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Date: March 10, 2021
Serial No. RA-21-0088

10 CFR 50.54(q)

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Subject: Duke Energy Carolinas, LLC
McGuire Nuclear Station, Units 1 and 2
Docket Numbers. 50-369, 50-370
Renewed License Nos. NPF-9 and NPF-7
Emergency Action Level Changes and associated 10 CFR 50.54(q) Screen and Evaluation

Please find attached Revision 001 of CSD-EP-MNS-0101-01, EAL TECHNICAL BASIS DOCUMENT, Revision 002 of CSD-EP-MNS-0101-02, EAL WALLCHARTS and the associated 10 CFR 50.54(q) Screen, Evaluation and IC-EAL VALIDATION AND VERIFICATION documents.

Questions regarding this submittal should be directed to Joseph Hussey, McGuire Regulatory Affairs, at (980) 875-5045.

Sincerely,

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Attachments

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MCGUIRE NUCLEAR STATION

CONTROLLED SUPPORTING DOCUMENT

CSD-EP-MNS-0101-01

EAL TECHNICAL BASIS DOCUMENT

Revision 1

Effective Date: 02/24/21

TABLE OF CONTENTS

1.0 PURPOSE

This document provides an explanation and rationale for each Emergency Action Level (EAL) included in the EAL Upgrade Project for McGuire Nuclear Station (MNS). It should be used to facilitate review of the MNS EALs and provide historical documentation for future reference. Decision-makers responsible for implementation of AD-EP-ALL-0101 EMERGENCY CLASSIFICATION, may use this document as a technical reference in support of EAL interpretation. This information may assist the Emergency Coordinator in making classifications, particularly those involving judgment or multiple events. The basis information may also be useful in training and for explaining event classifications to off-site officials.
The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 15 minutes or less in all cases of conditions present. Use of this document for assistance is not intended to delay the emergency classification. Because the information in a basis document can affect emergency classification decision- making (e.g., the Emergency Coordinator refers to it during an event), the NRC staff expects that changes to the basis document will be evaluated in accordance with the provisions of 10 CFR 50.54(q).

2.0 DISCUSSION

2.1 Background

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

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

NEI 99-01 (NUMARC/NESP-007) Revisions 4 and 5 were subsequently issued for industry implementation. Enhancements over earlier revisions included:

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

- Initiating conditions and example emergency action levels that fully address conditions that may be postulated to occur at permanently Defueled Stations and Independent Spent Fuel Storage Installations (ISFSIs).

- Simplifying the fission product barrier EAL threshold for a Site Area Emergency.

Subsequently, Revision 6 of NEI 99-01 has been issued which incorporates resolutions to numerous implementation issues including the NRC EAL Frequently Asked Questions (FAQs). Using NEI 99-01 Revision 6, "Methodology for the Development of Emergency Action Levels for Non-Passive Reactors,” November 2012 (ADAMS Accession Number ML12326A805) (ref.4.1.1), MNS conducted an EAL implementation upgrade project that produced the EALs discussed herein.

2.2 Fission Product Barriers

Fission product barrier thresholds represent threats to the defense in depth design concept that precludes the release of radioactive fission products to the environment. This concept relies on multiple physical barriers, any one of which, if maintained intact, precludes the release of significant amounts of radioactive fission products to the environment.

Many of the EALs derived from the NEI methodology are fission product barrier threshold based. That is, the conditions that define the EALs are based upon thresholds that represent the loss or potential loss of one or more of the three fission product barriers. “Loss” and “Potential Loss” signify the relative damage and threat of damage to the barrier. A “Loss” threshold means the barrier no longer assures containment of radioactive materials. A “Potential Loss” threshold implies an increased probability of barrier loss and decreased certainty of maintaining the barrier.

The primary fission product barriers are:

A. Fuel Clad (FC): The Fuel Clad Barrier is the zircalloy tubes that contain the fuel pellets.

B. Reactor Coolant System (NCS): The NCS Barrier includes the NCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

C. Containment (CMT): The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve. Containment Barrier thresholds are used as criteria for escalation of the ECL from Alert to a Site Area Emergency or a General Emergency

2.3 Fission Product Barrier Classification Criteria

The following criteria are the basis for event classification related to fission product barrier loss or potential loss:

Alert:

Any loss or any potential loss of either Fuel Clad or NCS barrier

Site Area Emergency:

Loss or potential loss of any two barriers

General Emergency:

Loss of any two barriers and loss or potential loss of the third barrier

2.4 EAL Organization

The MNS EAL scheme includes the following features:

- Division of the EAL set into three broad groups:
  - EALs applicable under all plant operating modes – This group would be reviewed by the EAL-user any time emergency classification is considered.
  - EALs applicable only under hot operating modes – This group would only be reviewed by the EAL-user when the plant is in Hot Shutdown, Hot Standby, Startup, or Power Operation mode.
  - EALs applicable only under cold operating modes – This group would only be reviewed by the EAL-user when the plant is in Cold Shutdown, Refueling or No Mode.

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

- Within each group, assignment of EALs to categories and subcategories:

Category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user. The MNS EAL categories are aligned to and represent the NEI 99- 01 ”Recognition Categories.” Subcategories are used in the MNS scheme as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The MNS EAL categories and subcategories are listed below.

EAL Groups, Categories and Subcategories

EAL Group/Category	EAL Subcategory
Any Operating Mode:	
R – Abnormal **R**ad Levels / Rad Effluent	1 – Radiological Effluent 2 – Irradiated Fuel Event 3 – Area Radiation Levels
H – **H**azards and Other Conditions Affecting Plant Safety	1 – Security 2 – Seismic Event 3 – Natural or Technological Hazard 4 – Fire 5 – Hazardous Gas 6 – Control Room Evacuation 7 – Emergency Coordinator Judgment
E – Independent Spent Fuel Storage Installation (ISFSI)	1 – Confinement Boundary
Hot Conditions:	
S – **S**ystem Malfunction	1 – Loss of Essential AC Power 2 – Loss of Vital DC Power 3 – Loss of Control Room Indications 4 – NCS Activity 5 – NCS Leakage 6 – RPS Failure 7 – Loss of Communications 8 – Containment Failure 9 – Hazardous Event Affecting Safety Systems
F – **F**ission Product Barrier Degradation	None
Cold Conditions:	
C – **C**old Shutdown / Refueling System Malfunction	1 – NCS Level 2 – Loss of Essential AC Power 3 – NCS Temperature 4 – Loss of Vital DC Power 5 5 – Loss of Communications 6 – Hazardous Event Affecting Safety Systems

The primary tool for determining the emergency classification level is the EAL Classification Matrix. The user of the EAL Classification Matrix may (but is not required to) consult the CSD-EP-MNS-0101-01 - EAL TECHNICAL BASIS DOCUMENT in order to obtain additional information concerning the EALs under classification consideration. The user should consult Section 3.0 and Attachments 1 & 2 of this document for such information.

2.5 Technical Basis Information

EAL technical basis are provided in Attachment 1 for each EAL according to EAL group (Any, Hot, Cold), EAL category (R, C, H, S, F and E) and EAL subcategory. A summary explanation of each category and subcategory is given at the beginning of the technical basis discussions of the EALs included in the category. For each EAL, the following information is provided:

Category Letter & Title

Subcategory Number & Title

Initiating Condition (IC)

Site-specific description of the generic IC given in NEI 99-01 Rev. 6.

EAL Identifier (enclosed in rectangle)

Each EAL is assigned a unique identifier to support accurate communication of the emergency classification to onsite and offsite personnel. Four characters define each EAL identifier:

1. First character (letter): Corresponds to the EAL category as described above (R, C, H, S, F or E)

2. Second character (letter): The emergency classification (G, S, A or U)

   G = General Emergency
   S = Site Area Emergency
   A = Alert
   U = Unusual Event

3. Third character (number): Subcategory number within the given category. Subcategories are sequentially numbered beginning with the number one (1). If a category does not have a subcategory, this character is assigned the number one (1).

4. Fourth character (number): The numerical sequence of the EAL within the EAL subcategory. If the subcategory has only one EAL, it is given the number one (1).

Classification (enclosed in rectangle):

Unusual Event (U), Alert (A), Site Area Emergency (S) or General Emergency (G)

EAL (enclosed in rectangle)

Exact wording of the EAL as it appears in the EAL Classification Matrix

Mode Applicability

One or more of the following plant operating conditions comprise the mode to which each EAL is applicable: 1 - Power Operations, 2 - Startup, 3 – Hot Standby, 4 - Hot Shutdown, 5 - Cold Shutdown, 6 - Refueling, NM - No Mode, or All. (See Section 2.6 for operating mode definitions)

Definitions:

If the EAL wording contains a defined term, the definition of the term is included in this section. These definitions can also be found in Section 5.1.

Basis:

A basis section that provides MNS-relevant information concerning the EAL as well as a description of the rationale for the EAL as provided in NEI 99-01 Rev. 6.

MNS Basis Reference(s):

Site-specific source documentation from which the EAL is derived

2.6 Operating Mode Applicability (ref. 4.1.7)

1 Power Operation
$K_{eff} \geq 0.99$ and reactor thermal power > 5%

2 Startup
$K_{eff} \geq 0.99$ and reactor thermal power $\leq$ 5%

3 Hot Standby
$K_{eff} < 0.99$ and average coolant temperature $\geq$ 350ºF

4 Hot Shutdown
$K_{eff} < 0.99$ and average coolant temperature 350ºF > T_{avg} > 200 ºF

5 Cold Shutdown
$K_{eff} < 0.99$ and average coolant temperature $\leq$ 200ºF

6 Refueling
One or more reactor vessel head closure bolts are less than fully tensioned

NM No mode
Reactor vessel contains no irradiated fuel

The plant operating mode that exists at the time that the event occurs (prior to any protective system or operator action being initiated in response to the condition) should be compared to the mode applicability of the EALs. If a lower or higher plant operating mode is reached before the emergency classification is made, the declaration shall be based on the mode that existed at the time the event occurred.

3.0 GUIDANCE ON MAKING EMERGENCY CLASSIFICATIONS

3.1 General Considerations

When making an emergency classification, the Emergency Coordinator must consider all information having a bearing on the proper assessment of an Initiating Condition (IC). This includes the Emergency Action Level (EAL) plus the associated Operating Mode Applicability, Notes, and the informing basis information. In the Recognition Category F matrices, EALs are based on loss or potential loss of Fission Product Barrier Thresholds.

3.1.1 Classification Timeliness

NRC regulations require the licensee to establish and maintain the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an emergency action level has been exceeded and to promptly declare the emergency condition as soon as possible following identification of the appropriate emergency classification level. The NRC staff has provided guidance on implementing this requirement in NSIR/DPR-ISG-01, "Interim Staff Guidance, Emergency Planning for Nuclear Power Plants" (ref. 4.1.12).

3.1.2 Valid Indications

All emergency classification assessments shall be based upon valid indications, reports or conditions. A valid indication, report, or condition, is one that has been verified through appropriate means such that there is no doubt regarding the indicator's operability, the condition's existence, or the report's accuracy. For example, verification could be accomplished through an instrument channel check, response on related or redundant indicators, or direct observation by plant personnel.

An indication, report, or condition is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

3.1.3 Imminent Conditions

For ICs and EALs that have a stipulated time duration (e.g., 15 minutes, 30 minutes, etc.), the Emergency Coordinator should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If an ongoing radiological release is detected and the release start time is unknown, it should be assumed that the release duration specified in the IC/EAL has been exceeded, absent data to the contrary.

3.1.4 Planned vs. Unplanned Events

A planned work activity that results in an expected event or condition which meets or exceeds an EAL does not warrant an emergency declaration provided that: 1) the activity proceeds as planned, and 2) the plant remains within the limits imposed by the operating license. Such activities include planned work to test, manipulate, repair, maintain or modify a system or component. In these cases, the controls associated with the planning, preparation and execution of the work will ensure that compliance is maintained with all aspects of the operating license provided that the activity proceeds and concludes as expected. Events or conditions of this type may be subject to the reporting requirements of 10 § CFR 50.72 (ref. 4.1.4).

3.1.5 Classification Based on Analysis

The assessment of some EALs is based on the results of analyses that are necessary to ascertain whether a specific EAL threshold has been exceeded (e.g., dose assessments, chemistry sampling, NCS leak rate calculation, etc.). For these EALs, the EAL wording or the associated basis discussion will identify the necessary analysis. In these cases, the 15-minute declaration period starts with the availability of the analysis results that show the threshold to be exceeded (i.e., this is the time that the EAL information is first available). The NRC expects licensees to establish the capability to initiate and complete EAL-related analyses within a reasonable period of time (e.g., maintain the necessary expertise on-shift).

3.1.6 Emergency Coordinator Judgment

While the EALs have been developed to address a full spectrum of possible events and conditions which may warrant emergency classification, a provision for classification based on operator/management experience and judgment is still necessary. The NEI 99-01 EAL scheme provides the Emergency Coordinator with the ability to classify events and conditions based upon judgment using EALs that are consistent with the Emergency Classification Level (ECL) definitions (refer to Category H). The Emergency Coordinator will need to determine if the effects or consequences of the event or condition reasonably meet or exceed a particular ECL definition. A similar provision is incorporated in the Fission Product Barrier Tables; judgment may be used to determine the status of a fission product barrier.

3.2 Classification Methodology

To make an emergency classification, the user will compare an event or condition (i.e., the relevant plant indications and reports) to an EAL(s) and determine if the EAL has been met or exceeded. The evaluation of an EAL must be consistent with the related Operating Mode Applicability and Notes. If an EAL has been met or exceeded, the associated IC is likewise met, the emergency classification process “clock” starts, and the ECL must be declared in accordance with plant procedures no later than fifteen minutes after the process “clock” started.

When assessing an EAL that specifies a time duration for the off-normal condition, the “clock” for the EAL time duration runs concurrently with the emergency classification process “clock.” For a full discussion of this timing requirement, refer to NSIR/DPR-ISG-01 (ref. 4.1.14).

3.2.1 Classification of Multiple Events and Conditions

When multiple emergency events or conditions are present, the user will identify all met or exceeded EALs. The highest applicable ECL identified during this review is declared. For example:

- If an Alert EAL and a Site Area Emergency EAL are met, whether at one unit or at two different units, a Site Area Emergency should be declared.

There is no “additive” effect from multiple EALs meeting the same ECL. For example:

- If two Alert EALs are met, whether at one unit or at two different units, an Alert should be declared.

Related guidance concerning classification of rapidly escalating events or conditions is provided in Regulatory Issue Summary (RIS) 2007-02, *Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events* (ref. 4.1.2).

3.2.2 Consideration of Mode Changes During Classification

The mode in effect at the time that an event or condition occurred, and prior to any plant or operator response, is the mode that determines whether or not an IC is applicable. If an event or condition occurs, and results in a mode change before the emergency is declared, the emergency classification level is still based on the mode that existed at the time that the event or condition was initiated (and not when it was declared). Once a different mode is reached, any new event or condition, not related to the original event or condition, requiring emergency classification should be evaluated against the ICs and EALs applicable to the operating mode at the time of the new event or condition.

For events that occur in Cold Shutdown or Refueling, escalation is via EALs that are applicable in the Cold Shutdown or Refueling modes, even if Hot Shutdown (or a higher mode) is entered during the subsequent plant response. In particular, the fission product barrier EALs are applicable only to events that initiate in the Hot Shutdown mode or higher.

3.2.3 Classification of Imminent Conditions

Although EALs provide specific thresholds, the Emergency Coordinator must remain alert to events or conditions that could lead to meeting or exceeding an EAL within a relatively short period of time (i.e., a change in the ECL is IMMINENT). If, in the judgment of the Emergency Coordinator, meeting an EAL is IMMINENT, the emergency classification should be made as if the EAL has been met. While applicable to all emergency classification levels, this approach is particularly important at the higher emergency classification levels since it provides additional time for implementation of protective measures.

3.2.4 Emergency Classification Level Upgrading and Downgrading

An ECL may be downgraded when the event or condition that meets the highest IC and EAL no longer exists, and other site-specific downgrading requirements are met. If downgrading the ECL is deemed appropriate, the new ECL would then be based on a lower applicable IC(s) and EAL(s). The ECL may also simply be terminated.

As noted above, guidance concerning classification of rapidly escalating events or conditions is provided in RIS 2007-02 (ref. 4.1.2).

3.2.5 Classification of Short-Lived Events

Event-based ICs and EALs define a variety of specific occurrences that have potential or actual safety significance. By their nature, some of these events may be short-lived and, thus, over before the emergency classification assessment can be completed. If an event occurs that meets or exceeds an EAL, the associated ECL must be declared regardless of its continued presence at the time of declaration. Examples of such events include an earthquake or a failure of the reactor protection system to automatically trip the reactor followed by a successful manual trip.

3.2.6 Classification of Transient Conditions

Many of the ICs and/or EALs employ time-based criteria. These criteria will require that the IC/EAL conditions be present for a defined period of time before an emergency declaration is warranted. In cases where no time-based criterion is specified, it is recognized that some transient conditions may cause an EAL to be met for a brief period of time (e.g., a few seconds to a few minutes). The following guidance should be applied to the classification of these conditions.

<u>EAL momentarily met during expected plant response</u> - In instances where an EAL is briefly met during an expected (normal) plant response, an emergency declaration is not warranted provided that associated systems and components are operating as expected, and operator actions are performed in accordance with procedures.

<u>EAL momentarily met but the condition is corrected prior to an emergency declaration</u> – If an operator takes prompt manual action to address a condition, and the action is successful in correcting the condition prior to the emergency declaration, then the applicable EAL is not considered met and the associated emergency declaration is not required. For illustrative purposes, consider the following example:

An ATWS occurs and the high pressure ECCS systems fail to automatically start. RPV level rapidly decreases and the plant enters an inadequate core cooling condition (a potential loss of both the fuel clad and NCS barriers). If an operator manually starts a high pressure ECCS system in accordance with an EOP step and clears the inadequate core cooling condition prior to an emergency declaration, then the classification should be based on the ATWS only.

It is important to stress that the 15-minute emergency classification assessment period (process clock) is not a "grace period" during which a classification may be delayed to allow the performance of a corrective action that would obviate the need to classify the event.
Emergency classification assessments must be deliberate and timely, with no undue delays. The provision discussed above addresses only those rapidly evolving situations when an operator is able to take a successful corrective action prior to the Emergency Coordinator completing the review and steps necessary to make the emergency declaration. This provision is included to ensure that any public protective actions resulting from the emergency classification are truly warranted by the plant conditions.

3.2.7 After-the-Fact Discovery of an Emergency Event or Condition

In some cases, an EAL may be met but the emergency classification was not made at the time of the event or condition. This situation can occur when personnel discover that an event or condition existed which met an EAL, but no emergency was declared, and the event or condition no longer exists at the time of discovery. This may be due to the event or condition not being recognized at the time or an error that was made in the emergency classification process.

In these cases, no emergency declaration is warranted; however, the guidance contained in NUREG-1022 (ref. 4.1.3) is applicable. Specifically, the event should be reported to the NRC in accordance with 10 CFR § 50.72 (ref. 4.1.4) within one hour of the discovery of the undeclared event or condition. The licensee should also notify appropriate State and local agencies in accordance with the agreed upon arrangements.

3.2.8 Retraction of an Emergency Declaration

Guidance on the retraction of an emergency declaration reported to the NRC is discussed in NUREG-1022 (ref. 4.1.3).

4.0 REFERENCES

4.1 Developmental

4.1.1 NEI 99-01 Revision 6, Methodology for the Development of Emergency Action Levels for Non-Passive Reactors, ADAMS Accession Number ML12326A805

4.1.2 RIS 2007-02 Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events, February 2, 2007.

4.1.3 NUREG-1022 Event Reporting Guidelines: 10CFR50.72 and 50.73

4.1.4 10 § CFR 50.72 Immediate Notification Requirements for Operating Nuclear Power Reactors

4.1.5 10 § CFR 50.73 License Event Report System

4.1.6 MNS UFSAR Figure 2-4 Plot Plan and Site Area

4.1.7 Technical Specifications Table 1.1-1 Modes

4.1.8 PT/1(2)/A/4200/002 C (Containment Closure)

4.1.9 PRO-NGGC-0201 NGG Procedure Writers Guide

4.1.10 NSIR/DPR-ISG-01 Interim Staff Guidance, Emergency Planning for Nuclear Power Plants

4.1.11 MNS ISFSI Certificate of Compliance

4.1.12 MNS Emergency Plan

4.1.13 MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary

4.2 Implementing

4.2.1 AD-EP-ALL-0101 EMERGENCY CLASSIFICATION

4.2.2 NEI 99-01 Rev. 6 to MNS EAL Comparison Matrix

4.2.3 MNS EAL Matrix

5.0 DEFINITIONS, ACRONYMS & ABBREVIATIONS

5.1 Definitions (ref. 4.1.1 except as noted)

Selected terms used in Initiating Condition and Emergency Action Level statements are set in all capital letters (e.g., ALL CAPS). These words are defined terms that have specific meanings as used in this document. The definitions of these terms are provided below.

Alert

Events are in progress, or have occurred, which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be small fractions of the EPA Protective Action Guideline exposure levels.

Confinement Boundary

The barrier(s) between spent fuel and the environment once the spent fuel is processed for dry storage. As related to the MNS ISFSI, Confinement Boundary is defined as the Transportable Storage Cask (TSC) for TN, UMS and MAGNASTOR storage systems.

Containment Closure

The procedurally defined actions taken to secure containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

As applied to MNS, Containment Closure is established when the requirements of PT/1(2)/A/4200/002 C are met (ref. 4.1.8).

Emergency Action Level (EAL)

A pre-determined, site-specific, observable threshold for an Initiating Condition that, when met or exceeded, places the plant in a given emergency classification level.

