RPV/Containment/Radioactivity Release Control

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.

5.1 Effluent Monitors

5.1.1 Unusual Event

A valid reading from an unplanned release on any monitors from Table 3 "UE" column for > 60 min. unless sample analysis can confirm release rates < 2 x technical specifications within this time period.

Table 3
Effluent Monitor Classification Thresholds

Monitor	UE	Alert	SAE	GE
Stack (RN10A/B)	≥300 cps	≥3.0E4 cps	≥5.0 E6 cps	N/A
EC Vent	≥10 mR/hr	≥30 mR/hr	≥310 mR/hr	N/A
SW Effluent	≥900 cpm	≥90,000 cpm	N/A	N/A
RW Discharge	≥2 x batch	≥200 x batch	N/A	N/A

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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 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.

5.1.1 **(Cont)**

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. The value shown for the UE level is two times the high alarm setpoint for the Emergency Condenser vent monitor and the Service Water effluent monitor, and two times the high-high alarm setpoint for the main stack (OGESM) monitor.

The following radiation monitors are not included in this EAL:

Reactor Building Vent Monitors: Reactor building ventilation discharges to the main stack. Radioactivity release from the reactor building would, therefore, be assessed by the main stack monitor.

Containment Spray Raw Water Monitors: These monitors detect radiation in the discharge from their respective processes. The monitors are located upstream of the Service Water monitor. Therefore, the Service Water radiation monitor adequately detects offsite radioactivity releases from these systems.

PEG Reference(s):

AU1.1

Basis Reference(s):

1. N1-OP-50B Process Radiation Monitoring System
2. N1-ARP-H1 Annunciator H1-1-8
3. N1-CSP-Q308, Attachment 2
4. N1-CSP-Q215, Service Water Alarm Setpoint Determination, Attachment 2
5. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications
6. Calculation 1H21C003, Rev 0

5.1.2 **Alert**

A valid reading from an unplanned release on any monitors from Table 3 "Alert" column for > 15 min. unless dose assessment can confirm releases are below Table 4 column "Alert" within this time period.

Table 3
Effluent Monitor Classification Thresholds

Monitor	UE	Alert	SAE	GE
Stack (RN10A/B)	≥300 cps	≥3.0E4 cps	≥5.0 E6 cps	N/A
EC Vent	≥10 mR/hr	≥30 mR/hr	≥310 mR/hr	N/A
SW Effluent	≥900 cpm	≥90,000 cpm	N/A	N/A
RW Discharge	≥2 x batch	≥200 x batch	N/A	N/A

Table 4
Dose Projection/Env. Measurement Classification Thresholds

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

NUMRAC 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 Unusual Event by increasing the magnitude of the release by a factor of 100 over the Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr bases of the 10CFR20 non-occupational DAC 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 following radiation monitors are not included in this EAL:

5.1.2 **(Cont)**

Reactor Building Vent Monitors: Reactor building ventilation discharges to the main stack. Radioactivity release from the reactor building would, therefore, be assessed by the main stack monitor.

Containment Spray Raw Water Monitors: These monitors detect radiation in the discharge from their respective processes. The monitors are located upstream of the Service Water monitor. Therefore, the Service Water radiation monitor adequately detects offsite radioactivity releases from these systems.

PEG Reference(s):

AA1.1

Basis Reference(s):

1. N1-OP-50B, Process Radiation Monitoring System
2. N1-ARP-H1, Annunciator H1-1-8
3. N1-CSP-Q308, Attachment 2
4. N1-CSP-Q215, Service Water Alarm Setpoint Determination, Attachment 2
5. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications
6. Calculation 1H21C003, Rev 0

5.1.3 **Site Area Emergency**

A valid reading from an unplanned release on any monitors from Table 3 "SAE" column for > 15 min. unless dose assessment can confirm releases are below Table 4 column "SAE" within this time period.

Table 3
Effluent Monitor Classification Thresholds

Monitor	UE	Alert	SAE	GE
Stack (RN10A/B)	≥300 cps	≥3.0E4 cps	≥5.0 E6 cps	N/A
EC Vent	≥10 mR/hr	≥30 mR/hr	≥310 mR/hr	N/A
SW Effluent	≥900 cpm	≥90,000 cpm	N/A	N/A
RW Discharge	≥2 x batch	≥200 x batch	N/A	N/A

Table 4
Dose Projection/Env. Measurement Classification Thresholds

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

5.1.3 **(Cont)**

NUMRAC 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:

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 determining indications for the monitors on that pathway.

The values are derived from Calculation 1H21C003, Rev. 0.

PEG Reference(s):

AS1.1

5.1.3 **(Cont)**

Basis Reference(s):

1. N1-OP-50B, Process Radiation Monitoring System
2. N1-ARP-H1, Annunciator H1-1-8
3. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications
4. Calculation 1H21C003, Rev. 0

5.2 Dose Projections/Environmental Measurements

5.2.1 Unusual Event

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

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

Confirmed sample analyses in excess of two times the site technical specifications that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the 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.

5.2.1 **(Cont)**

PEG Reference(s):

AU1.2

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Article 3.6.15.a(1) and Article 3.6.15.b(1)(a) and (b)

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 Unusual Event by increasing the magnitude of the release by a factor of 100 over the Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr bases of the 10CFR20 non-occupational DAC 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-63, Appendix A, Radiological Technical Specifications, Article 3.6.15.a(1) and Article 3.6.15.b(1)(a) and (b)

5.2.3 Alert

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 4 column "Alert" at the site boundary or beyond

Table 4
Dose Projection/Env. Measurement Classification Thresholds

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

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 Unusual Event by increasing the magnitude of the release by a factor of 100 over the Unusual Event level (i. e., 200 times Technical Specifications). Prorating the 500 mR/yr bases of 10CFR20 for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary dose rate would be 10 mR/hr.

5.2.3 **(Cont)**

Basis (Cont)

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

Imminent is intended to mean that a release will occur.

PEG Reference(s):

AA1.2

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Article 3.6.15.a(1) and Article 3.6.15.b(1)(a) and (b)

5.2.4 **Site Area Emergency**

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 4 column "SAE" at the site boundary or beyond

Table 4
Dose Projection/Env. Measurement Classification Thresholds

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

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

5.2.4 **(Cont)**

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.

Imminent is intended to mean that a release will occur.

PEG Reference(s):

AS1.3
AS1.4

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications

5.2.5 General Emergency

Dose projections or field surveys resulting from actual or imminent release which indicate doses / dose rates > Table 4 column "GE" at the site boundary or beyond

Table 4
Dose Projection/Env. Measurement Classification Thresholds

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

5.2.5 **(Cont)**

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.

Imminent is intended to mean that a release will occur.

PEG Reference(s):

AG1.3
AG1.4

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications

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 vdc power sources.

6.1 Loss of AC Power Sources

6.1.1 Unusual Event

Loss of power for > 15 min. to all:

- T-101N
- T-101S
- T-10 backfed from offsite through T-1 or T-2

NUMARC IC:

Loss of all offsite power to establish 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.

6.1.1 **(Cont)**

Backfeeding of the Station Transformer T10 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 offsite 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. N1-OP-45, Emergency Diesel Generators

2. N1-OP-30, 4.16 Kv, 600V, and 480V House Service

6.1.2 **Alert**

Loss of all emergency 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 to all:

- T-101N
- T-101S
- T-10 backfed through T-1 or T-2 AND failure of both DGs to power emergency buses AND failure to restore power to PB102 or PB103 in ≤ 15 min.

AND

Failure of both DGS to power emergency buses

AND

Failure to restore power to PB102 or PB103 in ≤ 15 min.

6.1.2 **(Cont)**

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.