Emergency Classification Level (ECL)

One of a set of names or titles established by the US Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The emergency classification levels, in ascending order of severity, are:

- Unusual Event (UE)
- Alert
- Site Area Emergency (SAE)
- General Emergency (GE)

EPA PAGs

Environment Protection Agency Protective Action Guidelines. The EPA PAGs are expressed in terms of dose commitment: 1 Rem TEDE or 5 Rem CDE Thyroid. Actual or projected offsite exposures in excess of the EPA PAGs requires MNS to recommend protective actions for the general public to offsite planning agencies.

Explosion

A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or over pressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events require a post-event inspection to determine if the attributes of an explosion are present.

Faulted

The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

Fire

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

Fission Product Barrier Threshold

A pre-determined, site-specific, observable threshold indicating the loss or potential loss of a fission product barrier.

Flooding

A condition where water is entering a room or area faster than installed equipment is capable of removal, resulting in a rise of water level within the room or area.

General Emergency

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

Hostage

A person(s) held as leverage against the station to ensure that demands will be met by the station.

Hostile Action

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

Hostile Force

One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

Imminent

The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

Impede(d)

Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

Initiating Condition (IC)

An event or condition that aligns with the definition of one of the four emergency classification levels by virtue of the potential or actual effects or consequences.

Intrusion

The act of entering without authorization. Discovery of a bomb in a specified area is indication of intrusion into that area by a hostile force.

Maintain

Take appropriate action to hold the value of an identified parameter within specified limits.

Normal Levels

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

Owner Controlled Area

Area outside the PROTECTED AREA fence that immediately surrounds the plant. The site property owned by, or otherwise under the control of, Duke Energy.

Projectile
An object directed toward a Nuclear Power Plant that could cause concern for its continued operability, reliability, or personnel safety.

Protected Area

An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area (ref. 4.1.6).

NCS Intact

The NCS should be considered intact when the NCS pressure boundary is in its normal condition for the cold shutdown mode of operation (e.g., no freeze seals or nozzle dams).

Refueling Pathway

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

Ruptured

The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

Restore

Take the appropriate action required to return the value of an identified parameter to the applicable limits

Safety System

A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety- related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

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

Security Condition

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

Site Area Emergency

Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the SITE BOUNDARY.

Site Boundary

Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary (ref. 4.1.13).

Unisolable

An open or breached system line that cannot be isolated, remotely or locally.

Unplanned

A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Unusual Event

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

Valid

An indication, report, or condition, is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Visible Damage

Damage to a SAFETY STYSTEM train that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected SAFETY STYSTEM train.

5.2 Abbreviations/Acronyms

°F ..... Degrees Fahrenheit
° ..... Degrees
AC ..... Alternating Current
AP ..... Abnormal Operating Procedure
ATWS ..... Anticipated Transient Without Scram
MNS ..... McGuire Nuclear Station
CDE ..... Committed Dose Equivalent
CFR ..... Code of Federal Regulations
CSFST ..... Critical Safety Function Status Tree
DBA ..... Design Basis Accident
DC ..... Direct Current
EAL ..... Emergency Action Level
EC ..... Emergency Coordinator
ECCS ..... Emergency Core Cooling System
ECL ..... Emergency Classification Level
EOF ..... Emergency Operations Facility
EOP ..... Emergency Operating Procedure
EPA ..... Environmental Protection Agency
ERG ..... Emergency Response Guideline
EPIP ..... Emergency Plan Implementing Procedure
ESF ..... Engineered Safety Feature
FAA ..... Federal Aviation Administration
FBI ..... Federal Bureau of Investigation
FEMA ..... Federal Emergency Management Agency
FSAR ..... Final Safety Analysis Report
GE ..... General Emergency
IC ..... Initiating Condition
IPEEE ..... Individual Plant Examination of External Events (Generic Letter 88-20)
ISFSI ..... Independent Spent Fuel Storage Installation
K_{eff} ..... Effective Neutron Multiplication Factor
LCO ..... Limiting Condition of Operation
LER ..... Licensee Event Report
LOCA ..... Loss of Coolant Accident

LWR.....Light Water Reactor
MPC..... Maximum Permissible Concentration/Multi-Purpose Canister
MSIV.....Main Steam Isolation Valve
MSL.....Main Steam Line
mR, mRem, mrem, mREM ..... milli-Roentgen Equivalent Man
MW .....Megawatt
NCS.....Reactor Coolant System
NEI .....Nuclear Energy Institute
NESP.....National Environmental Studies Project
NPP ..... Nuclear Power Plant
NRC.....Nuclear Regulatory Commission
NSSS..... Nuclear Steam Supply System
NORAD..... North American Aerospace Defense Command
(NO)UE.....Notification of Unusual Event
OBE ..... Operating Basis Earthquake
OCA.....Owner Controlled Area
ODCM.....Off-site Dose Calculation Manual
ORO ..... Offsite Response Organization
PA.....Protected Area
PAG.....Protective Action Guideline
PRA/PSA ..... Probabilistic Risk Assessment / Probabilistic Safety Assessment
PWR.....Pressurized Water Reactor
PSIG.....Pounds per Square Inch Gauge
R..... Roentgen
Rem, rem, REM .....Roentgen Equivalent Man
RETS..... Radiological Effluent Technical Specifications
RPS ..... Reactor Protection System
RV .....Reactor Vessel
RVLIS .....Reactor Vessel Level Indicating System
SAR.....Safety Analysis Report
SBGTS ..... Stand-By Gas Treatment System
SBO.....Station Blackout
SCBA..... Self-Contained Breathing Apparatus
SG ..... Steam Generator

SI ..... Safety Injection
SLC ..... Selected Licensee Commitment
SPDS ..... Safety Parameter Display System
SRO ..... Senior Reactor Operator
SSF ..... Standby Shutdown Facility
TEDE ..... Total Effective Dose Equivalent
TOAF ..... Top of Active Fuel
TSC ..... Technical Support Center
WOG ..... Westinghouse Owners Group

6.0 MNS-TO-NEI 99-01 Rev. 6 EAL CROSS-REFERENCE

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

MNS	NEI 99-01 Rev. 6	
EAL	**IC**	**Example EAL**
RU1.1	AU1	1, 2
RU1.2	AU1	3
RU2.1	AU2	1
RA1.1	AA1	1
RA1.2	AA1	2
RA1.3	AA1	3
RA1.4	AA1	4
RA2.1	AA2	1
RA2.2	AA2	2
RA2.3	AA2	3
RA3.1	AA3	1
RA3.2	AA3	2
RS1.1	AS1	1
RS1.2	AS1	2
RS1.3	AS1	3
RS2.1	AS2	1
RG1.1	AG1	1
RG1.2	AG1	2
RG1.3	AG1	3
RG2.1	AG2	1

MNS	NEI 99-01 Rev. 6	
EAL	**IC**	**Example EAL**
CU1.1	CU1	1
CU1.2	CU1	2
CU2.1	CU2	1
CU3.1	CU3	1
CU3.2	CU3	2
CU4.1	CU4	1
CU5.1	CU5	1, 2, 3
CA1.1	CA1	1
CA1.2	CA1	2
CA2.1	CA2	1
CA3.1	CA3	1, 2
CA6.1	CA6	1
CS1.1	CS1	3
CG1.1	CG1	2
FA1.1	FA1	1
FS1.1	FS1	1
FG1.1	FG1	1
HU1.1	HU1	1
HU1.2	HU1	2
HU1.3	HU1	3
HU2.1	HU2	1
HU3.1	HU3	1
HU3.2	HU3	2
HU3.3	HU3	3
HU3.4	HU3	4

MNS	NEI 99-01 Rev. 6	
EAL	IC	Example EAL
HU4.1	HU4	1
HU4.2	HU4	2
HU4.3	HU4	3
HU4.4	HU4	4
HU7.1	HU7	1
HA1.1	HA1	1
HA1.2	HA1	2
HA5.1	HA5	1
HA6.1	HA6	1
HA7.1	HA7	1
HS1.1	HS1	1
HS6.1	HS6	1
HS7.1	HS7	1
HG1.1	HG1	1
HG7.1	HG7	1
SU1.1	SU1	1
SU3.1	SU2	1
SU4.1	SU3	1
SU4.2	SU3	2
SU5.1	SU4	1, 2, 3
SU6.1	SU5	1
SU6.2	SU5	2
SU7.1	SU6	1, 2, 3
SU8.1	SU7	1, 2
SA1.1	SA1	1

MNS	NEI 99-01 Rev. 6	
EAL	**IC**	**Example EAL**
SA3.1	SA2	1
SA6.1	SA5	1
SA9.1	SA9	1
SS1.1	SS1	1
SS2.1	SS8	1
SS6.1	SS5	1
SG1.1	SG1	1
SG1.2	SG8	1
EU1.1	E-HU1	1

7.0 ATTACHMENTS

7.1 Attachment 1, Emergency Action Level Technical Basis

7.2 Attachment 2, Fission Product Barrier Matrix and Basis

ATTACHMENT 1
EAL Basis

Category R – Abnormal Rad Release / Rad Effluent

EAL Group: ANY (EALs in this category are applicable to any plant condition, hot or cold.)

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

At lower levels, abnormal radioactivity releases may be indicative of a failure of containment systems or precursors to more significant releases. At higher release rates, offsite radiological conditions may result which require offsite protective actions. Elevated area radiation levels in plant may also be indicative of the failure of containment systems or preclude access to plant vital equipment necessary to ensure plant safety.

Events of this category pertain to the following subcategories:

1. Radiological Effluent

Direct indication of effluent radiation monitoring systems provides a rapid assessment mechanism to determine releases in excess of classifiable limits. Projected offsite doses, actual offsite field measurements or measured release rates via sampling indicate doses or dose rates above classifiable limits.

2. Irradiated Fuel Event

Conditions indicative of a loss of adequate shielding or damage to irradiated fuel may preclude access to vital plant areas or result in radiological releases that warrant emergency classification.

3. Area Radiation Levels

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

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity greater than 2 times the SLC limits for 60 minutes or longer

EAL:

RU1.1 Unusual Event

Reading on **any** Table R-1 effluent radiation monitor > column "UE" for ≥ 60 min. (Notes 1, 2, 3)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Table R-1 Effluent Monitor Classification Thresholds

Release Point		Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	----	----	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	----
Liquid	Liquid Waste Effluent Line High	EMF49H	----	----	----	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	----	----	----	4.29E+2 cpm

Mode Applicability:

All

Definition(s):

None

Basis:

The column “UE” gaseous and liquid release values in Table R-1 represent two times the appropriate SLC release rate limits associated with the specified monitors (ref. 2, 3, 4).

ATTACHMENT 1
EAL Basis

Gaseous Releases

Instrumentation that may be used to assess this EAL is listed below (ref. 1):

- Unit Vent Noble Gas Low Monitor – 1(2)EMF36L

Liquid Releases

Instrumentation that may be used to assess this EAL is listed below (ref. 1):

- Liquid Waste Effluent Line High Monitor – EMF49H (batch release)
- CVUCDT High Monitor – 1(2)EMF44H

This IC addresses a potential decrease in the level of safety of the plant as indicated by a low- level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.

Nuclear power plants incorporate design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.

This EAL addresses normally occurring continuous radioactivity releases from monitored gaseous or liquid effluent pathways.

Escalation of the emergency classification level would be via IC RA1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. MNS ODCM Section 3.0 Setpoint Calculations
2. MNS-SLC 16.11.1 Liquid Effluents - Concentration
3. MNS-SLC 16.11.6 Dose Rate - Gaseous Effluents
4. EP-EALCALC-MNS-1401 MNS Radiological Effluent EAL Values, Rev. 0
5. NEI 99-01 AU1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity greater than 2 times the SLC limits for 60 minutes or longer.

EAL:

RU1.2 Unusual Event

Sample analysis for a gaseous or liquid release indicates a concentration or release rate > 2 x SLC limits for ≥ 60 min. (Notes 1, 2)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Mode Applicability:

All

Definition(s):

None

Basis:

This IC addresses a potential decrease in the level of safety of the plant as indicated by a low- level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.

Nuclear power plants incorporate design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

ATTACHMENT 1
EAL Basis

Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.

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

Escalation of the emergency classification level would be via IC RA1.

MNS Basis Reference(s):

1. MNS Offsite Dose Calculation Manual
2. MNS-SLC 16.11.1 Liquid Effluents - Concentration
3. MNS-SLC 16.11.6 Dose Rate - Gaseous Effluents
4. NEI 99-01 AU1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

EAL:

RA1.1 Alert

Reading on **any** Table R-1 effluent radiation monitor > column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4 The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Table R-1 Effluent Monitor Classification Thresholds

Release Point		Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	----	----	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	----
Liquid	Liquid Waste Effluent Line High	EMF49H	----	----	----	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	----	----	----	4.29E+2 cpm

Mode Applicability:

All

Definition(s):

None

ATTACHMENT 1
EAL Basis

Basis:

This EAL address gaseous radioactivity releases, that for whatever reason, cause effluent radiation monitor readings corresponding to site boundary doses that exceed either:

- 10 mRem TEDE
- 50 mRem CDE Thyroid

The column "ALERT" gaseous effluent release values in Table R-1 correspond to calculated doses of 1% (10% of the SAE thresholds) of the EPA Protective Action Guidelines (TEDE or CDE Thyroid) (ref. 2).

Instrumentation that may be used to assess this EAL is Unit Vent Noble Gas Low Monitor – 1(2)EMF36L and Unit Vent Noble Gas High Monitor – 1(2)EMF36H (ref. 1).

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC RS1.

MNS Basis Reference(s):

1. MNS ODCM Section 3.0 Setpoint Calculations
2. EP-EALCALC-MNS-1401 MNS Radiological Effluent EAL Values, Rev. 0
3. NEI 99-01 AA1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

EAL:

RA1.2 Alert

Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

Dose assessments are performed by computer-based methods (ref. 1, 2)

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

ATTACHMENT 1
EAL Basis

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have

stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC RS1.

MNS Basis Reference(s):

1. AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment

2. NEI 99-01 AA1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

EAL:

RA1.3 Alert

Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY for 60 min. of exposure (Notes 1, 2)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

Dose assessments based on liquid releases are performed per Offsite Dose Calculation Manual (ref. 1).

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

ATTACHMENT 1
EAL Basis

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC RS1.

MNS Basis Reference(s):

1. MNS Offsite Dose Calculation Manual

2. NEI 99-01 AA1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE

EAL:

RA1.4 Alert

Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:

- Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 50 mrem for 60 min. of inhalation.

(Notes 1, 2)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

AD-EP-MNS-0203 MNS Site Specific Field Monitoring and AD-EP-ALL-0203 Field Monitoring During Declared Emergency provide guidance for emergency or post-accident radiological environmental monitoring (ref. 1).

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

ATTACHMENT 1
EAL Basis

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1,000 mrem while the 50 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Escalation of the emergency classification level would be via IC RS1.

MNS Basis Reference(s):

1. AD-EP-MNS-0203 MNS Site Specific Field Monitoring
2. AD-EP-ALL-0203 Field Monitoring During Declared Emergency.
3. NEI 99-01 AA1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE

EAL:

RS1.1 Site Area Emergency

Reading on **any** Table R-1 effluent radiation monitor > column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Table R-1 Effluent Monitor Classification Thresholds

Release Point		Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	----	----	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	----
Liquid	Liquid Waste Effluent Line High	EMF49H	----	----	----	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	----	----	----	4.29E+2 cpm

Mode Applicability:

All

Definition(s):

None

ATTACHMENT 1
EAL Basis

Basis:

This EAL address gaseous radioactivity releases, that for whatever reason, cause effluent radiation monitor readings corresponding to site boundary doses that exceed either:

- 100 mRem TEDE
- 500 mRem CDE Thyroid

The column "SAE" gaseous effluent release value in Table R-1 corresponds to calculated doses of 10% of the EPA Protective Action Guidelines (TEDE or CDE Thyroid) (ref. 1).

Instrumentation that may be used to assess this EAL is Unit Vent Noble Gas High Monitor – 1(2)EMF36H (ref 2).

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 10% of the EPA PAG of 1,000 mrem while the 500 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Escalation of the emergency classification level would be via IC RG1.

MNS Basis Reference(s):

1. EP-EALCALC-MNS-1401 MNS Radiological Effluent EAL Values, Rev. 0
2. MNS ODCM Section 3.0 Setpoint Calculations
3. NEI 99-01 AS1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE

EAL:

RS1.2 Site Area Emergency

Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

Dose assessments are performed by computer-based methods (ref. 1, 2)

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 10% of the EPA PAG of 1,000 mrem while the 500 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

ATTACHMENT 1
EAL Basis

Escalation of the emergency classification level would be via IC RG1.

MNS Basis Reference(s):

1. AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment

2. NEI 99-01 AS1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE

EAL:

RS1.3 Site Area Emergency

Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:

- Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 500 mrem for 60 min. of inhalation.

(Notes 1, 2)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

AD-EP-MNS-0203 MNS Site Specific Field Monitoring and AD-EP-ALL-0203 Field Monitoring During Declared Emergency provide guidance for emergency or post-accident radiological environmental monitoring (ref. 1).

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to 10% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude are associated with the failure of plant systems needed for the protection of the public.

ATTACHMENT 1
EAL Basis

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 10% of the EPA PAG of 1,000 mrem while the 500 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Escalation of the emergency classification level would be via IC RG1.

MNS Basis Reference(s):

1. AD-EP-MNS-0203 MNS Site Specific Field Monitoring Information
2. AD-EP-ALL-0203 Field Monitoring During Declared Emergency.
3. NEI 99-01 AS1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE

EAL:

RG1.1 General Emergency

Reading on **any** Table R-1 effluent radiation monitor > column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Table R-1 Effluent Monitor Classification Thresholds

Release Point		Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	----	----	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	----
Liquid	Liquid Waste Effluent Line High	EMF49H	----	----	----	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	----	----	----	4.29E+2 cpm

Mode Applicability:

All

Definition(s):

None

ATTACHMENT 1
EAL Basis

Basis:

This EAL address gaseous radioactivity releases, that for whatever reason, cause effluent radiation monitor readings corresponding to site boundary doses that exceed either:

- 1000 mRem TEDE
- 5000 mRem CDE Thyroid

The column "GE" gaseous effluent release values in Table R-1 correspond to calculated doses of 100% of the EPA Protective Action Guidelines (TEDE or CDE Thyroid) (ref. 1).

Instrumentation that may be used to assess this EAL is the Unit Vent Noble Gas High Monitor 1(2)EMF36H (ref 2).

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude will require implementation of protective actions for the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at the EPA PAG of 1,000 mrem while the 5,000 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

MNS Basis Reference(s):

1. EP-EALCALC-MNS-1401 MNS Radiological Effluent EAL Values, Rev. 0
2. MNS ODCM Section 3.0 Setpoint Calculations
3. NEI 99-01 AG1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE

EAL:

RG1.2 General Emergency

Dose assessment using actual meteorology indicates doses > 1,000 mrem TEDE or 5,000 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

Dose assessments are performed by computer-based methods (ref. 1, 2)

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude will require implementation of protective actions for the public.

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at the EPA PAG of 1,000 mrem while the 5,000 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. AD-EP-ALL-0202, Emergency Response Offsite Dose Assessment

2. NEI 99-01 AG1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 1 – Radiological Effluent

Initiating Condition: Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE

EAL:

RG1.3 General Emergency

Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:

- Closed window dose rates > 1,000 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 5,000 mrem for 60 min. of inhalation.

(Notes 1, 2)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Mode Applicability:

All

Definition(s):

SITE BOUNDARY - Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary.

Basis:

AD-EP-MNS-0203 MNS Site Specific Field Monitoring and AD-EP-ALL-0203 Field Monitoring During Declared Emergency provide guidance for emergency or post-accident radiological environmental monitoring (ref. 1).

This IC addresses a release of gaseous radioactivity that results in projected or actual offsite doses greater than or equal to the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude will require implementation of protective actions for the public.

ATTACHMENT 1
EAL Basis

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of plant conditions alone. The inclusion of both plant condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at the EPA PAG of 1,000 mrem while the 5,000 mrem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

M**NS Basis Reference(s):**

1. AD-EP-MNS-0203 MNS Site Specific Field Monitoring

2. AD-EP-ALL-0203 Field Monitoring During Declared Emergency.

3. NEI 99-01 AG1

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Unplanned loss of water level above irradiated fuel

EAL:

RU2.1 Unusual Event

UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication

AND

UNPLANNED rise in corresponding area radiation levels as indicated by **EITHER** of the following radiation monitors:

- 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6)

Mode Applicability:

All

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

REFUELING PATHWAY-. The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

Basis:

The spent fuel pool low water level alarm setpoint is OAC point M1(2)D2937 (ref. 1). Water level restoration instructions are performed in accordance with AOPs (ref. 2, 3).

The specified radiation monitors are those expected to see increase area radiation levels as a result of a loss of REFUELING PATHWAY inventory (ref. 2, 3). Increasing radiation indications on these monitors in the absence of indications of decreasing REFUELING PATHWAY level are not classifiable under this EAL. 1EMF16 (2EMF3) Containment Building Refueling Bridge monitors are only operable in Mode 6 (Refueling).

ATTACHMENT 1
EAL Basis

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

This IC addresses a decrease in water level above irradiated fuel sufficient to cause elevated radiation levels. This condition could be a precursor to a more serious event and is also indicative of a minor loss in the ability to control radiation levels within the plant. It is therefore a potential degradation in the level of safety of the plant.

A water level decrease will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from plant personnel (e.g., from a refueling crew) or video camera observations (if available). A significant drop in the water level may also cause an increase in the radiation levels of adjacent areas that can be detected by monitors in those locations.

The effects of planned evolutions should be considered. For example, a refueling bridge area radiation monitor reading may increase due to planned evolutions such as lifting of the reactor vessel head or movement of a fuel assembly. Note that this EAL is applicable only in cases where the elevated reading is due to an unplanned loss of water level.

A drop in water level above irradiated fuel within the reactor vessel may be classified in accordance Recognition Category C during the Cold Shutdown and Refueling modes.

Escalation of the emergency classification level would be via IC RA2.

MNS Basis Reference(s):

1. AD-DC-MNS-0303
2. AP/1(2)/A/5500/40 Loss of Refueling Cavity Level
3. AP/1(2)/A/5500/41 Loss of Spent Fuel Cooling or Level
4. NEI 99-01 AU2

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Significant lowering of water level above, or damage to, irradiated fuel

EAL:

RA2.1	**Alert**
Uncovery of irradiated fuel in the REFUELING PATHWAY	

Mode Applicability:

All

Definition(s):

REFUELING PATHWAY-. The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

Basis:

This IC addresses events that have caused imminent or actual damage to an irradiated fuel assembly, or a significant lowering of water level within the spent fuel pool. These events present radiological safety challenges to plant personnel and are precursors to a release of radioactivity to the environment. As such, they represent an actual or potential substantial degradation of the level of safety of the plant.

This EAL escalates from RU2.1 in that the loss of level, in the affected portion of the REFUELING PATHWAY, is of sufficient magnitude to have resulted in uncovery of irradiated fuel. Indications of irradiated fuel uncovery may include direct or indirect visual observation (e.g., reports from personnel or camera images), as well as significant changes in water and radiation levels, or other plant parameters. Computational aids may also be used (e.g., a boil- off curve). Classification of an event using this EAL should be based on the totality of available indications, reports and observations.

While an area radiation monitor could detect an increase in a dose rate due to a lowering of water level in some portion of the REFUELING PATHWAY, the reading may not be a reliable indication of whether or not the fuel is actually uncovered. To the degree possible, readings should be considered in combination with other available indications of inventory loss.

A drop in water level above irradiated fuel within the reactor vessel may be classified in accordance Recognition Category C during the Cold Shutdown and Refueling modes.

Escalation of the emergency classification level would be via IC RS1 or RS2.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. AP/1(2)/A/5500/040 Loss of Refueling Cavity Level
2. AP/1(2)/A/5500/041 Loss of Spent Fuel Cooling or Level
3. NEI 99-01 AA2

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Significant lowering of water level above, or damage to, irradiated fuel

EAL:

RA2.2 Alert

Damage to irradiated fuel resulting in a release of radioactivity

AND

A Trip 2 radiation alarm on **any** of the following radiation monitor indications:

- 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6)
- 1EMF42 (2EMF42) Fuel Building Ventilation
- 1EMF39 (2EMF39) Containment Gas

Mode Applicability:

All

Definition(s):

None

Basis:

The specified radiation monitors are those expected to see increased area radiation levels as a result of damage to irradiated fuel (ref. 1). 1EMF16 (2EMF3) Containment Building Refueling Bridge monitors are only operable in Mode 6 (Refueling).

The Trip 2 alarm setpoints for the radiation monitors are set to be indicative of significant increases in area and/or airborne radiation (ref. 2).

This IC addresses events that have caused imminent or actual damage to an irradiated fuel assembly, or a significant lowering of water level within the spent fuel pool. These events present radiological safety challenges to plant personnel and are precursors to a release of radioactivity to the environment. As such, they represent an actual or potential substantial degradation of the level of safety of the plant.

This EAL applies to irradiated fuel that is licensed for dry storage up to the point that the loaded storage cask is sealed. Once sealed, damage to a loaded cask causing loss of the CONFINEMENT BOUNDARY is classified in accordance with EAL EU1.1.

ATTACHMENT 1
EAL Basis

Escalation of the emergency would be based on either Recognition Category R or C ICs.

This EAL addresses a release of radioactive material caused by mechanical damage to irradiated fuel. Damaging events may include the dropping, bumping or binding of an assembly, or dropping a heavy load onto an assembly. A rise in readings on radiation monitors should be considered in conjunction with in-plant reports or observations of a potential fuel damaging event (e.g., a fuel handling accident).

Escalation of the emergency classification level would be via IC RS1 or RS2.

MNS Basis Reference(s):

1. AP/1(2)/A/5500/25 Spent Fuel Damage
2. HP/0/B/1003/008 Determination of Radiation Monitor Setpoints (EMFs)
3. NEI 99-01 AA2

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Significant lowering of water level above, or damage to, irradiated fuel

EAL:

RA2.3 Alert

Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)

Mode Applicability:

All

Definition(s):

None

Basis:

Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3).

The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 2 corresponds to a SFP level of -15 ft. (756.4 ft. elev.) or approximately 10 ft. above the top of the SFP racks (ref. 2, 3, 5).

This IC addresses events that have caused imminent or actual damage to an irradiated fuel assembly, or a significant lowering of water level within the spent fuel pool. These events present radiological safety challenges to plant personnel and are precursors to a release of radioactivity to the environment. As such, they represent an actual or potential substantial degradation of the level of safety of the plant.

Escalation of the emergency would be based on either Recognition Category R or C ICs.

Spent fuel pool water level at this value is within the lower end of the level range necessary to prevent significant dose consequences from direct gamma radiation to personnel performing operations in the vicinity of the spent fuel pool. This condition reflects a significant loss of spent fuel pool water inventory and thus it is also a precursor to a loss of the ability to adequately cool the irradiated fuel assembles stored in the pool.

ATTACHMENT 1
EAL Basis

Escalation of the emergency classification level would be via IC RS1.

MNS Basis Reference(s):

1. NRC EA-12-051 Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation
2. MNS-14-023 Second Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
3. Engineering Change Packages #109073 and #109074
4. NEI 99-01 AA2
5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Spent fuel pool level at the top of the fuel racks

EAL:

RS2.1 Site Area Emergency

Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)

Mode Applicability:

All

Definition(s):

None

Basis:

Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3).

The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.

This EAL addresses a significant loss of spent fuel pool inventory control and makeup capability leading to IMMINENT fuel damage. This condition entails major failures of plant functions needed for protection of the public and thus warrant a Site Area Emergency declaration.

It is recognized that this IC would likely not be met until well after another Site Area Emergency IC was met; however, it is included to provide classification diversity.

Escalation of the emergency classification level would be via IC RG1 or RG2.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. NRC EA-12-051 Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation
2. MNS-14-023 Second Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
3. Engineering Change Packages #109073 and #109074
4. NEI 99-01 AS2
5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer

EAL:

RG2.1 General Emergency

Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

All

Definition(s):

None

Basis:

Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3).

The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.

This EAL addresses a significant loss of spent fuel pool inventory control and makeup capability leading to a prolonged uncovery of spent fuel. This condition will lead to fuel damage and a radiological release to the environment.

It is recognized that this IC would likely not be met until well after another General Emergency IC was met; however, it is included to provide classification diversity.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. NRC EA-12-051 Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation
2. MNS-14-023 Second Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)
3. Engineering Change Packages #109073 and #109074
4. NEI 99-01 AG2
5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 3 – Area Radiation Levels

Initiating Condition: Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown

EAL:

RA3.1 Alert

Dose rates > 15 mR/hr in **EITHER** of the following areas:

Control Room (1EMF12)

OR

Central Alarm Station (by survey)

Mode Applicability:

All

Definition(s):

IMPEDE(D) - Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

Basis:

Areas that meet this threshold include the Control Room and the Central Alarm Station (CAS). 1EMF Channel 12 monitors the Control room for area radiation (ref. 1). The CAS is included in this EAL because of its' importance to permitting access to areas required to assure safe plant operations.

There is no permanently installed CAS area radiation monitors that may be used to assess this EAL threshold. Therefore this threshold must be assessed via local radiation survey for the CAS.

This IC addresses elevated radiation levels in certain plant rooms/areas sufficient to preclude or impede personnel from performing actions necessary to maintain normal plant operation, or to perform a normal plant cooldown and shutdown. As such, it represents an actual or potential substantial degradation of the level of safety of the plant. The Emergency Coordinator should consider the cause of the increased radiation levels and determine if another IC may be applicable.

ATTACHMENT 1
EAL Basis

An emergency declaration is not warranted if the following condition applies.

- The increased radiation levels are a result of a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., radiography, spent filter or resin transfer, etc.).

Escalation of the emergency classification level would be via Recognition Category R, C or F ICs.

MNS Basis Reference(s):

1. UFSAR Table 12-11 Area Radiation Monitors
2. NEI 99-01 AA3

ATTACHMENT 1
EAL Basis

Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 3 – Area Radiation Levels

Initiating Condition: Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown

EAL:

RA3.2 Alert

An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **any** Table R-2 rooms or areas (Note 5)

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Table R-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Modes
Auxiliary 716'	P/C, RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750'	800 (1EMXA)	820 (2EMXA)	3, 4
	803 (1ETA)	805 (2ETA)	3, 4
Auxiliary 733'	702 (Elec. Pene.)	713 (Elec. Pene.)	3
	722 (1EMXB-1)	724 (2EMXB-1)	3, 4
	705 (1ETB)	716 (2ETB)	3, 4

Mode Applicability:

All

Definition(s):

IMPEDE(D) - Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

If the equipment in the listed room or area was already inoperable, or out-of-service, before the event occurred, then no emergency should be declared since the event will have no adverse impact beyond that already allowed by Technical Specifications at the time of the event.

ATTACHMENT 1
EAL Basis

The list of plant rooms or areas with entry-related mode applicability identified specify those rooms or areas that contain equipment which require a manual/local action as specified in operating procedures used for normal plant operation, cooldown and shutdown. Rooms or areas in which actions of a contingent or emergency nature would be performed (e.g., an action to address an off-normal or emergency condition such as emergency repairs, corrective measures or emergency operations) are not included. In addition, the list specifies the plant mode(s) during which entry would be required for each room or area (ref. 1).

This IC addresses elevated radiation levels in certain plant rooms/areas sufficient to preclude or impede personnel from performing actions necessary to maintain normal plant operation, or to perform a normal plant cooldown and shutdown. As such, it represents an actual or potential substantial degradation of the level of safety of the plant. The Emergency Coordinator should consider the cause of the increased radiation levels and determine if another IC may be applicable.

For RA3.2, an Alert declaration is warranted if entry into the affected room/area is, or may be, procedurally required during the plant operating mode in effect at the time of the elevated radiation levels. The emergency classification is not contingent upon whether entry is actually necessary at the time of the increased radiation levels. Access should be considered as impeded if extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., installing temporary shielding, requiring use of non-routine protective equipment, requesting an extension in dose limits beyond normal administrative limits).

An emergency declaration is not warranted if any of the following conditions apply:

- The plant is in an operating mode different than the mode specified for the affected room/area (i.e., entry is not required during the operating mode in effect at the time of the elevated radiation levels). For example, the plant is in Mode 1 when the radiation increase occurs, and the procedures used for normal operation, cooldown and shutdown do not require entry into the affected room until Mode 4.
- The increased radiation levels are a result of a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., radiography, spent filter or resin transfer, etc.).
- The action for which room/area entry is required is of an administrative or record keeping nature (e.g., normal rounds or routine inspections).
- The access control measures are of a conservative or precautionary nature, and would not actually prevent or impede a required action.
- If the equipment in the listed room or area was already inoperable, or out-of-service, before the event occurred, then no emergency should be declared since the event will have no adverse impact beyond that already allowed by Technical Specifications at the time of the event.

Escalation of the emergency classification level would be via Recognition Category R, C or F ICs.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. Attachment 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis
2. NEI 99-01 AA3

ATTACHMENT 1
EAL Basis

Category C – Cold Shutdown / Refueling System Malfunction

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

Category C EALs are directly associated with cold shutdown or refueling system safety functions. Given the variability of plant configurations (e.g., systems out-of-service for maintenance, containment open, reduced AC power redundancy, time since shutdown) during these periods, the consequences of any given initiating event can vary greatly. For example, a loss of decay heat removal capability that occurs at the end of an extended outage has less significance than a similar loss occurring during the first week after shutdown. Compounding these events is the likelihood that instrumentation necessary for assessment may also be inoperable. The cold shutdown and refueling system malfunction EALs are based on performance capability to the extent possible with consideration given to NCS integrity, containment closure, and fuel clad integrity for the applicable operating modes (5 - Cold Shutdown, 6 - Refueling, NM – No Mode).

The events of this category pertain to the following subcategories:

1. NCS Level

Reactor Pressure Vessel water level is directly related to the status of adequate core cooling and, therefore, fuel clad integrity.

2. Loss of Essential AC Power

Loss of essential plant electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of onsite and offsite power sources for 4160 VAC essential buses.

3. NCS Temperature

Uncontrolled or inadvertent temperature or pressure increases are indicative of a potential loss of safety functions.

4. Loss of Vital DC Power

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

ATTACHMENT 1
EAL Basis

5. Loss of Communications

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

6. Hazardous Event Affecting Safety Systems

Certain hazardous natural and technological events may result in visible damage to or degraded performance of safety systems warranting classification.

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: UNPLANNED loss of NCS inventory for 15 minutes or longer

EAL:

CU1.1 Unusual Event

UNPLANNED loss of reactor coolant results in NCS water level less than a required lower limit for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

NCS water level less than a required lower limit is meant to be less than the lower end of the level control band being procedurally maintained for the current condition or evolution.

With the plant in Cold Shutdown, NCS water level is normally maintained above the pressurizer low level setpoint of 17% (ref. 1). However, if NCS level is being controlled below the pressurizer low level setpoint, or if level is being maintained in a designated band in the reactor vessel it is the inability to maintain level above the low end of the designated control band due to a loss of inventory resulting from a leak in the NCS that is the concern.

With the plant in Refueling mode, NCS water level is normally maintained at or above the reactor vessel flange (Technical Specification LCO 3.9.7 requires at least 23 ft of water above the top of the reactor vessel flange in the refueling cavity during refueling operations) (ref. 2).

This IC addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band), or a loss of the ability to monitor NCS level concurrent with indications of coolant leakage. Either of these conditions is considered to be a potential degradation of the level of safety of the plant.

ATTACHMENT 1
EAL Basis

Refueling evolutions that decrease NCS water inventory are carefully planned and controlled. An UNPLANNED event that results in water level decreasing below a procedurally required

limit warrants the declaration of an Unusual Event due to the reduced water inventory that is available to keep the core covered.

This EAL recognizes that the minimum required NCS level can change several times during the course of a refueling outage as different plant configurations and system lineups are implemented. This EAL is met if the minimum level, specified for the current plant conditions, cannot be maintained for 15 minutes or longer. The minimum level is typically specified in the applicable operating procedure but may be specified in another controlling document.

The 15-minute threshold duration allows sufficient time for prompt operator actions to restore and maintain the expected water level. This criterion excludes transient conditions causing a brief lowering of water level.

Continued loss of NCS inventory may result in escalation to the Alert emergency classification level via either IC CA1 or CA3.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Tree - Inventory
2. MNS Technical Specifications Section 3.9.7 Refueling Cavity Water Level
3. NEI 99-01 CU1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: UNPLANNED loss of NCS inventory for 15 minutes or longer

EAL:

CU1.2 Unusual Event

NCS water level cannot be monitored

AND EITHER

- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of unisolable NCS leakage

Table C-6 Sumps/Tanks
• NCDT • PRT • CFAE sump • ND/NS sump • RHT • WDT • WEFT • SRST

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

In Cold Shutdown mode, the NCS will normally be intact and standard NCS level monitoring means are available. NCS level in the Refueling mode is normally monitored using the sight glass.

ATTACHMENT 1
EAL Basis

In this EAL, all water level indication is unavailable and the NCS inventory loss must be detected by indirect leakage indications. Level increases must be evaluated against other potential sources of leakage such as cooling water sources inside the containment to ensure they are indicative of NCS leakage. If the make-up rate to the NCS unexplainably rises above the pre-established rate, a loss of NCS inventory may be occurring even if the source of the leakage cannot be immediately identified. Visual observation of leakage from systems connected to the NCS that cannot be isolated could also be indicative of a loss of NCS inventory (ref. 1, 2).

This IC addresses the inability to restore and maintain water level to a required minimum level (or the lower limit of a level band), or a loss of the ability to monitor RPV level concurrent with indications of coolant leakage. Either of these conditions is considered to be a potential degradation of the level of safety of the plant.

Refueling evolutions that decrease NCS water inventory are carefully planned and controlled. An UNPLANNED event that results in water level decreasing below a procedurally required limit warrants the declaration of an Unusual Event due to the reduced water inventory that is available to keep the core covered.

This EAL addresses a condition where all means to determine RPV level have been lost. In this condition, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the NCS.

Continued loss of NCS inventory may result in escalation to the Alert emergency classification level via either IC CA1 or CA3.

MNS Basis Reference(s):

1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps
2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
3. NEI 99-01 CU1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: Loss of NCS inventory

EAL:

CA1.1 Alert

Loss of NCS inventory as indicated by NCS water level < 5 in. above hotleg centerline

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling

Definition(s):

None

Basis:

5.1 in. above hotleg centerline (rounded to 5 in.) NCS level indication is the lowest level to assure adequate net positive suction head and prevent ND pump cavitation and air entrainment for all flow rates (ref. 1).

This IC addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel (i.e., a precursor to a challenge to the fuel clad barrier). This condition represents a potential substantial reduction in the level of plant safety.

For this EAL, a lowering of NCS water level below 5 in. above hotleg centerline indicates that operator actions have not been successful in restoring and maintaining NCS water level. The heat-up rate of the coolant will increase as the available water inventory is reduced. A continuing decrease in water level will lead to core uncovery.

Although related, this EAL is concerned with the loss of NCS inventory and not the potential concurrent effects on systems needed for decay heat removal (e.g., loss of a Decay Heat Removal suction point). An increase in NCS temperature caused by a loss of decay heat removal capability is evaluated under IC CA3.

If NCS water level continues to lower, then escalation to Site Area Emergency would be via IC CS1.

MNS Basis Reference(s):

1. EP Calculation File MCC-1552.08-00-0208
2. NEI 99-01 CA1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: Loss of NCS inventory

EAL:

CA1.2 Alert

NCS water level cannot be monitored for ≥ 15 min. (Note 1)

AND EITHER

- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of unisolable NCS leakage

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table C-6	**Sumps/Tanks**
● NCDT ● PRT ● CFAE sump ● ND/NS sump ● RHT ● WDT ● WEFT ● SRST	

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

ATTACHMENT 1
EAL Basis

Basis:

In Cold Shutdown mode, the NCS will normally be intact and standard RPV level monitoring means are available. In the Refuel mode, the NCS is not intact and RPV level may be monitored by different means, including the ability to monitor level visually.

In this EAL, all NCS water level indication would be unavailable for greater than 15 minutes, and the NCS inventory loss must be detected by indirect leakage indications. Sump level increases must be evaluated against other potential sources of leakage. If the make-up rate to the NCS unexplainably rises above the pre-established rate, a loss of NCS inventory may be occurring even if the source of the leakage cannot be immediately identified. Visual observation of leakage from systems connected to the NCS that cannot be isolated could also be indicative of a loss of NCS inventory (ref. 1, 2).

This IC addresses conditions that are precursors to a loss of the ability to adequately cool irradiated fuel (i.e., a precursor to a challenge to the fuel clad barrier). This condition represents a potential substantial reduction in the level of plant safety.

For this EAL, the inability to monitor NCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the NCS.

The 15-minute duration for the loss of level indication was chosen because it is half of the EAL duration specified in IC CS1.

If the NCS inventory level continues to lower, then escalation to Site Area Emergency would be via IC CS1.

MNS Basis Reference(s):

1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps
2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
3. NEI 99-01 CA1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: Loss of NCS inventory affecting core decay heat removal capability

EAL:

CS1.1 Site Area Emergency

NCS water level cannot be monitored for ≥ 30 min. (Note 1)
AND
Core uncovery is indicated by **any** of the following:

- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of unisolable NCS leakage
- Reactor Building Refueling Bridge Monitor 1EMF16 (2EMF3) reading > 9000 mR/hr (Mode 6)
- Erratic Source Range or Wide Range Flux Monitor indication

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table C-6	**Sumps/Tanks**
• NCDT • PRT • CFAE sump • ND/NS sump • RHT • WDT • WEFT • SRST	

Mode Applicability:

5 – Cold Shutdown, 6 – Refueling

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

ATTACHMENT 1
EAL Basis

Basis:

The lowest measurable NCS level is the elevation of the NCS hot leg mid-loop. Therefore, NCS inventory loss relative to the NCS level elevation corresponding to the top of active fuel must be detected by indirect leakage indications. Sump level increases must be evaluated against other potential sources of leakage. If the make-up rate to the NCS unexplainably rises above the pre-established rate, a loss of NCS inventory may be occurring even if the source of the leakage cannot be immediately identified. Visual observation of leakage from systems connected to the NCS in areas outside the containment that cannot be isolated could also be indicative of a loss of NCS inventory (ref. 1, 2).

In the Refueling Mode, as water level in the reactor vessel lowers, the dose rate above the core will increase. The dose rate due to this core shine should result in indications on installed area radiation monitors. 1EMF16 (2EMF3), Reactor Building Refueling Bridge Monitor is located in the containment in proximity to the reactor cavity and is designed to provide monitoring of radiation due to a fuel handling event or loss of shielding during refueling operations. If this radiation monitor reaches and exceeds 9,000 mR/hr (90% of instrument scale), a loss of inventory with potential to uncover the core is likely to have occurred.
Radiation monitors 1EMF16 and 2EMF3 are only required to be operable in Mode 6.

Post-TMI accident studies indicated that the installed PWR nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

This IC addresses a significant and prolonged loss of reactor vessel/NCS inventory control and makeup capability leading to IMMINENT fuel damage. The lost inventory may be due to a NCS component failure, a loss of configuration control or prolonged boiling of reactor coolant. These conditions entail major failures of plant functions needed for protection of the public and thus warrant a Site Area Emergency declaration.

Following an extended loss of core decay heat removal and inventory makeup, decay heat will cause reactor coolant boiling and a further reduction in reactor vessel level. If NCS level cannot be restored, fuel damage is probable.

The 30-minute criterion is tied to a readily recognizable event start time (i.e., the total loss of ability to monitor level), and allows sufficient time to monitor, assess and correlate reactor and plant conditions to determine if core uncovery has actually occurred (i.e., to account for various accident progression and instrumentation uncertainties). It also allows sufficient time for performance of actions to terminate leakage, recover inventory control/makeup equipment and/or restore level monitoring.