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. N1-OP-30, 4.16 Kv, 600V, and 480V House Service

2. N1-OP-45, Emergency Diesel Generators

6.1.3 **Alert**

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

- DG102 (PB102)
- DG103 (PB103)
- T-101N
- T-101S

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, Hot Shutdown

6.1.3 **(Cont)**

Basis:

The condition indicated by this EAL is the degradation of the offsite power with a concurrent failure of one emergency generator to supply power to its emergency busses. 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. N1-OP-45, Emergency Diesel Generators

2. N1-OP-30, 4.16 Kv, 600V, and 480V House Service

6.1.4 Site Area Emergency

Loss of all emergency 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, 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 T-101N and T-101S, and T-10 backfed through T-1 or T-2 AND failure of both DGs to power any emergency buses AND failure to restore power to PB102 or PB103 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.

6.1.4 **(Cont)**

PEG Reference(s):

SS1.1

Basis Reference(s):

1. N1-OP-45, Emergency Diesel Generators
2. N1-OP-30 4.16 Kv, 600V, and 480V House Service
3. N1-SOP-18, Station Blackout

6.1.5 **General Emergency**

Loss of all emergency 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 > **-84 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, 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.

6.1.5 (Cont)

In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, the Emergency Director should declare a General Emergency based on two major considerations:

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

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

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

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.

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

> "The value of the identified parameter(s) is/is not able to be returned to above/below specified limits. This determination includes making an evaluation that considers both current and future 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 classification is made nor that the classification must be made before the limit is reached. Does not imply any specific time interval but does not permit prolonged operation beyond a limit without making the specified classification."

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

6.1.5 **(Cont)**

PEG Reference(s):

SG1.1

Basis Reference(s):

1. N1-OP-45, Emergency Diesel Generators
2. N1-OP-30 4.16 Kv, 600V, and 480V House Service
3. N1-SOP-18, Station Blackout, pg. 1
4. N1-ODP-PRO-0302, EOP Technical Bases

6.2 Loss of DC Power Sources

6.2.1 Unusual Event

< **106 vdc** on battery board 11 and 12 for >15 min.

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.

6.2.1 **(Cont)**

PEG Reference(s):

SU7.1

Basis Reference(s):

1. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Basis for articles 3.6.3 and 4.6.3

2. N1-OP-47A, 125 vdc Power System

6.2.2 **Site Area Emergency**

< 106 vdc on battery board 11 and 12 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, 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. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Basis for articles 3.6.3 and 4.6.3

2. N1-OP-47A, 125 vdc Power System

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.

7.1 Technical Specifications

7.1.1 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, Hot Shutdown

7.1.1 **(Cont)**

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 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. Radiological Technical Specifications, Appendix A to Facility Operating License No. DPR-63, article 3.0.1

7.2 <u>System Failures or Control Room Evacuation</u>

7.2.1 <u>Unusual Event</u>

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, Hot Shutdown

7.2.1 **(Cont)**

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 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

7.2.2 **Alert**

Entry into N1-SOP-9.1, "Control Room evacuation"

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 Facility 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. N1-SOP-9.1, 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. Facility Operating License No. DPR-63, Appendix A, Radiological Technical Specifications, Amendment 99, Article 1.1.a

7.2.4 **Site Area Emergency**

Entry into N1-SOP-9.1, "Control Room Evacuation".
AND
Plant control cannot be established per N1-SOP-9.1, "Control Room Evacuation" in ≤ 15 min.

7.2.4 **(Cont)**

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 EOPs 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. N1-SOP-18, Station Blackout
3. N1-SOP-9.1, Control Room Evacuation

7.3 <u>Loss of Indications/Alarm/Communication Capability</u>

7.3.1 <u>Unusual Event</u>

Unplanned loss of all annunciators or indicators on all panels L, K, H, F, G for > 15 min.
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.

7.3.1 **(Cont)**

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation, 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 (SPDS, plant computer, etc.).

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

It is not intended that plant personnel perform a detailed count of instrumentation lost but the use of judgment by the Shift Supervisor as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Supervisor 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 uninterruptable 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 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 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.