The inability to monitor NCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the NCS .

ATTACHMENT 1
EAL Basis

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

Escalation of the emergency classification level would be via IC CG1 or RG1

MNS Basis Reference(s):

1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps
2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
3. NEI 99-01 CS1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 1 – NCS Level

Initiating Condition: Loss of NCS inventory affecting fuel clad integrity with containment challenged

EAL:

CG1.1 General Emergency

NCS level **cannot** be monitored for ≥ 30 min. (Note 1)

AND

Core uncovery is indicated by **any** of the following:

- UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory
- Visual observation of UNISOLABLE NCS leakage
- Reactor Building Refueling Bridge Monitor 1EMF16 (2EMF3) reading > 9,000 mR/hr
- Erratic Source Range or Wide Range Flux Monitor indication

AND

Any Containment Challenge indication, Table C-1

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Table C-6	**Sumps/Tanks**
• NCDT • PRT • CFAE sump • ND/NS sump • RHT • WDT • WEFT • SRST	

ATTACHMENT 1
EAL Basis

Table C-1	**Containment Challenge Indications**
• CONTAINMENT CLOSURE **not** established (Note 6) • Containment hydrogen concentration > 6% • UNPLANNED rise in containment pressure	

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling

Definition(s):

CONTAINMENT CLOSURE - The procedurally defined conditions or actions taken to secure Primary or Secondary Containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

As applied to MNS, Containment Closure is established when the requirements of PT/1(2)/A/4200/002 C are met.

UNISOLABLE - An open or breached system line that cannot be isolated, remotely or locally.

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

The lowest measurable NCS level is the elevation of the NCS hot leg mid-loop. Therefore, NCS inventory loss relative to the NCS level elevation corresponding to the top of active fuel must be detected by indirect leakage indications. Sump level increases must be evaluated against other potential sources of leakage. If the make-up rate to the NCS unexplainably rises above the pre-established rate, a loss of NCS inventory may be occurring even if the source of the leakage cannot be immediately identified. Visual observation of leakage from systems connected to the NCS in areas outside the containment that cannot be isolated could also be indicative of a loss of NCS inventory (ref. 1, 2).

1EMF16 (2EMF3), Reactor Building Refueling Bridge Monitor is located in the containment in proximity to the reactor cavity and is designed to provide monitoring of radiation due to a fuel handling event or loss of shielding during refueling operations. If this radiation monitor reaches and exceeds 9,000 mR/hr (90% of instrument scale), a loss of inventory with potential to uncover the core is likely to have occurred. Radiation monitors 1EMF16 and 2EMF3 are only required to be operable in Mode 6.

ATTACHMENT 1
EAL Basis

Post-TMI accident studies indicated that the installed PWR nuclear instrumentation will operate erratically when the core is uncovered and that this should be used as a tool for making such determinations.

Three conditions are associated with a challenge to containment integrity:

- CONTAINMENT CLOSURE is not established (ref. 3).
- In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive mixture of dissolved gases in the containment. However, containment monitoring and/or sampling should be performed to verify this assumption and a General Emergency declared if it is determined that an explosive mixture exists. An explosive mixture can be formed when hydrogen gas concentration in the containment atmosphere is greater than 6% (upper limit of for operability of hydrogen recombiners) by volume in the presence of oxygen (>5%) (ref. 4).
- Any unplanned increase in containment pressure in the Cold Shutdown or Refueling mode indicates a potential loss of containment closure capability. Unplanned containment pressure increases indicates containment closure cannot be assured and the containment cannot be relied upon as a barrier to fission product release.

This IC addresses the inability to restore and maintain reactor vessel level above the top of active fuel with containment challenged. This condition represents actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity.
Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

Following an extended loss of core decay heat removal and inventory makeup, decay heat will cause reactor coolant boiling and a further reduction in reactor vessel level. If NCS level cannot be restored, fuel damage is probable.

With CONTAINMENT CLOSURE not established, there is a high potential for a direct and unmonitored release of radioactivity to the environment. If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, then declaration of a General Emergency is not required.

The existence of an explosive mixture means, at a minimum, that the containment atmospheric hydrogen concentration is sufficient to support a hydrogen burn (i.e., at the lower deflagration limit). A hydrogen burn will raise containment pressure and could result in collateral equipment damage leading to a loss of containment integrity. It therefore represents a challenge to Containment integrity.

ATTACHMENT 1
EAL Basis

In the early stages of a core uncovery event, it is unlikely that hydrogen buildup due to a core uncovery could result in an explosive gas mixture in containment. If all installed hydrogen gas monitors are out-of-service during an event leading to fuel cladding damage, it may not be possible to obtain a containment hydrogen gas concentration reading as ambient conditions within the containment will preclude personnel access. During periods when installed containment hydrogen gas monitors are out-of-service, operators may use the other listed indications to assess whether or not containment is challenged.

The 30-minute criterion is tied to a readily recognizable event start time (i.e., the total loss of ability to monitor level), and allows sufficient time to monitor, assess and correlate reactor and plant conditions to determine if core uncovery has actually occurred (i.e., to account for various accident progression and instrumentation uncertainties). It also allows sufficient time for performance of actions to terminate leakage, recover inventory control/makeup equipment and/or restore level monitoring.

The inability to monitor NCS level may be caused by instrumentation and/or power failures, or water level dropping below the range of available instrumentation. If water level cannot be monitored, operators may determine that an inventory loss is occurring by observing changes in sump and/or tank levels. Sump and/or tank level changes must be evaluated against other potential sources of water flow to ensure they are indicative of leakage from the NCS.

This EAL addresses concerns raised by Generic Letter 88-17, *Loss of Decay Heat Removal*; SECY 91-283, *Evaluation of Shutdown and Low Power Risk Issues*; NUREG-1449, *Shutdown and Low-Power Operation at Commercial Nuclear Power Plants in the United States*; and NUMARC 91-06, *Guidelines for Industry Actions to Assess Shutdown Management*.

MNS Basis Reference(s):

1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps
2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
3. PT/1(2)/A/4200/002 C Containment Closure
4. CALC-MCC-1552-08-00-0208 Emergency Procedure Setpoints
5. NEI 99-01 CG1

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Loss of Essential AC Power

Initiating Condition: Loss of all but one AC power source to essential buses for 15 minutes or longer

EAL:

CU2.1 Unusual Event

AC power capability, Table C-2, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1)

AND

Any additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table C-2 AC Power Sources
Offsite: • ATC (Train A) • SATA (Train A) • ATD (Train B) • SATB (Train B) **Onsite:** • D/G 1(2) A (Train A) • D/G 1(2) B (Train B)

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling, NM - No Mode

ATTACHMENT 1
EAL Basis

Definition(s):

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

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

Basis:

The 4160 VAC System provides the power requirements for operation and safe shutdown of the plant. The essential switchgear are buses ETA (Train A) and ETB (Train B) (ref. 1).

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite essential source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event but is not credited as an AC power source by Technical Specifications (ref. 1).

This cold condition EAL is equivalent to the hot condition EAL SA1.1.

This IC describes a significant degradation of offsite and onsite AC power sources such that any additional single failure would result in a loss of all AC power to SAFETY SYSTEMS. In this condition, the sole AC power source may be powering one, or more than one, train of safety-related equipment.

ATTACHMENT 1
EAL Basis

When in the cold shutdown, refueling, or no mode, this condition is not classified as an Alert because of the increased time available to restore another power source to service. Additional time is available due to the reduced core decay heat load, and the lower temperatures and pressures in various plant systems. Thus, when in these modes, this condition is considered to be a potential degradation of the level of safety of the plant.

An “AC power source” is a source recognized in AOPs and EOPs, and capable of supplying required power to an essential bus. Some examples of this condition are presented below.

- A loss of all offsite power with a concurrent failure of all but one emergency power source (e.g., an onsite diesel generator).
- A loss of all offsite power and loss of all emergency power sources (e.g., onsite diesel generators) with a single train of emergency buses being back-fed from the unit main generator.
- A loss of emergency power sources (e.g., onsite diesel generators) with a single train of emergency buses being fed from an offsite power source.

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

The subsequent loss of the remaining single power source would escalate the event to an Alert in accordance with IC CA2.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
4. NEI 99-01 CU2

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 2 – Loss of Essential AC Power

Initiating Condition: Loss of **all** offsite and **all** onsite AC power to essential buses for 15 minutes or longer

EAL:

CA2.1 Alert

Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling, NM - No Mode

Definition(s):

None

Basis:

The 4160 VAC System provides the power requirements for operation and safe shutdown of the plant. The essential switchgear are buses ETA (Train A) and ETB (Train B) (ref. 1).

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

ATTACHMENT 1
EAL Basis

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event. Although it is not credited as an AC power source by Technical Specifications, it is a credited source with regards to this EAL provided it is aligned within the 15 classification criteria (ref. 1).

This cold condition EAL is equivalent to the hot condition loss of all offsite AC power EAL SS1.1.

This IC addresses a total loss of AC power that compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink.

When in the cold shutdown, refueling, or no mode, this condition is not classified as a Site Area Emergency because of the increased time available to restore an essential bus to service. Additional time is available due to the reduced core decay heat load, and the lower temperatures and pressures in various plant systems. Thus, when in these modes, this condition represents an actual or potential substantial degradation of the level of safety of the plant.

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

Escalation of the emergency classification level would be via IC CS1 or RS1.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
4. NEI 99-01 CA2

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – NCS Temperature

Initiating Condition: UNPLANNED increase in NCS temperature

EAL:

CU3.1 Unusual Event

UNPLANNED increase in NCS temperature to > 200°F due to loss of decay heat removal capability

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

Definition(s):

UNPLANNED-. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

Several instruments are capable of providing indication of NCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1) including both hot leg and cold leg RTDs and core exit T/Cs (ref. 2, 3).

In the absence of reliable NCS temperature indication caused by a loss of decay heat removal capability, classification should be based on EAL CU3.2 should NCS level indication be subsequently lost.

This IC addresses an UNPLANNED increase in NCS temperature above the Technical Specification cold shutdown temperature limit and represents a potential degradation of the level of safety of the plant. If the NCS is not intact and CONTAINMENT CLOSURE is not established during this event, the Emergency Coordinator should also refer to IC CA3.

A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available does not warrant a classification.

This EAL involves a loss of decay heat removal capability, or an addition of heat to the NCS in excess of that which can currently be removed, such that reactor coolant temperature cannot be maintained below the cold shutdown temperature limit specified in Technical Specifications. During this condition, there is no immediate threat of fuel damage because the core decay heat load has been reduced since the cessation of power operation.

ATTACHMENT 1
EAL Basis

During an outage, the level in the reactor vessel will normally be maintained at or above the reactor vessel flange. Refueling evolutions that lower water level below the reactor vessel flange are carefully planned and controlled. A loss of forced decay heat removal at reduced inventory may result in a rapid increase in reactor coolant temperature depending on the time after shutdown.

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

Escalation to Alert would be via IC CA1 based on an inventory loss or IC CA3 based on exceeding plant configuration-specific time criteria.

MNS Basis Reference(s):

1. MNS Technical Specifications Table 1.1-1
2. MNS UFSAR Section 7.0 Instrumentation and Controls
3. AP/1(2)/A/5500/19 Loss of ND or ND System Leakage System
4. NEI 99-01 CU3

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – NCS Temperature

Initiating Condition: UNPLANNED increase in NCS temperature

EAL:

CU3.2	**Unusual Event**
Loss of **all** NCS temperature and NCS level indication for ≥ 15 min. (Note 1)	

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

5 - Cold Shutdown, 6- Refueling

Definition(s):

None

Basis:

Several instruments are capable of providing indication of NCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1) including both hot leg and cold leg RTDs and core exit T/Cs (ref. 2, 3).

NCS water level is normally monitored using various instruments including NC System narrow range and wide range monitors, RVLIS, NC System sightglass, tygon tube and Pressurizer level instruments (ref. 4).

This EAL addresses the inability to determine NCS temperature and level, and represents a potential degradation of the level of safety of the plant. If the NCS is not intact and CONTAINMENT CLOSURE is not established during this event, the Emergency Coordinator should also refer to IC CA3.

This EAL reflects a condition where there has been a significant loss of instrumentation capability necessary to monitor NCS conditions and operators would be unable to monitor key parameters necessary to assure core decay heat removal. During this condition, there is no immediate threat of fuel damage because the core decay heat load has been reduced since the cessation of power operation.

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

ATTACHMENT 1
EAL Basis

Escalation to Alert would be via IC CA1 based on an inventory loss or IC CA3 based on exceeding plant configuration-specific time criteria.

MNS Basis Reference(s):

1. MNS Technical Specifications Table 1.1-1
2. MNS UFSAR Section 7.0 Instrumentation and Controls
3. AP/1(2)/A/5500/19 Loss of ND or ND System Leakage System
4. OP/1(2)/A/6100/SD-20 Draining the NC System
5. NEI 99-01 CU3

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 3 – NCS Temperature

Initiating Condition: Inability to maintain plant in cold shutdown

EAL:

CA3.1 Alert

UNPLANNED increase in NCS temperature to > 200°F for > Table C-3 duration (Notes 1, 9)

OR

UNPLANNED NCS pressure increase > 20 psig due to a loss of NCS cooling (this does **not** apply during water-solid plant conditions)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the NCS pressure increase criteria when in Mode 5 or based on time to boil data when in Mode 6.

Table C-3: NCS Heat-up Duration Thresholds

NCS Status	Containment Closure Status	Heat-up Duration
Intact (but **not** reduced inventory)	N/A	60 min.*
Not intact **OR** At reduced inventory	established	20 min.*
	not established	0 min.

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

Mode Applicability:

5 - Cold Shutdown, 6 – Refueling

Definition(s):

CONTAINMENT CLOSURE - The procedurally defined conditions or actions taken to secure Primary or Secondary Containment and its associated structures, systems, and components as a functional barrier to fission product release under shutdown conditions.

As applied to MNS, Containment Closure is established when the requirements of PT/1(2)/A/4200/002 C are met.

ATTACHMENT 1
EAL Basis

UNPLANNED -. A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

Several instruments are capable of providing indication of NCS temperature with respect to the Technical Specification cold shutdown temperature limit (200°F, ref. 1) including both hot leg and cold leg RTDs and core exit T/Cs (ref. 2, 3).

A 20 psig RPV pressure increase can be read on various instruments during outage (1NCLP5122 and 5142) (ref. 4).

In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the NCS pressure increase criteria when in Mode 5 or based on time to boil data when in Mode 6.

This IC addresses conditions involving a loss of decay heat removal capability or an addition of heat to the NCS in excess of that which can currently be removed. Either condition represents an actual or potential substantial degradation of the level of safety of the plant.

A momentary UNPLANNED excursion above the Technical Specification cold shutdown temperature limit when the heat removal function is available does not warrant a classification.

The NCS Heat-up Duration Thresholds table addresses an increase in NCS temperature when CONTAINMENT CLOSURE is established but the NCS is not intact, or NCS inventory is reduced (e.g., mid-loop operation). The 20-minute criterion was included to allow time for operator action to address the temperature increase.

The NCS Heat-up Duration Thresholds table also addresses an increase in NCS temperature with the NCS intact. The status of CONTAINMENT CLOSURE is not crucial in this condition since the intact NCS is providing a high pressure barrier to a fission product release. The 60- minute time frame should allow sufficient time to address the temperature increase without a substantial degradation in plant safety.

Finally, in the case where there is an increase in NCS temperature, the NCS is not intact or is at reduced inventory, and CONTAINMENT CLOSURE is not established, no heat-up duration is allowed (i.e., 0 minutes). This is because 1) the evaporated reactor coolant may be released directly into the containment atmosphere and subsequently to the environment, and
2) there is reduced reactor coolant inventory above the top of irradiated fuel.

The NCS pressure increase threshold provides a pressure-based indication of NCS heat-up in the absence of NCS temperature monitoring capability.

Escalation of the emergency classification level would be via IC CS1 or RS1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. MNS Technical Specifications Table 1.1-1
2. MNS UFSAR Section 7.0 Instrumentation and Controls
3. AP/1(2)/A/5500/19 Loss of ND or ND System Leakage System
4. MCC-1210.04-00-0040
5. NEI 99-01 CA3

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 4 – Loss of Vital DC Power

Initiating Condition: Loss of Vital DC power for 15 minutes or longer

EAL:

CU4.1 Unusual Event

< 105 VDC bus voltage indications on Technical Specification **required** 125 VDC buses for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

Definition(s):

None

Basis:

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A or EVDA, and Train B or EVDD). Each subsystem consists of two channels of 125 VDC batteries (each battery 100% capacity), the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. (ref. 1).

The Train A and Train B DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses. (ref. 1).

The minimum battery discharge voltage (requiring opening the degraded battery output breaker) is 105 VDC (ref. 1, 2).

This EAL is the cold condition equivalent of the hot condition loss of DC power EAL SS7.1.

This IC addresses a loss of vital DC power which compromises the ability to monitor and control operable SAFETY SYSTEMS when the plant is in the cold shutdown or refueling mode. In these modes, the core decay heat load has been significantly reduced, and coolant system temperatures and pressures are lower; these conditions increase the time available to restore a vital DC bus to service. Thus, this condition is considered to be a potential degradation of the level of safety of the plant.

ATTACHMENT 1
EAL Basis

As used in this EAL, “required” means the vital DC buses necessary to support operation of the in-service, or operable, train or trains of SAFETY SYSTEM equipment. For example, if Train A is out-of-service (inoperable) for scheduled outage maintenance work and Train B is in-service (operable), then a loss of Vital DC power affecting Train B would require the declaration of an Unusual Event. A loss of Vital DC power to Train A would not warrant an emergency classification.

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

Depending upon the event, escalation of the emergency classification level would be via IC CA1 or CA3, or an IC in Recognition Category R.

MNS Basis Reference(s):

1. MNS Technical Specification 3.8.4 DC Sources – Operating Bases
2. AP/1/A/5500/15 Loss of Vital or Aux Control Power
3. MNS UFSAR Section 8.0 Electrical Power
4. NEI 99-01 CU4

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction
Subcategory: 5 – Loss of Communications
Initiating Condition: Loss of **all** onsite or offsite communications capabilities

EAL:

CU5.1 Unusual Event

Loss of **all** Table C-4 onsite communication methods

OR

Loss of **all** Table C-4 ORO communication methods

OR

Loss of **all** Table C-4 NRC communication methods

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling, NM – No Mode

Definition(s):

None

ATTACHMENT 1
EAL Basis

Basis:

Onsite/offsite communications include one or more of the systems listed in Table C-4 (ref. 1).

Public Address System

The McGuire Nuclear Station public address system provides paging and party line communications between stations located throughout the plant. Inside and outside type wall and desk-mounted stations are used to communicate between roaming personnel and fixed work locations. Plant-wide instructions are issued using the paging feature.

Internal Telephone System

The McGuire Nuclear Station PBX telephone system provides communication capability between telephone stations located within the plant by dialing the four-digit telephone station code.

On-site Radio System

Radio systems can be used for communication among operators, off-site monitoring teams, the control room, TSC and EOF.

DEMNET

DEMNET is the primary means of offsite communication. This circuit allows intercommunication among the EOF, TSC, control room, counties, and states. DEMNET operates as an internet based (VoIP) communications system with a satellite back-up. Should the internet transfer rate become slow or unavailable, the DEMNET will automatically transfer to satellite mode.

Commercial Telephones

Commercial telephone lines, which supply public telephone communications, are employed by Duke Energy. The local service provider provides primary and secondary power for their lines at the Central Office.

NRC Emergency Telecommunications System (ETS)

The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.

This EAL is the cold condition equivalent of the hot condition EAL SU7.1.

ATTACHMENT 1
EAL Basis

This IC addresses a significant loss of on-site or offsite communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to OROs and the NRC.

This IC should be assessed only when extraordinary means are being utilized to make communications possible (e.g., use of non-plant, privately owned equipment, relaying of on- site information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

The first EAL condition addresses a total loss of the communications methods used in support of routine plant operations.

The second EAL condition addresses a total loss of the communications methods used to notify all OROs of an emergency declaration. The OROs referred to here are the State, Gaston, Catawba, Iredell, Lincoln, Cabarrus and Mecklenburg County EOCs

The third EAL addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

MNS Basis Reference(s):

1. MNS Emergency Plan Section F Emergency Communications
2. MNS Emergency Plan Section B On-Site Emergency Organization.
3. NEI 99-01 CU5

ATTACHMENT 1
EAL Basis

Category: C – Cold Shutdown / Refueling System Malfunction

Subcategory: 6 – Hazardous Event Affecting Safety Systems

Initiating Condition: Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode

EAL:

CA6.1 Alert

The occurrence of **any** Table C-5 hazardous event

AND

Event damage has caused indications of degraded performance on one train of a SAFETY SYSTEM needed for the current operating mode

AND EITHER of the following:

- Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode
- Event damage has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode

(Note 11, 12)

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Table C-5	**Hazardous Events**
● Seismic event (earthquake) ● Internal or external FLOODING event ● High winds or tornado strike ● FIRE ● EXPLOSION ● Other events with similar hazard characteristics as determined by the Shift Manager	

ATTACHMENT 1
EAL Basis

Mode Applicability:

5 - Cold Shutdown, 6 - Refueling

Definition(s):

EXPLOSION - A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or over pressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events require a post- event inspection to determine if the attributes of an explosion are present.

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

FLOODING - A condition where water is entering a room or area faster than installed equipment is capable of removal, resulting in a rise of water level within the room or area.

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

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

VISIBLE DAMAGE - Damage to a SAFETY SYSTEM train that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected SAFETY SYSTEM train.

Basis:

- The significance of seismic events are discussed under EAL HU2.1 (ref. 1).
- Internal FLOODING may be caused by events such as component failures, equipment misalignment, or outage activity mishaps (ref. 2).
- External flooding may be due to high lake level. MNS powerhouse yard elevation is 760 ft MSL. The administration building and yard are elevation 747 ft MSL. The maximum water level elevation at the site is 760.375 ft MFL (ref. 3, 4).
- Seismic Category I structures are analyzed to withstand a sustained, design wind velocity of 95 mph. (ref. 5).
- Areas containing functions and systems required for safe shutdown of the plant are identified by fire area in the fire response procedure (ref. 5).