7.3.1 **(Cont)**

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 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):

1. N1-OP-42, Process Computer/SPDS

7.3.2 Unusual Event

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.

7.3.2 **(Cont)**

The onsite communications loss must encompass the loss of all means of routine communications, Table 7.1.

Table 7.1
Communications Systems

System	Onsite	Offsite
PBX	x	x
Gaitronics	x	
Portable headsets	x	
Station radios	x	
ENS		x
RECS		x
UHF radios		x

The offsite communications loss must encompass the loss of all means of communications with offsite authorities, 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. N1-OP-51, Communications System

7.3.3 **Alert**

Unplanned loss of all annunciators or indicators on all panels L, K, H, F, G for > 15 min.
AND
Increased surveillance is required for safe plant operation
AND either:
Plant transient in progress
OR
plant computer and SPDS are 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.

7.3.3 **(Cont)**

FPB Loss/Potential Loss:

N/A

Mode Applicability:

Power Operation, 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.

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 supervisor as the threshold for determining the severity of the plant conditions. This judgment is supported by the specific opinion of the Shift Supervisor 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 uninterruptable 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.).

"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.

7.3.3 **(Cont)**

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):

1. N1-OP-42, Process Computer/SPDS

7.3.4 **Site Area Emergency**

Loss of all annunciators or indicators on all panels L, K, H, F, G
AND
Plant computer and SPDS are 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, 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.

7.3.4 **(Cont)**

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.).

"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. N1-OP-42, Process Computer/SPDS

2. N1-ODP-PRO-0302, EOP Technical Bases,

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 fires within the site Protected Area or which may affect operability of vital equipment.

8.0 (Cont)

- 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.

8.1 Security Threats

8.1.1 Unusual Event

Bomb device or other indication of attempted sabotage discovered within plant Protected Area
OR
C1 Notification of any credible site specific security threat by the Security Site Supervisor or outside agency (NRC, military or law enforcement)

NEI IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

This EAL is based on the Nine Mile Point Nuclear Station Physical Security and Safeguards Contingency Plans. Security events which do not represent at least a potential degradation in the level of safety of the plant, are reported under 10CFR73.71 or in some cases under 10CFR50.72.

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

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

8.1.1 **(Cont)**

C1 The second EAL condition is included to ensure the appropriate notifications for the security threat are made in a timely manner. The determination of "credible" is made through the use of information found in the Safeguards Contingency Plan. Only the plant or site to which the specific threat is made need declare the Unusal Event. Threats made that are not plant specific or ambiguious to a specific plant (ex. "the Nine Mile site") may be conservatively interpreted to include all of the plants on site. This would result in an emergency classificatin at more than one plant. Guidance in these instances should be provided directly by the individual site security departments and their sources. A higher initial classification could be made based upon the nature and timing of the threat and potential consequences. Consideration shall be given to upgrading the emergency response in accordance with the Safeguards Contingency Plan and Emergency Plan.

PEG Reference(s):

HU4.1
HU4.2

Basis Reference(s):

1. Nine Mile Point Nuclear Station Physical Security and Safeguards Contingency Plans.

2. Letter from Mr. B. A. Boger (NRC) to Ms. Lynette Hendricks (NEI) dated 2/4/02.

3. NRC order dated 2/25/02.

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

8.1.2 **(Cont)**

Basis:

This class of security events represents an escalated threat to plant safety above that contained in the Unusual Event. For the purposes of this EAL, the intrusion by unauthorized personnel inside the Protected Area boundary can be considered a significant security threat. Intrusion into a vital area by unauthorized personnel will escalate this event to a Site Area Emergency.

NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also see S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

PEG Reference(s):

HA4.1
HA4.2

Basis Reference(s):

1. Nine Mile Point Nuclear Station Physical Security and Safeguards Contingency Plans

2. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89

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 unauthorized personnel have progressed from the Protected Area to the vital area.