ATTACHMENT 1
EAL Basis

This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.

This IC addresses a hazardous event that causes damage to SAFETY SYSTEMS needed for the current operating mode. In order to provide the appropriate context for consideration of an ALERT classification, the hazardous event must have caused indications of degraded SAFETY SYSTEM performance in one train, and there must be either indications of performance issues with the second SAFETY SYSTEM train or VISIBLE DAMAGE to the second train such that the potential exists for this second SAFETY SYSTEM train to have performance issues. In other words, in order for this EAL to be classified, the hazardous event must occur, at least one SAFETY SYSTEM train must have indications of degraded performance, and the second SAFETY SYSTEM train must have indications of degraded performance or VISIBLE DAMAGE such that the potential exists for performance issues. Note that this second SAFETY SYSTEM train is from the same SAFETY SYSTEM that has indications of degraded performance for criteria in the first condition of this EAL; commercial nuclear power plants are designed to be able to support single system issues without compromising public health and safety from radiological events.

Indications of degraded performance address damage to a SAFETY SYSTEM train that is in service/operation since indications for it will be readily available. The indications of degraded performance should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

Operators will make a determination of VISIBLE DAMAGE based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage. This VISIBLE DAMAGE should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under CA6.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis.

An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under CA6.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement.

ATTACHMENT 1
EAL Basis

An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under CA6.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted because the event was severe enough to affect the operability or reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.

The examples below can assist in determining the threshold meeting the two train criteria.

Scenario	Train A	Train B	Extent of Damage	Classify?	Reason
1	OOS/Under Clearance (Visible Damage)	In Service (NO Degraded Performance)	Event caused damage to Train A only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
2	OOS/Under Clearance (No damage)	In Service (Degraded Performance)	Event caused damage to Train B only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
3	OOS/Under Clearance (Visible Damage)	In Service (Degraded Performance)	Event causes damage to both trains	YES	The event was significant enough to impact two trains.
4	In Stby (Visible Damage)	In Stby (Visible Damage)	Event caused damage to both trains	NO	Cannot classify on Visible Damage only.
5	In Service (Degraded Performance)	In Stby (Visible Damage)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
6	In Service (Degraded Performance)	In Service (Degraded Performance)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
7	In service OR in Stby	In service OR in Stby	Event caused damage to a common component to both trains (i.e. FWST)	YES	The event impacted equipment common to two or more trains.

Escalation of the emergency classification level would be via IC RS1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. RP/0/A/5000/007 Earthquake
2. AP/0/A/5500/030 Plant Flooding
3. UFSAR Section 2.1 Site Location
4 UFSAR Section 3.4 Water Level (Flood) Design
5. UFSAR Section 3.3.1 Wind Loadings
6. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak
7. NEI 99-01 CA6

ATTACHMENT 1
EAL Basis

Category H – Hazards and Other Conditions Affecting Plant Safety

EAL Group: ANY (EALs in this category are applicable to any plant condition, hot or cold.)

Hazards are non-plant, system-related events that can directly or indirectly affect plant operation, reactor plant safety or personnel safety.

1.Security

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

2.Seismic Event

Natural events such as earthquakes have potential to cause plant structure or equipment damage of sufficient magnitude to threaten personnel or plant safety.

3.Natural or Technology Hazard

Other natural and non-naturally occurring events that can cause damage to plant facilities include tornados, FLOODING, hazardous material releases and events restricting site access warranting classification.

4.Fire

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

5.Hazardous Gas

Toxic, corrosive, asphyxiant or flammable gas leaks can affect normal plant operations or preclude access to plant areas required to safely shutdown the plant.

ATTACHMENT 1
EAL Basis

6.Control Room Evacuation

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

7.Emergency Coordinator Judgment

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

ATTACHMENT 1
EAL Basis

Category: H – Hazards

Subcategory: 1 – Security

Initiating Condition: Confirmed SECURITY CONDITION or threat

EAL:

HU1.1 Unusual Event

A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by the Security Shift Supervision

Mode Applicability:

All

Definition(s):

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

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

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses events that pose a threat to plant personnel or SAFETY SYSTEM equipment, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs HA1 and HS1.

ATTACHMENT 1
EAL Basis

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3, 4).
Classification of these events will initiate appropriate threat-related notifications to plant personnel and Offsite Response Organizations.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan and Independent Spent Fuel Storage Installation Security Program*.

This threshold references the Security Shift Supervision because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.39 information.

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

Escalation of the emergency classification level would be via IC HA1.

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HU1

ATTACHMENT 1
EAL Basis

Category: H – Hazards
Subcategory: 1 – Security
Initiating Condition: Confirmed SECURITY CONDITION or threat

EAL:

HU1.2	**Unusual Event**
Notification of a credible security threat directed at the site	

Mode Applicability:

All

Definition(s):

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

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses events that pose a threat to plant personnel or SAFETY SYSTEM equipment, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs HA1 and HS1.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3, 4).
Classification of these events will initiate appropriate threat-related notifications to plant personnel and Offsite Response Organizations.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan and Independent Spent Fuel Storage Installation Security Program*.

This threshold addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with the MNS Security Contingency Plan (ref. 1).

ATTACHMENT 1
EAL Basis

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

Escalation of the emergency classification level would be via IC HA1.

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HU1

ATTACHMENT 1
EAL Basis

Category: H – Hazards
Subcategory: 1 – Security
Initiating Condition: Confirmed SECURITY CONDITION or threat

EAL:

HU1.3	**Unusual Event**
A validated notification from the NRC providing information of an aircraft threat	

Mode Applicability:

All

Definition(s):

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

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses events that pose a threat to plant personnel or SAFETY SYSTEM equipment, and thus represent a potential degradation in the level of plant safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under ICs HA1 and HS1.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3, 4).
Classification of these events will initiate appropriate threat-related notifications to plant personnel and Offsite Response Organizations.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan and Independent Spent Fuel Storage Installation Security Program*.

This threshold addresses the threat from the impact of an aircraft on the plant. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the

ATTACHMENT 1
EAL Basis

NRC. Validation of the threat is performed in accordance with the MNS Security Contingency Plan (ref. 1).

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

Escalation of the emergency classification level would be via IC HA1.

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HU1

ATTACHMENT 1
EAL Basis

Category: H – Hazards

Subcategory: 1 – Security

Initiating Condition: HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes

EAL:

HA1.1 Alert

A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision

Mode Applicability:

All

Definition(s):

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

OWNER CONTROLLED AREA - Area outside the PROTECTED AREA fence that immediately surrounds the plant. Access to this area is generally restricted to those entering on official business.

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact.

Timely and accurate communications between the Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3, 4).

ATTACHMENT 1
EAL Basis

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations (OROs), allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

This threshold is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against an ISFSI that is located outside the plant PROTECTED AREA.

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HA1

ATTACHMENT 1
EAL Basis

Category: H – Hazards

Subcategory: 1 – Security

Initiating Condition: HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes

EAL:

HA1.2 Alert

A validated notification from NRC of an aircraft attack threat within 30 min. of the site

Mode Applicability:

All

Definition(s):

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

OWNER CONTROLLED AREA - Area outside the PROTECTED AREA fence that immediately surrounds the plant. Access to this area is generally restricted to those entering on official business.

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the plant and staff for a potential aircraft impact.

Timely and accurate communications between the Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3, 4).

ATTACHMENT 1
EAL Basis

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program]*.

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations (OROs), allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

This threshold addresses the threat from the impact of an aircraft on the plant, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat- related notifications are made in a timely manner so that plant personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with site-specific security procedures (ref. 2).

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may be provided by NORAD through the NRC.

In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HA1

ATTACHMENT 1
EAL Basis

Category: H – Hazards

Subcategory: 1 – Security

Initiating Condition: Hostile Action within the Protected Area

EAL:

HS1.1 Site Area Emergency

A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision

Mode Applicability:

All

Definition(s):

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

PROTECTED AREA - An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area.

Basis:

Security Shift Supervision is the Shift Security Supervisor or Response Team Leader. These individuals are the designated on-site personnel qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the Duke Energy Physical Security Plan for MNS (Safeguards) information (ref. 1).

This IC addresses the occurrence of a HOSTILE ACTION within the PROTECTED AREA. This event will require rapid response and assistance due to the possibility for damage to plant equipment.

Timely and accurate communications between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event (ref. 2, 3).

ATTACHMENT 1
EAL Basis

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan and Independent Spent Fuel Storage Installation Security Program*.

As time and conditions allow, these events require a heightened state of readiness by the plant staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Site Area Emergency declaration will mobilize Offsite Response Organization (ORO) resources and have them available to develop and implement public protective actions in the unlikely event that the attack is successful in impairing multiple safety functions.

This IC does not apply to a HOSTILE ACTION directed at an ISFSI PROTECTED AREA located outside the plant PROTECTED AREA; such an attack should be assessed using IC HA1. It also does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

Emergency plans and implementing procedures are public documents; therefore, EALs should not incorporate Security-sensitive information. This includes information that may be advantageous to a potential adversary, such as the particulars concerning a specific threat or threat location. Security-sensitive information should be contained in non-public documents such as the Duke Energy Physical Security Plan for MNS (ref. 1).

MNS Basis Reference(s):

1. Duke Energy Physical Security Plan for MNS
2. AP/0/A/5500/047 Security Events
3. AP/0/A/5500/048 Extensive Damage Mitigation
4. NEI 99-01 HS1

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 2 – Seismic Event

Initiating Condition: Seismic event greater than OBE levels

EAL:

HU2.1	**Unusual Event**
Seismic event > OBE as indicated by OBE EXCEEDED alarm on 1AD-13, E7	

Mode Applicability:

All

Definition(s):

None

Basis:

Ground motion acceleration of 0.08g horizontal or 0.0533g vertical is the Operating Basis Earthquake for MNS (ref. 1, 3).

Five strong motion triaxial accelerographs are used to obtain seismic event data at the station site. The seismic instrumentation system also consists of a network control center (NCC), which is used for rapid interrogation of the accelerograph data and for data transfer to a dedicated system computer for subsequent data processing and analysis. The time-history recorded at each accelerograph location can be analyzed to determine its corresponding peak acceleration values and to verify that site Operating Basis Earthquake (OBE) limits have not been exceeded. Immediate control room alarm indication of an earthquake of 0.08 g horizontal or 0.533 g vertical or greater is annunciated through the system's network control center (NCC), following seismic trigger actuation by at least two accelerographs (ref. 2).

RP/0/A/5700/007 Earthquake provides the guidance for determining if the OBE earthquake threshold is exceeded and any required response actions. (ref. 4)

To avoid inappropriate emergency classification resulting from spurious actuation of the seismic instrumentation or felt motion not attributable to seismic activity, an offsite agency (USGS, National Earthquake Information Center) can confirm that an earthquake has occurred in the area of the plant. Such confirmation should not, however, preclude a timely emergency declaration based on receipt of the OBE alarm. The NEIC can be contacted by calling **(303) 273-8500**. Select **option #1** and inform the analyst you wish to confirm recent seismic activity in the vicinity of MNS. Provide the analyst with the following MNS coordinates: **35º 25' 59" north latitude, 80º 56' 55" west longitude** (ref. 5). Alternatively, near real-time seismic activity can be accessed via the NEIC website:

http://earthquake.usgs.gov/eqcenter/

ATTACHMENT 1
EAL Basis

An additional method to rule out spurious activation of the seismic instrumentation is to download seismic recorders stored memory on the dedicated laptop computer located in the Control Room, Elevation 767 ft., behind 1MC9. Such validation should not, however, preclude a timely emergency declaration based on receipt of OBE alarm.

This IC addresses a seismic event that results in accelerations at the plant site greater than those specified for an Operating Basis Earthquake (OBE). An earthquake greater than an OBE but less than a Safe Shutdown Earthquake (SSE) should have no significant impact on safety-related systems, structures and components; however, some time may be required for the plant staff to ascertain the actual post-event condition of the plant (e.g., performs walk- downs and post-event inspections). Given the time necessary to perform walk-downs and inspections, and fully understand any impacts, this event represents a potential degradation of the level of safety of the plant.

Event verification with external sources should not be necessary during or following an OBE. Earthquakes of this magnitude should be readily felt by on-site personnel and recognized as a seismic event (e.g., lateral accelerations in excess of 0.08g). The Shift Manager or Emergency Coordinator may seek external verification if deemed appropriate (e.g., a call to the USGS, check internet news sources, etc.); however, the verification action must not preclude a timely emergency declaration.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9.

MNS Basis Reference(s):

1. UFSAR Section 3.1 Conformance with General Design Criteria
2. UFSAR Section 3.7.4.2 Location and Description of Instrumentation
3. OP/1/A/6100/010N Annunciator Response for Panel 1AD-13
4. RP/0/A/5700/007 Earthquake
5. UFSAR Section 2.1.1 Site Location
6. NEI 99-01 HU2

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 3 – Natural or Technological Hazard

Initiating Condition: Hazardous event

EAL:

HU3.1 Unusual Event

A tornado strike within the PROTECTED AREA

Mode Applicability:

All

Definition(s):

PROTECTED AREA - An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area.

Basis:

Response actions associated with a tornado onsite is provided in RP/0/A/5700/006 Natural Disasters (ref. 1).

If damage is confirmed visually or by other in-plant indications, the event may be escalated to an Alert under EAL CA6.1 or SA9.1.

A tornado striking (touching down) within the PROTECTED AREA warrants declaration of an Unusual Event regardless of the measured wind speed at the meteorological tower. A tornado is defined as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm.

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

EAL HU3.1 addresses a tornado striking (touching down) within the PROTECTED AREA.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, S or C.

MNS Basis Reference(s):

1. RP/0/A/5700/006 Natural Disasters
2. NEI 99-01 HU3

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety
Subcategory: 3 – Natural or Technological Hazard
Initiating Condition: Hazardous event

EAL:

HU3.2 Unusual Event

Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode

Mode Applicability:

All

Definition(s):

FLOODING - A condition where water is entering a room or area faster than installed equipment is capable of removal, resulting in a rise of water level within the room or area.

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;

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

Basis:

Areas susceptible to internal flooding are Turbine Building, Service Building and Auxiliary from the following systems: Condenser Circulating Water, Fire Protection, Nuclear and Conventional Service Water and Condensate Storage (ref.1). Refer to EAL CA6.1 for internal flooding affecting one or more SAFETY SYSTEM trains.

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

This EAL addresses FLOODING of a building room or area that results in operators isolating power to a SAFETY SYSTEM component due to water level or other wetting concerns.

ATTACHMENT 1
EAL Basis

Classification is also required if the water level or related wetting causes an automatic isolation of a SAFETY SYSTEM component from its power source (e.g., a breaker or relay trip). To warrant classification, operability of the affected component must be required by Technical Specifications for the current operating mode.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, S or C.

MNS Basis Reference(s):

1. AP/0/A/5500/044 Plant Flooding
2. NEI 99-01 HU3

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 3 – Natural or Technological Hazard

Initiating Condition: Hazardous event

EAL:

HU3.3 Unusual Event

Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release)

Mode Applicability:

All

Definition(s):

IMPEDE(D) - Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

PROTECTED AREA - An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area.

Basis:

As used here, the term "offsite" is meant to be areas external to the MNS PROTECTED AREA.

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

This EAL addresses a hazardous materials event originating at an offsite location and of sufficient magnitude to impede the movement of personnel within the PROTECTED AREA.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, S or C.

MNS Basis Reference(s):

1. NEI 99-01 HU3

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 3 – Natural or Technological Hazard

Initiating Condition: Hazardous event

EAL:

HU3.4 Unusual Event

A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Mode Applicability:

All

Definition(s):

None

Basis:

This IC addresses hazardous events that are considered to represent a potential degradation of the level of safety of the plant.

This EAL addresses a hazardous event that causes an on-site impediment to vehicle movement and significant enough to prohibit the plant staff from accessing the site using personal vehicles. Examples of such an event include site FLOODING caused by a hurricane, heavy rains, up-river water releases, dam failure, etc., or an on-site train derailment blocking the access road.

This EAL is not intended to apply to routine impediments such as fog, snow, ice, or vehicle breakdowns or accidents, but rather to more significant conditions such as the Hurricane Andrew strike on Turkey Point in 1992, the flooding around the Cooper Station during the Midwest floods of 1993, or the flooding around Ft. Calhoun Station in 2011.

Escalation of the emergency classification level would be based on ICs in Recognition Categories R, F, S or C.

MNS Basis Reference(s):

1. NEI 99-01 HU3

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 4 – Fire

Initiating Condition: FIRE potentially degrading the level of safety of the plant

EAL:

HU4.1 Unusual Event

A FIRE is **not** extinguished within 15 min. of **any** of the following FIRE detection indications (Note 1):

- Report from the field (i.e., visual observation)
- Receipt of multiple (more than 1) fire alarms or indications
- Field verification of a single fire alarm

AND

The FIRE is located within **any** Table H-1 area

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table H-1 Fire Areas
• Containment • Auxiliary Building • Diesel Generator Rooms • FWST • Dog Houses • Standby Shutdown Facility (SSF)

Mode Applicability:

All

Definition(s):

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

ATTACHMENT 1
EAL Basis

Basis:

The 15 minute requirement begins with a credible notification that a fire is occurring, or receipt of multiple valid fire detection system alarms or field validation of a single fire alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data.

Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).

This IC addresses the magnitude and extent of FIRES that may be indicative of a potential degradation of the level of safety of the plant.

For EAL HU4.1 the intent of the 15-minute duration is to size the FIRE and to discriminate against small FIRES that are readily extinguished (e.g., smoldering waste paper basket). In addition to alarms, other indications of a FIRE could be a drop in fire main pressure, automatic activation of a suppression system, etc.

Upon receipt, operators will take prompt actions to confirm the validity of an initial fire alarm, indication, or report. For EAL assessment purposes, the emergency declaration clock starts at the time that the initial alarm, indication, or report was received, and not the time that a subsequent verification action was performed. Similarly, the fire duration clock also starts at the time of receipt of the initial alarm, indication or report.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9.

MNS Basis Reference(s):

1. MCS-1465.00-00-0008 Fire Protection
2. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak
3. NEI 99-01 HU4
4. National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 4 – Fire

Initiating Condition: FIRE potentially degrading the level of safety of the plant

EAL:

HU4.2 Unusual Event

Receipt of a single fire alarm (i.e., no other indications of a FIRE)

AND

The fire alarm is indicating a FIRE within **any** Table H-1 area

AND

The existence of a FIRE is not verified within 30 min. of alarm receipt (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table H-1 Fire Areas
• Containment • Auxiliary Building • Diesel Generator Rooms • FWST • Dog Houses • Standby Shutdown Facility (SSF)

Mode Applicability:

All

Definition(s):

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

ATTACHMENT 1
EAL Basis

Basis:

The 30 minute requirement begins upon receipt of a single valid fire detection system alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Actual field reports must be made within the 30 minute time limit or a classification must be made. If a fire is verified to be occurring by field report, classification shall be made based on EAL HU4.1.

Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).

This IC addresses the magnitude and extent of FIRES that may be indicative of a potential degradation of the level of safety of the plant.

This EAL addresses receipt of a single fire alarm, and the existence of a FIRE is not verified (i.e., proved or disproved) within 30-minutes of the alarm. Upon receipt, operators will take prompt actions to confirm the validity of a single fire alarm. For EAL assessment purposes, the 30-minute clock starts at the time that the initial alarm was received, and not the time that a subsequent verification action was performed.

A single fire alarm, absent other indication(s) of a FIRE, may be indicative of equipment failure or a spurious activation, and not an actual FIRE. For this reason, additional time is allowed to verify the validity of the alarm. The 30-minute period is a reasonable amount of time to determine if an actual FIRE exists; however, after that time, and absent information to the contrary, it is assumed that an actual FIRE is in progress.

If an actual FIRE is verified by a report from the field, then HU4.1 is immediately applicable, and the emergency must be declared if the FIRE is not extinguished within 15-minutes of the report. If the alarm is verified to be due to an equipment failure or a spurious activation, and this verification occurs within 30-minutes of the receipt of the alarm, then this EAL is not applicable and no emergency declaration is warranted.

<u>Basis-Related Requirements from NFPA 0805</u>

General Design Criterion (GDC) 3 specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."

When considering the effects of fire, those systems associated with achieving and maintaining safe shutdown conditions assume major importance to safety because damage to them can lead to core damage resulting from loss of coolant through boil-off.

ATTACHMENT 1
EAL Basis

Because fire may affect safe shutdown systems and because the loss of function of systems used to mitigate the consequences of design basis accidents under post-fire conditions does not per se impact public safety, the need to limit fire damage to systems required to achieve and maintain safe shutdown conditions is greater than the need to limit fire damage to those systems required to mitigate the consequences of design basis accidents.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9.

MNS Basis Reference(s):

1. MCS-1465.00-00-0008 Fire Protection
2. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak
3. NEI 99-01 HU4
4. National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 4 – Fire

Initiating Condition: FIRE potentially degrading the level of safety of the plant

EAL:

HU4.3 Unusual Event

A FIRE within the plant PROTECTED AREA not extinguished within 60 min. of the initial report, alarm or indication (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

All

Definition(s):

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

PROTECTED AREA - An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area.

Basis:

This IC addresses the magnitude and extent of FIRES that may be indicative of a potential degradation of the level of safety of the plant.

In addition to a FIRE addressed by EAL HU4.1 or HU4.2, a FIRE within the plant PROTECTED AREA not extinguished within 60-minutes may also potentially degrade the level of plant safety.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9.

MNS Basis Reference(s):

1. NEI 99-01 HU4

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 4 – Fire

Initiating Condition: FIRE potentially degrading the level of safety of the plant

EAL:

HU4.4 Unusual Event

A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish

Mode Applicability:

All

Definition(s):

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

PROTECTED AREA - An area encompassed by physical barriers and to which access is controlled. The Protected Area refers to the designated security area around the process buildings and is depicted in MNS UFSAR Figure 2-4 Plot Plan and Site Area.

Basis:

This IC addresses the magnitude and extent of FIRES that may be indicative of a potential degradation of the level of safety of the plant.

If a FIRE within the plant PROTECTED AREA is of sufficient size to require a response by an offsite firefighting agency (e.g., a local town Fire Department), then the level of plant safety is potentially degraded. The dispatch of an offsite firefighting agency to the site requires an emergency declaration only if it is needed to actively support firefighting efforts because the fire is beyond the capability of the Fire Brigade to extinguish. Declaration is not necessary if the agency resources are placed on stand-by, or supporting post-extinguishment recovery or investigation actions.

Depending upon the plant mode at the time of the event, escalation of the emergency classification level would be via IC CA6 or SA9.

MNS Basis Reference(s):

1. NEI 99-01 HU4

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 5 – Hazardous Gases

Initiating Condition: Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown

EAL:

HA5.1 Alert

Release of a toxic, corrosive, asphyxiant or flammable gas into **any** Table H-2 rooms or areas

AND

Entry into the room or area is prohibited or IMPEDED (Note 5)

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted

Table H-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Modes
Auxiliary 716’	P/C, RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750’	800 (1EMXA)	820 (2EMXA)	3, 4
	803 (1ETA)	805 (2ETA)	3, 4
Auxiliary 733’	702 (Elec. Pene.)	713 (Elec. Pene.)	3
	722 (1EMXB-1)	724 (2EMXB-1)	3, 4
	705 (1ETB)	716 (2ETB)	3, 4

Mode Applicability:

3 - Hot Standby, 4 – Hot Shutdown

Definition(s):

IMPEDE(D) - Personnel access to a room or area is hindered to an extent that extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

Basis:

If the equipment in the listed room or area was already inoperable, or out-of-service, before the event occurred, then no emergency should be declared since the event will have no adverse impact beyond that already allowed by Technical Specifications at the time of the event.

ATTACHMENT 1
EAL Basis

The list of plant rooms or areas with entry-related mode applicability identified specify those rooms or areas that contain equipment which require a manual/local action as specified in operating procedures used for normal plant operation, cooldown and shutdown. Rooms or areas in which actions of a contingent or emergency nature would be performed (e.g., an action to address an off-normal or emergency condition such as emergency repairs, corrective measures or emergency operations) are not included. In addition, the list specifies the plant mode(s) during which entry would be required for each room or area (ref. 1).

This IC addresses an event involving a release of a hazardous gas that precludes or impedes access to equipment necessary to maintain normal plant operation, or required for a normal plant cooldown and shutdown. This condition represents an actual or potential substantial degradation of the level of safety of the plant.

An Alert declaration is warranted if entry into the affected room/area is, or may be, procedurally required during the plant operating mode in effect at the time of the gaseous release. The emergency classification is not contingent upon whether entry is actually necessary at the time of the release.

Evaluation of the IC and EAL does not require atmospheric sampling; it only requires the Emergency Coordinator's judgment that the gas concentration in the affected room/area is sufficient to preclude or significantly impede procedurally required access. This judgment may be based on a variety of factors including an existing job hazard analysis, report of ill effects on personnel, advice from a subject matter expert or operating experience with the same or similar hazards. Access should be considered as impeded if extraordinary measures are necessary to facilitate entry of personnel into the affected room/area (e.g., requiring use of protective equipment, such as SCBAs, that is not routinely employed).

An emergency declaration is not warranted if any of the following conditions apply:

- The plant is in an operating mode different than the mode specified for the affected room/area (i.e., entry is not required during the operating mode in effect at the time of the gaseous release). For example, the plant is in Mode 1 when the gaseous release occurs, and the procedures used for normal operation, cooldown and shutdown do not require entry into the affected room until Mode 4.
- The gas release is a planned activity that includes compensatory measures which address the temporary inaccessibility of a room or area (e.g., fire suppression system testing).
- The action for which room/area entry is required is of an administrative or record keeping nature (e.g., normal rounds or routine inspections).
- The access control measures are of a conservative or precautionary nature, and would not actually prevent or impede a required action.
- If the equipment in the listed room or area was already inoperable, or out-of-service, before the event occurred, then no emergency should be declared since the event will have no adverse impact beyond that already allowed by Technical Specifications at the time of the event.

ATTACHMENT 1
EAL Basis

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

This EAL does not apply to firefighting activities that automatically or manually activate a fire suppression system in an area.

Escalation of the emergency classification level would be via Recognition Category R, C or F ICs.

***NOTE**: IC HA5 mode applicability has been limited to the applicable modes identified in Table H-2 Safe Operation & Shutdown Rooms/Areas. If due to plant operating procedure or plant configuration changes, the applicable plant modes specified in Table H-2 are changed, a corresponding change to Attachment 3 'Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis' and to IC HA5 mode applicability is required.*

MNS Basis Reference(s):

1. Attachment 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis
2. NEI 99-01 HA5

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 6 – Control Room Evacuation

Initiating Condition: Control Room evacuation resulting in transfer of plant control to alternate locations

EAL:

HA6.1 Alert

An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF)

Mode Applicability:

All

Definition(s):

None

Basis:

The Shift Manager (SM) determines if the Control Room is inoperable and requires evacuation. Control Room inhabitability may be caused by fire, dense smoke, noxious fumes, bomb threat in or adjacent to the Control Room, or other life threatening conditions (Ref. 1, 2).

Inability to establish plant control from outside the Control Room escalates this event to a Site Area Emergency per EAL HS6.1.

This IC addresses an evacuation of the Control Room that results in transfer of plant control to alternate locations outside the Control Room. The loss of the ability to control the plant from the Control Room is considered to be a potential substantial degradation in the level of plant safety.

Following a Control Room evacuation, control of the plant will be transferred to alternate shutdown locations. The necessity to control a plant shutdown from outside the Control Room, in addition to responding to the event that required the evacuation of the Control Room, will present challenges to plant operators and other on-shift personnel. Activation of the ERO and emergency response facilities will assist in responding to these challenges.

Escalation of the emergency classification level would be via IC HS6.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. AP/1(2)/A/5500/17 Loss of Control Room
2. MCS-1465.00-00-0008 Fire Protection
3. NEI 99-01 HA6

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 6 – Control Room Evacuation

Initiating Condition: Inability to control a key safety function from outside the Control Room

EAL:

HS6.1 Site Area Emergency

An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF)

AND

Control of **any** of the following key safety functions is **not** reestablished within 15 min. (Note 1):

- Reactivity (Modes 1, 2 and 3 **only**)
- Core Cooling
- NCS heat removal

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 - Hot Standby, 4 – Hot Shutdown, 5 – Cold Shutdown, 6 - Refueling

Definition(s):

None

Basis:

The Shift Manager determines if the Control Room is inoperable and requires evacuation. Control Room inhabitability may be caused by fire, dense smoke, noxious fumes, bomb threat in or adjacent to the Control Room, or other life threatening conditions (Ref. 1, 2).

This IC addresses an evacuation of the Control Room that results in transfer of plant control to alternate locations, and the control of a key safety function cannot be reestablished in a timely manner. The failure to gain control of a key safety function following a transfer of plant control to alternate locations is a precursor to a challenge to one or more fission product barriers within a relatively short period of time.

The determination of whether or not “control” is established at the remote safe shutdown location(s) is based on Emergency Coordinator judgment. The Emergency Coordinator is expected to make a reasonable, informed judgment within 15 minutes whether or not the operating staff has control of key safety functions from the remote safe shutdown location(s).

ATTACHMENT 1
EAL Basis

Escalation of the emergency classification level would be via IC FG1 or CG1

MNS Basis Reference(s):

1. AP/1(2)/A/5500/17 Loss of Control Room
2. MCS-1465.00-00-0008 Fire Protection
3. NEI 99-01 HS6

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 7 – Emergency Coordinator Judgment

Initiating Condition: Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a UE

EAL:

HU7.1 Unusual Event

Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

Mode Applicability:

All

Definition(s):

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and *maintain* it in a safe shutdown condition;

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

Basis:

The Emergency Coordinators are the designated onsite individuals having the responsibility and authority for implementing the MNS Emergency Response Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Coordinator and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Coordinator, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management

is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

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

MNS Basis Reference(s):

1. MNS Emergency Plan Section B On-Site Emergency Organization Section B.2 Emergency Coordinator
2. NEI 99-01 HU7

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 7 – Emergency Coordinator Judgment

Initiating Condition: Other conditions exist that in the judgment of the Emergency Coordinator warrant declaration of an Alert

EAL:

HA7.1 Alert

Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Mode Applicability:

All

Definition(s):

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

Basis:

The Emergency Coordinators are the designated onsite individuals having the responsibility and authority for implementing the MNS Emergency Response Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Coordinator and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Coordinator, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref.1).

ATTACHMENT 1
EAL Basis

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

MNS Basis Reference(s):

1. MNS Emergency Plan Section B On-Site Emergency Organization Section B.2 Emergency Coordinator
2. NEI 99-01 HA7

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 7 – Emergency Coordinator Judgment

Initiating Condition: Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a Site Area Emergency

EAL:

HS7.1 Site Area Emergency

Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

Mode Applicability:

All

Definition(s):

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

SITE BOUNDARY **-** Area as depicted in MNS-SLC-16.11.1 Figure 16.11.1-1 Site Boundary/Exclusion Area Boundary

Basis:

The Emergency Coordinators are the designated onsite individuals having the responsibility and authority for implementing the MNS Emergency Response Plan. The Shift Manager (SM) initially acts in the capacity of the Emergency Coordinator and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Coordinator, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management

ATTACHMENT 1
EAL Basis

is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the emergency classification level description for a Site Area Emergency.

MNS Basis Reference(s):

1. MNS Emergency Plan Section B On-Site Emergency Organization Section B.2 Emergency Coordinator
2. NEI 99-01 HS7

ATTACHMENT 1
EAL Basis

Category: H – Hazards and Other Conditions Affecting Plant Safety

Subcategory: 7 – Emergency Coordinator Judgment

Initiating Condition: Other conditions exist which in the judgment of the Emergency Coordinator warrant declaration of a General Emergency

EAL:

HG7.1 General Emergency

Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

Mode Applicability:

All

Definition(s):

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

IMMINENT - The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

Basis:

The Emergency Coordinator are the designated onsite individuals having the responsibility and authority for implementing the MNS Emergency Response Plan. The Shift Manager(SM) initially acts in the capacity of the Emergency Coordinator and takes actions as outlined in the Emergency Plan implementing procedures. If required by the emergency classification or if deemed appropriate by the Emergency Coordinator, emergency response personnel are notified and instructed to report to their emergency response locations. In this manner, the individual usually in charge of activities in the Control Room is responsible for initiating the necessary emergency response, but Plant Management is expected to manage the emergency response as soon as available to do so in anticipation of the possible wide-ranging responsibilities associated with managing a major emergency (ref. 1).

ATTACHMENT 1
EAL Basis

Releases can reasonably be expected to exceed EPA PAG plume exposure levels outside the Site Boundary.

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

MNS Basis Reference(s):

1. MNS Emergency Plan Section B On-Site Emergency Organization Section B.2 Emergency Coordinator
2. NEI 99-01 HG7

ATTACHMENT 1
EAL Basis

Category S – System Malfunction

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

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

The events of this category pertain to the following subcategories:

1. Loss of Essential AC Power

Loss of emergency electrical power can compromise plant safety system operability including decay heat removal and emergency core cooling systems which may be necessary to ensure fission product barrier integrity. This category includes loss of onsite and offsite sources for 4160 VAC essential buses.

2. Loss of Vital DC Power

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

3. Loss of Control Room Indications

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

4. NCS Activity

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

5. NCS Leakage

The reactor vessel provides a volume for the coolant that covers the reactor core. The reactor pressure vessel and associated pressure piping (reactor coolant system) together provide a barrier to limit the release of radioactive material should the reactor fuel clad integrity fail. Excessive NCS leakage greater than Technical Specification limits indicates potential pipe cracks that may propagate to an extent threatening fuel clad, NCS and containment integrity.

ATTACHMENT 1
EAL Basis

6. RPS Failure

This subcategory includes events related to failure of the Reactor Protection System (RPS) to initiate and complete reactor trips. In the plant licensing basis, postulated failures of the RPS to complete a reactor trip comprise a specific set of analyzed events referred to as Anticipated Transient Without Scram (ATWS) events. For EAL classification, however, ATWS is intended to mean any trip failure event that does not achieve reactor shutdown. If RPS actuation fails to assure reactor shutdown, positive control of reactivity is at risk and could cause a threat to fuel clad, NCS and containment integrity.

7. Loss of Communications

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

8. Containment Isolation Failure

Failure of containment isolation capability (under conditions in which the containment is not currently challenged) warrants emergency classification.

9. Hazardous Event Affecting Safety Systems

Various natural and technological events that result in degraded plant safety system performance or significant visible damage warrant emergency classification under this subcategory.

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 1 – Loss of Essential AC Power

Initiating Condition: Loss of **all** offsite AC power capability to essential buses for 15 minutes or longer

EAL:

SU1.1 Unusual Event

Loss of **all** offsite AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table S-1 AC Power Sources
Offsite: • ATC (Train A) • SATA (Train A) • ATD (Train B) • SATB (Train B) **Onsite:** • D/G 1(2) A (Train A) • D/G 1(2) B (Train B)

Mode Applicability:

1 - Power Operations, 2 - Startup, 3 - Hot Standby, 4 – Hot Shutdown

Definition(s):

None

Basis:

The 4160 VAC System provides the power requirements for operation and safe shutdown of the plant. The essential switchgear are buses ETA (Train A) and ETB (Train B) (ref. 1).

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a

ATTACHMENT 1
EAL Basis

standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event but is not credited as an AC power source by Technical Specifications (ref. 1).

This IC addresses a prolonged loss of offsite power. The loss of offsite power sources renders the plant more vulnerable to a complete loss of power to AC essential buses. This condition represents a potential reduction in the level of safety of the plant.

For emergency classification purposes, “capability” means that an offsite AC power source(s) is available to the essential buses, whether or not the buses are powered from it.

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

Escalation of the emergency classification level would be via IC SA1.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
4. NEI 99-01 SU1

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 1 – Loss of Emergency AC Power

Initiating Condition: Loss of **all but one** AC power source to essential buses for 15 minutes or longer

EAL:

SA1.1 Alert

AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1)

AND

Any additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table S-1 AC Power Sources
Offsite: • ATC (Train A) • SATA (Train A) • ATD (Train B) • SATB (Train B) **Onsite:** • D/G 1(2) A (Train A) • D/G 1(2) B (Train B)

Mode Applicability:

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

Definition(s):

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

ATTACHMENT 1
EAL Basis

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

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

Basis:

For emergency classification purposes, “capability” means that an AC power source is available to the essential buses, whether or not the buses are powered from it.

The 4160 VAC System provides the power requirements for operation and safe shutdown of the plant. The essential switchgear are buses ETA (Train A) and ETB (Train B) (ref. 1).

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event but is not credited as an AC power source by Technical Specifications (ref. 1).

The 15-minute interval was selected as a threshold to exclude transient or momentary power losses. If the capability of a second source of emergency bus power is not restored within 15 minutes, an Alert is declared under this EAL.

This IC describes a significant degradation of offsite and onsite AC power sources such that any additional single failure would result in a loss of all AC power to SAFETY SYSTEMS. In this condition, the sole AC power source may be powering one, or more than one, train of safety-related equipment. This IC provides an escalation path from IC SU1.

ATTACHMENT 1
EAL Basis

An “AC power source” is a source recognized in AOPs and EOPs, and capable of supplying required power to an emergency bus. Some examples of this condition are presented below.

- A loss of all offsite power with a concurrent failure of all but one emergency power source (e.g., an onsite diesel generator).

- A loss of all offsite power and loss of all emergency power sources (e.g., onsite diesel generators) with a single train of emergency buses being back-fed from the unit main generator.

- A loss of emergency power sources (e.g., onsite diesel generators) with a single train of emergency buses being fed from an offsite power source.

Escalation of the emergency classification level would be via IC SS1.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
4. NEI 99-01 SA1

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 1 – Loss of Emergency AC Power

Initiating Condition: Loss of **all** offsite power and **all** onsite AC power to essential buses for 15 minutes or longer

EAL:

SS1.1 Site Area Emergency

Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

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

Definition(s):

None

Basis:

This EAL is indicated by the loss of all offsite and onsite AC power capability (Table C-2) to 4160V essential buses ETA and ETB. The essential switchgear are buses ETA (Train A) and ETB (Train B) (ref. 1). For emergency classification purposes, “capability” means that an AC power source is available to the essential buses, whether or not the buses are powered from it.

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

ATTACHMENT 1
EAL Basis

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event. Although it is not credited as an AC power source by Technical Specifications, it is a credited source with regards to this EAL provided it is aligned within the 15 minute classification criteria (ref. 1).

The 15-minute interval was selected as a threshold to exclude transient or momentary power losses. The interval begins when both offsite and onsite AC power capability are lost.

This IC addresses a total loss of AC power that compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. In addition, fission product barrier monitoring capabilities may be degraded under these conditions. This IC represents a condition that involves actual or likely major failures of plant functions needed for the protection of the public.

Escalation of the emergency classification level would be via ICs RG1, FG1 or SG1.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
4. NEI 99-01 SS1

ATTACHMENT 1
EAL Basis

Category: S –System Malfunction

Subcategory: 1 – Loss of Essential AC Power

Initiating Condition: Prolonged loss of **all** offsite and **all** onsite AC power to essential buses

EAL:

SG1.1 General Emergency

Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB

AND EITHER:

- Restoration of at least one essential bus in < 4 hours is **not** likely (Note 1)
- Core Cooling RED PATH conditions met

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

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

Definition(s):

None

Basis:

This EAL is indicated by the extended loss of all offsite and onsite AC power capability to 4160V emergency buses ETA and ETB either for greater then the MNS Station Blackout (SBO) coping analysis time (4 hrs.) (ref. 1) or that has resulted in indications of an actual loss of adequate core cooling.

Indication of continuing core cooling degradation is manifested by CSFST Core Cooling RED PATH conditions being met. (ref. 2).

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

ATTACHMENT 1
EAL Basis

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event (ref. 3).

Four hours is the station blackout coping time (ref 2).

Indication of continuing core cooling degradation must be based on fission product barrier monitoring with particular emphasis on Emergency Coordinator judgment as it relates to imminent Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers. Indication of continuing core cooling degradation is manifested by CSFST Core Cooling RED PATH conditions being met (ref. 2). Specifically, Core Cooling RED PATH conditions exist if either core exit T/Cs are reading greater than or equal to 1200ºF or subcooling is 0°F AND no NC pumps are on AND core exit T/Cs are reading greater than or equal to 700ºF AND Reactor Vessel Lower Range level less than or equal to 39% (ref. 2).

This IC addresses a prolonged loss of all power sources to AC essential buses. A loss of all AC power compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. A prolonged loss of these buses will lead to a loss of one or more fission product barriers. In addition, fission product barrier monitoring capabilities may be degraded under these conditions.

The EAL should require declaration of a General Emergency prior to meeting the thresholds for IC FG1. This will allow additional time for implementation of offsite protective actions.

Escalation of the emergency classification from Site Area Emergency will occur if it is projected that power cannot be restored to at least one AC essential bus by the end of the analyzed station blackout coping period. Beyond this time, plant responses and event trajectory are subject to greater uncertainty, and there is an increased likelihood of challenges to multiple fission product barriers.

The estimate for restoring at least one essential bus should be based on a realistic appraisal of the situation. Mitigation actions with a low probability of success should not be used as a basis for delaying a classification upgrade. The goal is to maximize the time available to prepare for, and implement, protective actions for the public.

The EAL will also require a General Emergency declaration if the loss of AC power results in parameters that indicate an inability to adequately remove decay heat from the core.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. UFSAR Section 8.4.2 Station Blackout Duration
2. EP/1(2)/A/5000/F-0 Critical Safety Function Status Tress – Core Cooling
3. UFSAR Section 8.0 Electric Power
4. AP/1(2)/A/5500/07 Loss of Electrical Power
5. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
6. NEI 99-01 SG1

ATTACHMENT 1
EAL Basis

Category: S –System Malfunction

Subcategory: 1 – Loss of Essential AC Power

Initiating Condition: Loss of **all** essential AC and vital DC power sources for 15 minutes or longer

EAL:

SG1.2 General Emergency

Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min.

AND

Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **both** vital DC buses EVDA and EVDD for ≥ 15 min.

(Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

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

Definition(s):

None

Basis:

This EAL is indicated by the loss of all offsite and onsite emergency AC power capability to 4160V emergency buses ETA and ETB for greater than 15 minutes in combination with degraded vital DC power voltage. This EAL addresses operating experience from the March 2011 accident at Fukushima Daiichi.

The essential buses are normally powered from the 6.9KV offsite power system through their respective 6.9KV/4160V Station Auxiliary Transformers (1ATC & 1ATD). Additionally, a standby source of power to each 4160V essential bus is provided from the 6.9KV offsite power system via two separate and independent 6.9KV/4160V transformers (SATA & SATB). These transformers are shared between the two units (ref. 1, 2).

ATTACHMENT 1
EAL Basis

Each essential bus has a dedicated diesel generator (D/G 1(2) A & D/G 1(2) B) to supply an onsite emergency source of power to safe shutdown loads in the event of a loss of the normal power source or loss of off-site power. The D/Gs will automatically start and tie onto the essential buses if the normal power source or off-site power is lost (ref. 1).

An Alternate AC power source, the Standby Shutdown Diesel Generator, which provides power to the Standby Shutdown System, is located in the Standby Shutdown Facility (SSF). This AC power source must be started locally from the SSF Control Room. The SSF Diesel Generator has sufficient capability to operate equipment necessary to maintain a safe shutdown condition for the 4 hour SBO event (ref. 1).