8.1.3 **(Cont)**

PEG Reference(s):

HS1.1
HS1.2

Basis Reference(s):

1. Nine Mile Point Nuclear Station Physical Security and Safeguards Contingency Plans

8.1.4 **General Emergency**

Security event which results in either:

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

8.2 Fire or Explosion

8.2.1 Unusual Event

Confirmed fire in or contiguous to any plant area, Table 5 or Table 6, not extinguished in ≤ 15 min. of Control Room notification

Table 5
Plant Areas

- RadWaste Solidification and Storage Bldg.
- Security West Bldg.

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

NUMARC IC:

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

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

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

8.2.1 **(Cont)**

PEG Reference(s):

HU2.1

Basis Reference(s):

1. Nine Mile Point Nuclear Station Physical Security and Safeguards Contingency Plans

2. NUREG 0737, Section II.B.2-2

8.2.2 **Alert**

Fire or explosion in any plant area, which results in damage to plant equipment or structures needed for safe plant operation, Table 5 or Table 6.

Table 5
Plant Areas

- RadWaste Solidification and Storage Bldg.
- Security West Bldg.

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

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

8.2.2 **(Cont)**

Basis:

The listed areas contain functions and systems required for the safe shutdown of the plant. The NMP-1 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, 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. N1-SOP-9, Fire In Plant
2. Nine Mile Point Nuclear Station FSAR, Section 10
3. NUREG 0737, Section II.B.2-2

8.3 Man-Made Events

8.3.1 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

8.3.1 **(Cont)**

Basis:

The Protected Area boundary is within the security isolation zone and is defined in the site security plan. NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also, refer to S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

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. USAR Figure 1.2-1

2. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89

8.3.2 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. NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also, refer to S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

8.3.2 **(Cont)**

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. USAR Figure 1.2-1

2. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89

8.3.3 Unusual Event

Report or detection of a release 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

8.3.3 **(Cont)**

Basis:

This EAL may represent a condition in which toxic or flammable gas was released within the Protected Area, or was released outside the protected area but is anticipated to, or has entered the protected area. In either case, the actual or anticipated presence of the gas within the protected area may adversely affect either personnel within the protected area, or safe plant operation. The release may be considered to affect safe plant operation if it could preclude access to areas that contain equipment required for safe plant operation, or may damage equipment required for safe plant operation.

A report by offsite officials that a potential evacuation of site personnel may be required based on an offsite event, assumes that the plant lies within an evacuation area established by offsite officials due to a release of toxic or flammable gas. In this case, it can be assumed that an actual or potential release of toxic or flammable gas is anticipated to enter the protected area in amounts that could affect the health of plant personnel or safe plant operation.

NMP-1 and NMP-2 share a common protected area border. Consideration should be given to the opposite unit when considering classification of the EAL.

Should an explosion occur within a specified plant area, an Alert would be declared in accordance with EAL 8.2.2.

PEG Reference(s):

HU3.1
HU3.2

Basis Reference(s):

None

8.3.4 Alert

Vehicle crash or projectile impact which precludes personnel access to or damages equipment in plant vital areas, Table 6

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

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.

NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also see S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

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

8.3.4 **(Cont)**

PEG Reference(s):

HA1.5

Basis Reference(s):

1. USAR Figure 1.2-1

2. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89

3. NUREG 0737, Section II.B.2-2

8.3.5 **Alert**

Confirmed report or detection of toxic or flammable gases within a plant vital area, Table 6, in concentrations that will be life threatening to plant personnel or preclude access to equipment needed for safe plant operation

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

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

8.3.5 **(Cont)**

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. USAR Figure III-6, Station Floor Plan - Elevation 281'-0" and 291'-0"

8.4 Natural Events

8.4.1 Unusual Event

Earthquake felt inplant based upon a consensus of Control Room Operators on duty.
AND either:
NMP-1 seismic instrumentation actuated
OR
Confirmation of earthquake received on NMP-2 or JAFNPP seismic instrumentation

NUMARC IC:

Natural and destructive phenomena affecting the protected area.