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A or EVDA, and Train B or EVDD). Each subsystem consists of two channels of 125 VDC batteries (each battery 100% capacity), the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. (ref. 1).

The Train A and Train B DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses. (ref. 1, 3).

The minimum battery discharge voltage (requiring opening the degraded battery output breaker) is 105 VDC (ref. 1, 3).

This IC addresses a concurrent and prolonged loss of both essential AC and Vital DC power. A loss of all essential AC power compromises the performance of all SAFETY SYSTEMS requiring electric power including those necessary for emergency core cooling, containment heat removal/pressure control, spent fuel heat removal and the ultimate heat sink. A loss of vital DC power compromises the ability to monitor and control SAFETY SYSTEMS. A sustained loss of both essential AC and vital DC power will lead to multiple challenges to fission product barriers.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. The 15-minute emergency declaration clock begins at the point when both EAL thresholds are met.

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/07 Loss of Electrical Power
3. AP/1(2)/A/5500/15 Loss of Vital or Aux Control Power
4. ECA-0.0 EP/1(2)/A/5000/ECA-0.0 Loss of All AC Power
5. NEI 99-01 SG8

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 2 – Loss of Vital DC Power

Initiating Condition: Loss of all vital DC power for 15 minutes or longer

EAL:

SS2.1 Site Area Emergency

Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **both** vital DC buses EVDA and EVDD for ≥ 15 min (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

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

Definition(s):

None

Basis:

The 125 VDC electrical power system consists of two independent and redundant safety related Class 1E DC electrical power subsystems (Train A or EVDA, and Train B or EVDD). Each subsystem consists of two channels of 125 VDC batteries (each battery 100% capacity), the associated battery charger(s) for each battery, and all the associated control equipment and interconnecting cabling. (ref. 1).

The Train A and Train B DC electrical power subsystems provide the control power for its associated Class 1E AC power load group, 4.16 kV switchgear, and 600 V load centers. The DC electrical power subsystems also provide DC electrical power to the inverters, which in turn power the AC vital buses. (ref. 1, 2).

The minimum battery discharge voltage (requiring opening the degraded battery output breaker) is 105 VDC (ref. 1, 2).

This IC addresses a loss of vital DC power which compromises the ability to monitor and control SAFETY SYSTEMS. In modes above Cold Shutdown, this condition involves a major failure of plant functions needed for the protection of the public.

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

Escalation of the emergency classification level would be via ICs RG1, FG1 or SG1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. UFSAR Section 8.0 Electric Power
2. AP/1(2)/A/5500/15 Loss of Vital or Aux Control Power
3. NEI 99-01 SS8

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 3 – Loss of Control Room Indications

Initiating Condition: UNPLANNED loss of Control Room indications for 15 minutes or longer

EAL:

SU3.1 Unusual Event

An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table S-2 Safety System Parameters
• Reactor power • NCS level • NCS pressure • Core exit T/C temperature • Level in at least one S/G • Auxiliary feed flow in at least one S/G

Mode Applicability:

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

Definition(s):

UNPLANNED - A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

SAFETY SYSTEM parameters listed in Table S-2 are monitored in the Control Room through a combination of hard control panel indicators as well as computer based information systems. The Operator Aid Computer (OAC), which displays SPDS required information, serves as a redundant compensatory indicator which may be utilized in lieu of normal Control Room indicators (ref. 1, 2).

This IC addresses the difficulty associated with monitoring normal plant conditions without the ability to obtain SAFETY SYSTEM parameters from within the Control Room. This condition is a precursor to a more significant event and represents a potential degradation in the level of safety of the plant.

ATTACHMENT 1
EAL Basis

As used in this EAL, an “inability to monitor” means that values for one or more of the listed parameters cannot be determined from within the Control Room. This situation would require a loss of all of the Control Room sources for the given parameter(s). For example, the reactor power level cannot be determined from any analog, digital and recorder source within the Control Room.

An event involving a loss of plant indications, annunciators and/or display systems is evaluated in accordance with 10 CFR 50.72 (and associated guidance in NUREG-1022) to determine if an NRC event report is required. The event would be reported if it significantly impaired the capability to perform emergency assessments. In particular, emergency assessments necessary to implement abnormal operating procedures, emergency operating procedures, and emergency plan implementing procedures addressing emergency classification, accident assessment, or protective action decision-making.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, core cooling and NCS heat removal. The loss of the ability to determine one or more of these parameters from within the Control Room is considered to be more significant than simply a reportable condition. In addition, if all indication sources for one or more of the listed parameters are lost, then the ability to determine the values of other SAFETY SYSTEM parameters may be impacted as well. For example, if the value for reactor vessel level cannot be determined from the indications and recorders on a main control board, the SPDS or the plant computer, the availability of other parameter values may be compromised as well.

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

Escalation of the emergency classification level would be via IC SA3.

MNS Basis Reference(s):

1. UFSAR Section 7.5 Safety-Related Display Instrumentation
2. OP/1(2)/A/6100/SD-2 Cooldown to 400 Degrees F
3. NEI 99-01 SU2

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 3 – Loss of Control Room Indications

Initiating Condition: UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress

EAL:

SA3.1 Alert

An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)

AND

Any significant transient is in progress, Table S-3

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Table S-2 Safety System Parameters
• Reactor power • NCS level • NCS pressure • Core exit T/C temperature • Level in at least one S/G • Auxiliary or emergency feed flow

Table S-3 Significant Transients
• Reactor trip • Runback > 25% thermal power • Electrical load rejection > 25% electrical load • Safety injection actuation

Mode Applicability:

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

ATTACHMENT 1
EAL Basis

Definition(s):

UNPLANNED - A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

Basis:

SAFETY SYSTEM parameters listed in Table S-2 are monitored in the Control Room through a combination of hard control panel indicators as well as computer based information systems. The Operator Aid Computer (OAC), which displays SPDS required information, serves as a redundant compensatory indicator which may be utilized in lieu of normal Control Room indicators (ref. 1, 2).

Significant transients are listed in Table S-3 and include response to automatic or manually initiated functions such as reactor trips, runbacks involving greater than 25% thermal power change, electrical load rejections of greater than 25% full electrical load or SI injection actuations.

This IC addresses the difficulty associated with monitoring rapidly changing plant conditions during a transient without the ability to obtain SAFETY SYSTEM parameters from within the Control Room. During this condition, the margin to a potential fission product barrier challenge is reduced. It thus represents a potential substantial degradation in the level of safety of the plant.

As used in this EAL, an “inability to monitor” means that values for one or more of the listed parameters cannot be determined from within the Control Room. This situation would require a loss of all of the Control Room sources for the given parameter(s). For example, the reactor power level cannot be determined from any analog, digital and recorder source within the Control Room.

An event involving a loss of plant indications, annunciators and/or display systems is evaluated in accordance with 10 CFR 50.72 (and associated guidance in NUREG-1022) to determine if an NRC event report is required. The event would be reported if it significantly impaired the capability to perform emergency assessments. In particular, emergency assessments necessary to implement abnormal operating procedures, emergency operating procedures, and emergency plan implementing procedures addressing emergency classification, accident assessment, or protective action decision-making.

This EAL is focused on a selected subset of plant parameters associated with the key safety functions of reactivity control, core cooling and NCS heat removal. The loss of the ability to determine one or more of these parameters from within the Control Room is considered to be more significant than simply a reportable condition. In addition, if all indication sources for one or more of the listed parameters are lost, then the ability to determine the values of other SAFETY SYSTEM parameters may be impacted as well. For example, if the value for reactor vessel level cannot be determined from the indications and recorders on a main control board, the SPDS or the plant computer, the availability of other parameter values may be compromised as well.

ATTACHMENT 1
EAL Basis

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

Escalation of the emergency classification level would be via ICs FS1 or IC RS1

MNS Basis Reference(s):

1. UFSAR Section 7.5 Safety-Related Display Instrumentation
2. OP/1(2)/A/6100/SD-2 Cooldown to 400 Degrees F
3. NEI 99-01 SA2

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 4 – NCS Activity

Initiating Condition: NCS activity greater than Technical Specification allowable limits

EAL:

SU4.1 Unusual Event

NCS activity > **any** of the following Technical Specification 3.4.16 limits:

- Dose Equivalent I-131 > 1.0 µCi/gm for > 48 hrs.
- Dose Equivalent I-131 > 60 µCi/gm
- Dose Equivalent Xe-133 > 280 µCi/gm

Mode Applicability:

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

Definition(s):

None

Basis:

The specific iodine activity is limited to ≤ 1.0 µCi/gm Dose Equivalent I-131 for > 48 hrs. or ≤ 60 µCi/gm Dose Equivalent I-131 instantaneous. The specific Xe-133 activity is limited to ≤ 280 µCi/gm Dose Equivalent XE-133 (ref 1, 2).

This IC addresses a reactor coolant activity value that exceeds an allowable limit specified in Technical Specifications. This condition is a precursor to a more significant event and represents a potential degradation of the level of safety of the plant.

Escalation of the emergency classification level would be via ICs FA1 or the Recognition Category R ICs.

MNS Basis Reference(s):

1. MNS Technical Specifications Section 3.4.16 RCS Specific Activity
2. MNS Technical Specifications Section 3.4.16 RCS Specific Activity Bases
3. NEI 99-01 SU3

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 5 – NCS Leakage

Initiating Condition: NCS leakage for 15 minutes or longer

EAL:

SU5.1 Unusual Event

NCS unidentified or pressure boundary leakage > 10 gpm for ≥ 15 min.
OR
NCS identified leakage > 25 gpm for ≥ 15 min.
OR
Leakage from the NCS to a location outside containment > 25 gpm for ≥ 15 min.
(Note 1)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Mode Applicability:

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

Definition(s):

None

Basis:

Failure to isolate the leak within 15 minutes, or if known that the leak cannot be isolated within 15 minutes from the start of the leak, requires immediate classification.

Identified leakage includes leakage such as that from pump seals or valve packing (except reactor coolant pump (NCP) seal water injection or leakoff), that is captured and conducted to collection systems or a sump or collecting tank, leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of leakage detection systems or not to be pressure boundary leakage; or NCS leakage through a steam generator to the secondary system (primary to secondary leakage) (ref. 1).

Unidentified leakage is all leakage (except NCP seal water injection or leakoff) that is not identified leakage (ref. 1).

Pressure Boundary leakage is leakage (except primary to secondary leakage) through a nonisolable fault in an NCS component body, pipe wall, or vessel wall (ref. 1)

ATTACHMENT 1
EAL Basis

NCS leakage outside of the containment that is not considered identified or unidentified leakage per Technical Specifications includes leakage via interfacing systems such as NCS to the Component Cooling Water (KC), or systems that directly see NCS pressure outside containment such as Chemical & Volume Control System (NV), Nuclear Sampling system (NM) and Residual Heat Removal (ND) system (when in the shutdown cooling mode).

This IC addresses NCS leakage which may be a precursor to a more significant event. In this case, NCS leakage has been detected and operators, following applicable procedures, have been unable to promptly isolate the leak. This condition is considered to be a potential degradation of the level of safety of the plant.

The first and second EAL conditions are focused on a loss of mass from the NCS due to “unidentified leakage", "pressure boundary leakage" or "identified leakage” (as these leakage types are defined in the plant Technical Specifications). The third condition addresses an NCS mass loss caused by an UNISOLABLE leak through an interfacing system. These conditions thus apply to leakage into the containment, a secondary-side system (e.g., steam generator tube leakage) or a location outside of containment.

The leak rate values for each condition were selected because they are usually observable with normal Control Room indications. Lesser values typically require time-consuming calculations to determine (e.g., a mass balance calculation). The first condition uses a lower value that reflects the greater significance of unidentified or pressure boundary leakage.

The release of mass from the NCS due to the as-designed/expected operation of a relief valve does not warrant an emergency classification. An emergency classification would be required if a mass loss is caused by a relief valve that is not functioning as designed/expected (e.g., a relief valve sticks open and the line flow cannot be isolated).

The 15-minute threshold duration allows sufficient time for prompt operator actions to isolate the leakage, if possible.

Escalation of the emergency classification level would be via ICs of Recognition Category R or F.

MNS Basis Reference(s):

1. MNS Technical Specifications Definitions Section 1.1
2. NEI 99-01 SU4

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 6 – RPS Failure

Initiating Condition: Automatic or manual trip fails to shut down the reactor

EAL:

SU6.1 Unusual Event

An automatic trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** RPS setpoint is exceeded

AND

A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Mode Applicability:

1- Power Operations

Definition(s):

None

Basis:

The first condition of this EAL identifies the need to cease critical reactor operations by actuation of the automatic Reactor Protection System (RPS) trip function. A reactor trip is automatically initiated by the RPS when certain continuously monitored parameters exceed predetermined setpoints (ref. 1).

Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a fraction of the original power level and then decays to a level several decades less with a negative startup rate. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from an automatic reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a lowering of power into the source range. A successful trip has therefore occurred when there is sufficient rod insertion from the trip of RPS to bring the reactor power below the immediate shutdown decay heat level of 5% (ref. 2, 3, 4).

ATTACHMENT 1
EAL Basis

For the purposes of emergency classification, successful manual trip actions are those which can be quickly performed from the reactor control console (i.e., manual trip switches or turbine trip). Reactor shutdown achieved by use of other trip actions specified in EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS (such as depressing manual pushbutton on turbine control panel, emergency boration or manually driving control rods) do not constitute a successful manual trip (ref. 4).

Following any automatic RPS trip signal, EP/1(2)/A/5000/E-0 (ref. 2) and EP/1(2)/A/5000/FR-S.1 (ref. 3) prescribe insertion of redundant manual trip signals to back up the automatic RPS trip function and ensure reactor shutdown is achieved. Even if the first subsequent manual trip signal inserts all control rods to the full-in position immediately after the initial failure of the automatic trip, the lowest level of classification that must be declared is an Unusual Event (ref. 4).

In the event that the operator identifies a reactor trip is imminent and initiates a successful manual reactor trip before the automatic RPS trip setpoint is reached, no declaration is required. The successful manual trip of the reactor before it reaches its automatic trip setpoint or reactor trip signals caused by instrumentation channel failures do not lead to a potential fission product barrier loss. However, if subsequent manual reactor trip actions fail to reduce reactor power below 5%, the event escalates to the Alert under EAL SA6.1.

If by procedure, operator actions include the initiation of an immediate manual trip following receipt of an automatic trip signal and there are no clear indications that the automatic trip failed (such as a time delay following indications that a trip setpoint was exceeded), it may be difficult to determine if the reactor was shut down because of automatic trip or manual actions. If a subsequent review of the trip actuation indications reveals that the automatic trip did not cause the reactor to be shut down, then consideration should be given to evaluating the fuel for potential damage, and the reporting requirements of 50.72 should be considered for the transient event.

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or an automatic trip is successful in shutting down the reactor. This event is a precursor to a more significant condition and thus represents a potential degradation of the level of safety of the plant.

Following the failure on an automatic reactor trip, operators will promptly initiate manual actions at the reactor control consoles to shut down the reactor (e.g., initiate a manual reactor trip). If these manual actions are successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

ATTACHMENT 1
EAL Basis

If an initial manual reactor trip is unsuccessful, operators will promptly take manual action at another location(s) on the reactor control consoles to shut down the reactor (e.g., initiate a manual reactor trip using a different switch). Depending upon several factors, the initial or subsequent effort to manually trip the reactor, or a concurrent plant condition, may lead to the generation of an automatic reactor trip signal. If a subsequent manual or automatic trip is successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

A manual action at the reactor control consoles is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core (e.g., initiating a manual reactor trip). This action does not include manually driving in control rods or implementation of boron injection strategies. Actions taken at back-panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be "at the reactor control consoles".

The plant response to the failure of an automatic or manual reactor trip will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If subsequent operator manual actions taken at the reactor control consoles are also unsuccessful in shutting down the reactor, then the emergency classification level will escalate to an Alert via IC SA6. Depending upon the plant response, escalation is also possible via IC FA1. Absent the plant conditions needed to meet either IC SA6 or FA1, an Unusual Event declaration is appropriate for this event.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Should a reactor trip signal be generated as a result of plant work (e.g., RPS setpoint testing), the following classification guidance should be applied.

- If the signal causes a plant transient that should have included an automatic reactor trip
- and the RPS fails to automatically shut down the reactor, then this IC and the EALs are applicable, and should be evaluated.
- If the signal does not cause a plant transient and the trip failure is determined through other means (e.g., assessment of test results), then this IC and the EALs are not applicable and no classification is warranted.

MNS Basis Reference(s):

1. MNS Technical Specifications Section 3.3.1 Reactor Trip System (RTS) Instrumentation
2. EP/1(2)/A/5000/E-0 Reactor Trip or Safety Injection
3. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees - Subcriticality
4. EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
5. NEI 99-01 SU5

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 6 – RPS Failure

Initiating Condition: Automatic or manual trip fails to shut down the reactor

EAL:

SU6.2 Unusual Event

A manual trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** manual trip action was initiated

AND

A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Mode Applicability:

1 - Power Operations

Definition(s):

None

Basis:

This EAL addresses a failure of a manually initiated trip in the absence of having exceeded an automatic RPS trip setpoint and a subsequent automatic or manual trip is successful in shutting down the reactor (reactor power < 5%). (ref. 1).

Following a successful reactor trip, rapid insertion of the control rods occurs. Nuclear power promptly drops to a fraction of the original power level and then decays to a level several decades less with a negative startup rate. The reactor power drop continues until reactor power reaches the point at which the influence of source neutrons on reactor power starts to be observable. A predictable post-trip response from a manual reactor trip signal should therefore consist of a prompt drop in reactor power as sensed by the nuclear instrumentation and a lowering of power into the source range. A successful trip has therefore occurred when there is sufficient rod insertion from the trip of RPS to bring the reactor power below the immediate shutdown decay heat level of 5% (ref. 2, 3 4).

ATTACHMENT 1
EAL Basis

For the purposes of emergency classification, successful manual trip actions are those which can be quickly performed from the reactor control console (i.e., manual trip switches or turbine trip). Reactor shutdown achieved by use of other trip actions specified in EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS (such as depressing manual pushbutton on turbine control panel, emergency boration or manually driving control rods) do not constitute a successful manual trip (ref. 4).

If both subsequent automatic and subsequent manual reactor trip actions in the Control Room fail to reduce reactor power below the power associated with the safety system design (< 5%) following a failure of an initial manual trip, the event escalates to an Alert under EAL SA6.1

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and either a subsequent operator manual action taken at the reactor control consoles or an automatic trip is successful in shutting down the reactor. This event is a precursor to a more significant condition and thus represents a potential degradation of the level of safety of the plant.

Following the failure on an automatic reactor trip, operators will promptly initiate manual actions at the reactor control consoles to shut down the reactor (e.g., initiate a manual reactor trip). If these manual actions are successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

If an initial manual reactor trip is unsuccessful, operators will promptly take manual action at another location(s) on the reactor control consoles to shut down the reactor (e.g., initiate a manual reactor trip using a different switch). Depending upon several factors, the initial or subsequent effort to manually the reactor, or a concurrent plant condition, may lead to the generation of an automatic reactor trip signal. If a subsequent manual or automatic trip is successful in shutting down the reactor, core heat generation will quickly fall to a level within the capabilities of the plant's decay heat removal systems.

A manual action at the reactor control consoles is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core (e.g., initiating a manual reactor trip). This action does not include manually driving in control rods or implementation of boron injection strategies. Actions taken at back-panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be "at the reactor control consoles".

The plant response to the failure of an automatic or manual reactor trip will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If subsequent operator manual actions taken at the reactor control consoles are also unsuccessful in shutting down the reactor, then the emergency classification level will escalate to an Alert via IC SA6. Depending upon the plant response, escalation is also possible via IC FA1. Absent the plant conditions needed to meet either IC SA6 or FA1, an Unusual Event declaration is appropriate for this event.

ATTACHMENT 1
EAL Basis

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Should a reactor trip signal be generated as a result of plant work (e.g., RPS setpoint testing), the following classification guidance should be applied.

- If the signal causes a plant transient that should have included an automatic reactor trip and the RTS fails to automatically shut down the reactor, then this IC and the EALs are applicable, and should be evaluated.
- If the signal does not cause a plant transient and the trip failure is determined through other means (e.g., assessment of test results), then this IC and the EALs are not applicable and no classification is warranted.

MNS Basis Reference(s):

1. MNS Technical Specifications Section 3.3.1 Reactor Trip System (RTS) Instrumentation
2. EP/1(2)/A/5000/E-0 Reactor Trip or Safety Injection
3. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees - Subcriticality
4. EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
5. NEI 99-01 SU5

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 2 – RPS Failure

Initiating Condition: Automatic or manual trip fails to shut down the reactor and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor

EAL:

SA6.1 Alert

An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%

AND

Manual trip actions taken at the reactor control console (manual reactor trip switches or turbine manual trip) are **not** successful in shutting down the reactor as indicated by reactor power ≥ 5% (Note 8)

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Mode Applicability:

1 - Power Operations

Definition(s):

None

Basis:

This EAL addresses any automatic or manual reactor trip signal that fails to shut down the reactor followed by a subsequent manual trip that fails to shut down the reactor to an extent the reactor is producing energy in excess of the heat load for which the safety systems were designed.

For the purposes of emergency classification, successful manual trip actions are those which can be quickly performed from the reactor control console (i.e., manual trip switches or turbine trip). Reactor shutdown achieved by use of other trip actions specified in EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS (such as depressing manual pushbutton on turbine control panel, emergency boration or manually driving control rods) do not constitute a successful manual trip (ref. 4).

5% rated power is a minimum reading on the power range scale that indicates continued power production. It also approximates the decay heat which the shutdown systems were designed to remove and is indicative of a condition requiring immediate response to prevent subsequent core damage. Below 5%, plant response will be similar to that observed during a normal shutdown. Nuclear instrumentation can be used to determine if reactor power is greater than 5 % power (ref. 1).