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

8.4.1 **(Cont)**

Basis:

NMP-1 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-2 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. N1-ARP-H2 annunciator H2-1-6
2. N1-SOP-11, Earthquake
3. EPRI document, "Guidelines for Nuclear Plant Response to an Earthquake"

8.4.2 <u>Unusual Event</u>

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

8.4.2 **(Cont)**

Basis:

This EAL is based on the assumption that a tornado striking (touching down) within the protected 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.

NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also see S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

PEG Reference(s):

HU1.2

Basis Reference(s):

1. USAR Figure 1.2-1

2. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89

8.4.3 Unusual Event

Lake water level > **248 ft**
OR
forebay water level < **238.8 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 uncontrolled lake water level. The low level is based on intake forebay level and corresponds to the minimum intake water level for operability of Emergency Service Water, Emergency Diesel Generator cooling water, Containment Spray Raw Water and Diesel and Electric Fire Pump.

8.4.3 **(Cont)**

PEG Reference(s):

HU1.7

Basis Reference(s):

1. N1-ARP-H2, Annunciator H2-1-3
2. N1-SOP-7, Service Water Failure/Low Intake Level
3. DER 1-92-Q-0489

8.4.4 **Alert**

Earthquake felt in plant based upon a consensus of Control Room Operators on duty
AND
NMP-1 seismic instrumentation indicates > **0.11 g**

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 bases earthquake of 0.11 g. Seismic events of this magnitude can cause damage to plant safety functions.

PEG Reference(s):

HA1.1

Basis Reference(s):

1. N1-ARP-H2, annunciator H2-1-6
2. N1-SOP-11, Earthquake

8.4.5 **Alert**

Sustained winds > **125 mph**
OR
Tornado strikes a plant vital area, Table 6

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

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 bases of 125 mph. Wind loads of this magnitude can cause damage to safety functions.

NMP-1 and NMP-2 Protected Area boundaries are illustrated in USAR Figure 1.2-1. Also see S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89.

PEG Reference(s):

HA1.2

8.4.5 **(Cont)**

Basis Reference(s):

1. FSAR Section VI.C.1.1, Wind and Snow Loadings, 6/91
2. N1-SOP-10, High Winds
3. USAR Figure 1.2-1
4. S&W Drawing No. 12187-SK-032483-25, Issue No. 1, Site Facilities Layout Status as of 8/1/89
5. NUREG 0737, Section II.B.2-2

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 6.

Table 6
Plant Vital Areas

- Reactor Building
- Control Room
- Diesel Generator Engine and Board Rooms
- Battery Rooms
- Battery Board Rooms
- Cable Spreading Room
- Central Alarm Station
- Secondary Alarm Station
- Security Uninterruptible Power System Room
- Telephone Rooms
- Main Steam Isolation Valve Room

NUMARC IC:

Natural and destructive phenomena affecting the plant vital area.

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

Basis:

8.4.6 **(Cont)**

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 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. USAR Figure III-6, Station Floor Plan - Elevation 281'-0" and 291'-0"

2. NUREG 0737, Section II.B.2-2

8.4.7 **Alert**

Lake water level > **254 ft**
OR
forebay water level < **236 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 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.

8.4.7 **(Cont)**

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 maximum probable flood level. The low forebay water level corresponds to the minimum level before damage may occur to the service water pumps.

PEG Reference(s):

HA1.7

Basis Reference(s):

1. N1-SOP-7, Service Water Failure/Low Intake Level

2. DER 1-92-Q-0489

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 Supervisor or Emergency Director the latitude to classify emergency conditions consistent with the established classification criteria, based upon their judgment.

9.1.1 **Unusual Event**

Any event, as determined by the Shift Supervisor 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 Judgement

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

9.1.1 **(Cont)**

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 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

9.1.2 **Unusual Event**

Any event, as determined by the Shift Supervisor or Emergency Director, that could lead to or has led to a loss or potential loss of containment. (Attachment 2)

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, Hot Shutdown

8.4.7 **(Cont)**

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

9.1.3 Alert

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

NUMARC IC:

Emergency Director Judgement

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

9.1.4 **Alert**

Any event, as determined by the Shift Supervisor or Emergency Director, that could lead or has led to a loss or potential loss of either fuel clad or RCS barrier. (Attachment 2)

NUMARC IC:

N/A

FPB Loss/Potential Loss:

Loss or Potential Loss of Either Fuel Clad or RCS Barrier

Mode Applicability:

Power Operations, 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

9.1.5 **Site Area Emergency**

As determined by the Shift Supervisor 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 Judgement

FPB Loss/Potential Loss:

N/A

9.1.5 **(Cont)**

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

9.1.6 Site Area Emergency

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

Loss or potential loss of both fuel clad and RCS barrier, Attachment 2
OR
Loss or potential loss of either fuel clad or RCS barrier in conjunction with a loss of containment, Attachment 2

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 conjunctions with a loss of containment

Mode Applicability:

Power Operations, Hot Shutdown

9.1.6 **(Cont)**

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 may indicate a loss of containment integrity.

PEG Reference(s):

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

Basis Reference(s):

None

9.1.7 **General Emergency**

As determined by the Shift Supervisor 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 Judgement

FPB Loss/Potential Loss:

N/A

Mode Applicability:

All

9.1.7 **(Cont)**

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

9.1.8 General Emergency

Any event, as determined by the Shift Supervisor 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 2).

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, 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.

9.1.8 **(Cont)**

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.

PEG Reference(s):

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

Basis Reference(s):

None

ATTACHMENT 2

FISSION PRODUCT BARRIER LOSS & 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 > **-84 in.** (TAF)
- Emergency Director Judgment

Loss

- RPV water level cannot be restored and maintained > **-84 in.** (TAF)
- Coolant activity > **300 µCi/gm** I-131 equivalent
- Valid offgas radiation ≥ **10 x hi-hi alarm**
- Drywell radiation ≥ **3000 R/hr**
- Emergency Director Judgment

RCS

Potential Loss

- RCS leakage greater than 50 gpm inside the drywell
- Primary system is discharging outside PC
  AND
  RB area radiation levels are > 8.0 R/hr in two or more areas, N1-EOP-5
- Primary system is discharging outside PC
  AND
  RB general area temperatures are > 135°F in two or more areas, N1-EOP-5
- Emergency Director Judgment

Loss

- RPV water level cannot be restored and maintained > -84 in. (TAF)
- Primary containment pressure cannot be maintained < 3.5 psig due to coolant leakage
- Drywell radiation ≥ **20 R/hr**
- Emergency Director Judgment

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

- Drywell radiation ≥ **4.0E6 R/hr**
- Emergency Director Judgment

Loss

- Primary containment venting is required due to **PCPL**
- Primary containment venting is required due to combustible gas concentrations
- MSL, EC steam line or RWCU isolation failure resulting in a release pathway outside primary containment
- Primary system is discharging outside PC
  AND
  RB area radiation levels are > 8.0 R/hr in two or more areas, N1-EOP-5
- Primary system is discharging outside PC
  AND
- RB general area temperatures are > 135°F in two or more areas, N1-EOP-5
- Emergency Director Judgment
  Loss of containment indication may include rapid unexplained decrease following initial increase in containment pressure

ATTACHMENT 3: WORD LIST/DEFINITIONS

Actuate

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

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.

Adequate Core Cooling

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

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.

Can/Cannot be restored and maintained 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 performances 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. This does not imply any specific time interval but does not permit prolonged operation beyond a limit without taking the specified classification.

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

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.

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 an 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.

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, consisting of the drywell and wetwell in a BWR plant.

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.

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).

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.

Sustained

Prolonged. Not intermittent or of transitory nature

Torus

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

Transient

Events of off-normal nature such as; scrams, runbacks involving >25% thermal power changes, ECCS injections or thermal power oscillations of >10%.

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.

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 bases.

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."

Vital Area

Any plant area which contains vital equipment.