ATTACHMENT 1
EAL Basis

Escalation of this event to a Site Area Emergency would be under EAL SS6.1 or Emergency Coordinator judgment.

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, and subsequent operator manual actions taken at the reactor control consoles to shut down the reactor are also unsuccessful. This condition represents an actual or potential substantial degradation of the level of safety of the plant. An emergency declaration is required even if the reactor is subsequently shutdown by an action taken away from the reactor control consoles since this event entails a significant failure of the RPS.

A manual action at the reactor control console is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core (e.g., initiating a manual reactor trip). This action does not include manually driving in control rods or implementation of boron injection strategies. If this action(s) is unsuccessful, operators would immediately pursue additional manual actions at locations away from the reactor control console (e.g., locally opening breakers). Actions taken at back panels or other locations within the Control Room, or any location outside the Control Room, are not considered to be “at the reactor control console”.

The plant response to the failure of an automatic or manual reactor trip will vary based upon several factors including the reactor power level prior to the event, availability of the condenser, performance of mitigation equipment and actions, other concurrent plant conditions, etc. If the failure to shut down the reactor is prolonged enough to cause a challenge to the core cooling or NCS heat removal safety functions, the emergency classification level will escalate to a Site Area Emergency via IC SS6. Depending upon plant responses and symptoms, escalation is also possible via IC FS1. Absent the plant conditions needed to meet either IC SS6 or FS1, an Alert declaration is appropriate for this event.

It is recognized that plant responses or symptoms may also require an Alert declaration in accordance with the Recognition Category F ICs; however, this IC and EAL are included to ensure a timely emergency declaration.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

MNS Basis Reference(s):

1. MNS Technical Specifications Section 3.3.1 Reactor Trip System (RTS) Instrumentation
2. EP/1(2)/A/5000/E-0 Reactor Trip or Safety Injection
3. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees - Subcriticality
4. EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
5. NEI 99-01 SA5

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 2 – RPS Failure

Initiating Condition: Inability to shut down the reactor causing a challenge to core cooling or NCS heat removal

EAL:

SS6.1 Site Area Emergency

An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%

AND

All actions to shut down the reactor are **not** successful as indicated by reactor power ≥ 5%

AND EITHER:

- Core Cooling RED PATH conditions met
- Heat Sink RED PATH conditions met

Mode Applicability:

1 - Power Operations

Definition(s):

None

Basis:

This EAL addresses the following:

- Any automatic reactor trip signal followed by a manual trip that fails to shut down the reactor to an extent the reactor is producing energy in excess of the heat load for which the safety systems were designed (EAL SA6.1), and
- Indications that either core cooling is extremely challenged or heat removal is extremely challenged.

The combination of failure of both front line and backup protection systems to function in response to a plant transient, along with the continued production of heat, poses a direct threat to the Fuel Clad and NCS barriers.

Reactor shutdown achieved by use of EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS (such as depressing manual pushbutton on turbine control panel, emergency boration or manually driving control rods) are also credited as a successful manual trip provided reactor power can be reduced below 5% before indications of an extreme challenge to either core cooling or heat removal exist (ref. 1, 4)

ATTACHMENT 1
EAL Basis

.5% rated power is a minimum reading on the power range scale that indicates continued power production. It also approximates the decay heat which the shutdown systems were designed to remove and is indicative of a condition requiring immediate response to prevent subsequent core damage. Below 5%, plant response will be similar to that observed during a normal shutdown. Nuclear instrumentation can be used to determine if reactor power is greater than 5% power (ref. 1, 4).

Indication of continuing core cooling degradation is manifested by CSFST Core Cooling RED PATH conditions being met (ref. 2). Specifically, Core Cooling RED PATH conditions exist if either core exit T/Cs are reading greater than or equal to 1200ºF or subcooling is 0°F AND no NC pumps are on AND core exit T/Cs are reading greater than or equal to 700ºF AND Reactor Vessel Lower Range level less than or equal to 39% (ref. 2).

Indication of inability to adequately remove heat from the NCS is manifested by CSFST Heat Sink RED PATH conditions being met (ref. 2). Specifically, Heat Sink RED PATH conditions exist if narrow range level in at least on steam generator is not greater than or equal to 11% (32% ACC) and total feedwater flow to the intact steam generators is less than or equal to 450 gpm. (ref. 3).

This IC addresses a failure of the RPS to initiate or complete an automatic or manual reactor trip that results in a reactor shutdown, all subsequent operator actions to manually shutdown the reactor are unsuccessful, and continued power generation is challenging the capability to adequately remove heat from the core and/or the NCS. This condition will lead to fuel damage if additional mitigation actions are unsuccessful and thus warrants the declaration of a Site Area Emergency.

In some instances, the emergency classification resulting from this IC/EAL may be higher than that resulting from an assessment of the plant responses and symptoms against the Recognition Category F ICs/EALs. This is appropriate in that the Recognition Category F ICs/EALs do not address the additional threat posed by a failure to shut down the reactor. The inclusion of this IC and EAL ensures the timely declaration of a Site Area Emergency in response to prolonged failure to shut down the reactor.

A reactor shutdown is determined in accordance with applicable Emergency Operating Procedure criteria.

Escalation of the emergency classification level would be via IC RG1 or FG1.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees – Subcriticality
2. EP/1(2)/A/5000/F-0 Critical Safety Function Status Tress – Core Cooling
3. EP/1(2)/A/5000/F-0 Critical Safety Function Status Tress – Heat Sink
4. EP/1(2)/A/5000/FR-S.1 Response to Nuclear Power Generation/ATWS
5. NEI 99-01 SS5

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 7 – Loss of Communications

Initiating Condition: Loss of **all** onsite or offsite communications capabilities

EAL:

SU7.1 Unusual Event

Loss of **all** Table S-4 onsite communication methods

OR

Loss of **all** Table S-4 ORO communication methods

OR

Loss of **all** Table S-4 NRC communication methods

Table S-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

Mode Applicability:

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

Definition(s):

None

ATTACHMENT 1
EAL Basis

Basis:

Onsite/offsite communications include one or more of the systems listed in Table S-4 (ref. 1). Public

Address System

The McGuire Nuclear Station public address system provides paging and party line communications between stations located throughout the plant. Inside and outside type wall and desk-mounted stations are used to communicate between roaming personnel and fixed work locations. Plant-wide instructions are issued using the paging feature.

Internal Telephone System

The McGuire Nuclear Station PBX telephone system provides communication capability between telephone stations located within the plant by dialing the four-digit telephone station code.

On-site Radio System

Radio systems can be used for communication among operators, off-site monitoring teams, the control room, TSC and EOF.

DEMNET

DEMNET is the primary means of offsite communication. This circuit allows intercommunication among the EOF, TSC, control room, counties, and states. DEMNET operates as an internet based (VoIP) communications system with a satellite back-up. Should the internet transfer rate become slow or unavailable, the DEMNET will automatically transfer to satellite mode.

Commercial Telephones

Commercial telephone lines, which supply public telephone communications, are employed by Duke Energy. The local service provider provides primary and secondary power for their lines at the Central Office.

NRC Emergency Telecommunications System (ETS)

The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.

ATTACHMENT 1
EAL Basis

This EAL is the hot condition equivalent of the cold condition EAL CU5.1.

This IC addresses a significant loss of on-site or offsite communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to OROs and the NRC.

This IC should be assessed only when extraordinary means are being utilized to make communications possible (e.g., use of non-plant, privately owned equipment, relaying of on- site information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

The first EAL condition addresses a total loss of the communications methods used in support of routine plant operations.

The second EAL condition addresses a total loss of the communications methods used to notify all OROs of an emergency declaration. The OROs referred to here are the State, Gaston, Catawba, Iredell, Lincoln, Cabarrus and Mecklenburg County EOCs

The third EAL addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

MNS Basis Reference(s):

1. MNS Emergency Plan Section F Emergency Communications
2. MNS Emergency Plan Section B On-Site Emergency Organization.
3. NEI 99-01 CU5

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 8 – Containment Failure

Initiating Condition: Failure to isolate containment or loss of containment pressure control.

EAL:

SU8.1 Unusual Event

EITHER:

Any penetration is not isolated within 15 min. of a VALID containment isolation signal (Note 1)

OR

Containment pressure > 3 psig with **EITHER** a failure of both trains of NS **OR** failure of both trains of VX-CARF for ≥ 15 min. (Notes 1, 10)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL **only** applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Mode Applicability:

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

Definition(s):

VALID - An indication, report, or condition, is considered to be valid when it is verified by (1) an instrument channel check, or (2) indications on related or redundant indicators, or (3) by direct observation by plant personnel, such that doubt related to the indicator's operability, the condition's existence, or the report's accuracy is removed. Implicit in this definition is the need for timely assessment.

Basis:

The containment Phase B pressure setpoint (3 psig, ref. 1, 2) is the pressure at which the containment cooling systems should actuate and begin performing their function.

One full train of containment cooling operating per design is considered (ref. 1, 2):

- One train of Containment Air Return Fan System (VX-CARF), and
- One train of Containment Spray System (NS)

ATTACHMENT 1
EAL Basis

Once the Residual Heat Removal system is taking suction from the containment sump, with containment pressure greater than 3 psig and procedural guidance, one train of containment spray is manually aligned to the containment sump. If unable to place one NS train in service or without an operating train of VX-CARF (the CARF with a 10-minute delay) within 15 minutes this EAL has been exceeded. At this point a significant portion of the ice in the ice condenser would have melted and the NS system would be needed for containment pressure control.
The Unusual Event threshold applies after automatic or manual alignment of the containment spray system has been attempted with containment pressure greater than 3 psig and less than one full train of NS is operating for greater than or equal to 15 minutes.

The Unusual Event threshold also applies if containment pressure is greater than 3 psig and at least one train of VX-CARF is not operating after a 10 minute delay for greater than or equal to 15 minutes. Without a single train of VX-CARF in service following actuation, the Unusual Event should be declared regardless of whether ECCS is in injection or sump recirculation mode after 15 minutes.

This EAL addresses a failure of one or more containment penetrations to automatically isolate (close) when required by an actuation signal. It also addresses an event that results in high containment pressure with a concurrent failure of containment pressure control systems. Absent challenges to another fission product barrier, either condition represents potential degradation of the level of safety of the plant.

For the first condition, the containment isolation signal must be generated as the result on an off-normal/accident condition (e.g., a safety injection or high containment pressure); a failure resulting from testing or maintenance does not warrant classification. The determination of containment and penetration status – isolated or not isolated – should be made in accordance with the appropriate criteria contained in the plant AOPs and EOPs. The 15-minute criterion is included to allow operators time to manually isolate the required penetrations, if possible.

The second condition addresses a condition where containment pressure is greater than the setpoint at which containment energy (heat) removal systems are designed to automatically actuate, and less than one full train of equipment is capable of operating per design. The 15- minute criterion is included to allow operators time to manually start equipment that may not have automatically started, if possible. The inability to start the required equipment indicates that containment heat removal/depressurization systems (e.g., containment sprays or ice condenser fans) are either lost or performing in a degraded manner.

This event would escalate to a Site Area Emergency in accordance with IC FS1 if there were a concurrent loss or potential loss of either the Fuel Clad or NCS fission product barriers.

MNS Basis Reference(s):

1. MNS Technical Specification 3.6.6
2. MNS Technical Specification 3.6.6 Bases
3. MNS Technical Specification 3.3.2
4. UFSAR Section 6.2 Containment Systems
5. NEI 99-01 SU7

ATTACHMENT 1
EAL Basis

Category: S – System Malfunction

Subcategory: 9 – Hazardous Event Affecting Safety Systems

Initiating Condition: Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode

EAL:

SA9.1 Alert

The occurrence of **any** Table S-5 hazardous event

AND

Event damage has caused indications of degraded performance on one train of a SAFETY SYSTEM needed for the current operating mode

AND EITHER of the following:

- Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode
- Event damage has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode

(Note 11, 12)

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Table S-5	**Hazardous Events**
● Seismic event (earthquake) ● Internal or external FLOODING event ● High winds or tornado strike ● FIRE ● EXPLOSION ● Other events with similar hazard characteristics as determined by the Shift Manager	

ATTACHMENT 1
EAL Basis

Mode Applicability:

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

Definition(s):

EXPLOSION - A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or over pressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events require a post- event inspection to determine if the attributes of an explosion are present.

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

FLOODING - A condition where water is entering a room or area faster than installed equipment is capable of removal, resulting in a rise of water level within the room or area.

SAFETY SYSTEM - A system required for safe plant operation, cooling down the plant and/or placing it in the cold shutdown condition, including the ECCS. These are typically systems classified as safety-related (as defined in 10CFR50.2):

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

(1) The integrity of the reactor coolant pressure boundary;

(2) The capability to shut down the reactor and maintain it in a safe shutdown condition;

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

VISIBLE DAMAGE - Damage to a SAFETY SYSTEM train that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected SAFETY SYSTEM train.

Basis:

- The significance of seismic events are discussed under EAL HU2.1 (ref. 1).
- Internal FLOODING may be caused by events such as component failures, equipment misalignment, or outage activity mishaps (ref. 2).
- External flooding may be due to high lake level. MNS powerhouse yard elevation is 760 ft MSL. The administration building and yard are elevation 747 ft MSL. The maximum water level elevation at the site is 760.375 ft MFL (ref. 3, 4).
- Seismic Category I structures are analyzed to withstand a sustained, design wind velocity of 95 mph. (ref. 5).
- Areas containing functions and systems required for safe shutdown of the plant are identified by fire area in the fire response procedure (ref. 5).

ATTACHMENT 1
EAL Basis

This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.

This IC addresses a hazardous event that causes damage to SAFETY SYSTEMS needed for the current operating mode. In order to provide the appropriate context for consideration of an ALERT classification, the hazardous event must have caused indications of degraded SAFETY SYSTEM performance in one train, and there must be either indications of performance issues with the second SAFETY SYSTEM train or VISIBLE DAMAGE to the second train such that the potential exists for this second SAFETY SYSTEM train to have performance issues. In other words, in order for this EAL to be classified, the hazardous event must occur, at least one SAFETY SYSTEM train must have indications of degraded performance, and the second SAFETY SYSTEM train must have indications of degraded performance or VISIBLE DAMAGE such that the potential exists for performance issues. Note that this second SAFETY SYSTEM train is from the same SAFETY SYSTEM that has indications of degraded performance for criteria in the first condition of this EAL; commercial nuclear power plants are designed to be able to support single system issues without compromising public health and safety from radiological events.

Indications of degraded performance address damage to a SAFETY SYSTEM train that is in service/operation since indications for it will be readily available. The indications of degraded performance should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

Operators will make a determination of VISIBLE DAMAGE based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage. This VISIBLE DAMAGE should be significant enough to cause concern regarding the operability or reliability of the SAFETY SYSTEM train.

An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under SA9.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis.

An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under SA9.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement.

ATTACHMENT 1
EAL Basis

An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under SA9.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted because the event was severe enough to affect the operability or reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.

The examples below can assist in determining the threshold meeting the two train criteria.

Scenario	Train A	Train B	Extent of Damage	Classify?	Reason
1	OOS/Under Clearance (Visible Damage)	In Service (NO Degraded Performance)	Event caused damage to Train A only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
2	OOS/Under Clearance (No damage)	In Service (Degraded Performance)	Event caused damage to Train B only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
3	OOS/Under Clearance (Visible Damage)	In Service (Degraded Performance)	Event causes damage to both trains	YES	The event was significant enough to impact two trains.
4	In Stby (Visible Damage)	In Stby (Visible Damage)	Event caused damage to both trains	NO	Cannot classify on Visible Damage only.
5	In Service (Degraded Performance)	In Stby (Visible Damage)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
6	In Service (Degraded Performance)	In Service (Degraded Performance)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
7	In service OR in Stby	In service OR in Stby	Event caused damage to a common component to both trains (i.e. FWST)	YES	The event impacted equipment common to two or more trains.

Escalation of the emergency classification level would be via IC FS1 or RS1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. RP/0/A/5700/007 Earthquake
2. AP/0/A/5500/030 Plant Flooding
3. UFSAR Section 2.1 Site Location
4 UFSAR Section 3.4 Water Level (Flood) Design
5. UFSAR Section 3.3.1 Wind Loadings
6. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak
7. NEI 99-01 SA9

ATTACHMENT 1
EAL Basis

Category E – <u>Independent Spent Fuel Storage Installation (ISFSI)</u>

EAL Group: ANY (EALs in this category are applicable to any plant condition, hot or cold)

An independent spent fuel storage installation (ISFSI) is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask/canister must escape its packaging and enter the biosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel.

An Unusual Event is declared on the basis of the occurrence of an event of sufficient magnitude that a loaded cask CONFINEMENT BOUNDARY is damaged or violated.

The MNS ISFSI is contained wholly within the plant Protected Area. Therefore a security event related to the ISFSI would be applicable to EALs HU1.1, HA1.1and HS1.1

Minor surface damage that does not affect storage cask/canister boundary is excluded from the scope of these EALs.

ATTACHMENT 1
EAL Basis

Category: E - ISFSI

Sub-category: None

Initiating Condition: Damage to a loaded cask CONFINEMENT BOUNDARY

EAL:

EU1.1 Unusual Event

Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading on the surface of a loaded spent fuel cask > **any** Table E-1 dose limit

Table E-1 ISFSI Dose Limits

NAC Magnastor	NAC UMS	Transnuclear (TN-32)
• 240 mrem/hr (gamma) on the side of the cask (excludes air inlet/outlet ports) • 10 mrem/hr (neutron) on the side of the cask (excludes air inlet/outlet ports) • 900 mrem/hr (neutron + gamma) on the top of the cask (excludes air inlet/outlet ports)	• 100 mrem/hr (neutron + gamma) on the side of the cask • 100 mrem/hr (neutron + gamma) on the top of the cask • 200 mrem/hr (neutron + gamma) at air inlets and outlets	• 120 mrem/hr (gamma) or 20 mrem/hr (neutron) on top of the cask • 340 mrem/hr (gamma) or 40 mrem/hr (neutron) on the sides of the radial neutron shield • 560 mrem/hr (gamma) or 280 mrem/hr (neutron) on the side surfaces above the radial neutron shield region • 220 mrem/hr (gamma) or 400 mrem/hr (neutron) on the side surfaces below the radial neutron shield region

Mode Applicability:

All

Definition(s):

CONFINEMENT BOUNDARY- The barrier(s) between spent fuel and the environment once the spent fuel is processed for dry storage. As related to the MNS ISFSI, Confinement Boundary is defined as the Transportable Storage Canister (TSC) for TN, UMS and MAGNASTOR storage systems.

ATTACHMENT 1
EAL Basis

Basis:

The MNS ISFSI utilizes three designs for dry spent fuel storage:

- The Transnuclear (TN) TN-32 dry spent fuel storage system
- The NAC-UMS dry spent fuel storage system
- The NAC-MAGNASTOR dry spent fuel storage system

All systems consist of a Transportable Storage Canister (TSC) and concrete Vertical Concrete Cask (VCC). The TSC is the CONFINEMENT BOUNDARY for all systems. The TSC is welded/bolted and designed to provide confinement of all radionuclides under normal, off- normal, and accident conditions (ref. 1, 2, 3).

Confinement boundary is defined as the barrier(s) between spent fuel and the environment once the spent fuel is processed for dry storage. Therefore, damage to a confinement boundary must be a confirmed physical breach between the spent fuel and the environment for the TSC.

The values shown in Table E-1 represent 2 times the limits specified in the ISFSI Certificate of Compliance Technical Specification for radiation external to a loaded cask for each of the NAC-MAGNASTOR, NAC-UMS and TN designs. All Table E-1 ISFSI dose limits are based on surveys taken consistent with the locations specified in the associated Technical Specification (ref. 1, 2, 3).

This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.

The existence of “damage” is determined by radiological survey. The technical specification multiple of “2 times”, which is also used in Recognition Category R IC RU1, is used here to distinguish between non-emergency and emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the “on-contact” dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.

Security-related events for ISFSIs are covered under ICs HU1 and HA1.

ATTACHMENT 1
EAL Basis

MNS Basis Reference(s):

1. TN Generic Technical Specifications
2. NAC-UMS Certificate of Compliance
3. MAGNASTOR Technical Specifications and Design Features
4. NEI 99-01 E-HU1

ATTACHMENT 1
EAL Basis

Category F – Fission Product Barrier Degradation

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

EALs in this category represent threats to the defense in depth design concept that precludes the release of highly radioactive fission products to the environment. This concept relies on multiple physical barriers any one of which, if maintained intact, precludes the release of significant amounts of radioactive fission products to the environment. The primary fission product barriers are:

A. Fuel Clad (FC): The Fuel Clad Barrier consists of the cladding material that contains the fuel pellets.
B. Reactor Coolant System (NCS): The NCS Barrier includes the NCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.
C. Containment (CMT): The Containment Barrier includes the containment building and connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve. Containment Barrier thresholds are used as criteria for escalation of the ECL from Alert to a Site Area Emergency or a General Emergency.

The EALs in this category require evaluation of the loss and potential loss thresholds listed in the fission product barrier matrix of Table F-1 (Attachment 2). “Loss” and “Potential Loss” signify the relative damage and threat of damage to the barrier. “Loss” means the barrier no longer assures containment of radioactive materials. “Potential Loss” means integrity of the barrier is threatened and could be lost if conditions continue to degrade. The number of barriers that are lost or potentially lost and the following criteria determine the appropriate emergency classification level:

Alert:

Any loss or any potential loss of either Fuel Clad or NCS Site Area

Emergency:

Loss or potential loss of any two barriers

General Emergency:

Loss of any two barriers and loss or potential loss of third barrier

ATTACHMENT 1
EAL Basis

The logic used for emergency classification based on fission product barrier monitoring should reflect the following considerations:

- The Fuel Clad Barrier and the NCS Barrier are weighted more heavily than the Containment Barrier.

- Unusual Event ICs associated with NCS and Fuel Clad Barriers are addressed under System Malfunction ICs.

- For accident conditions involving a radiological release, evaluation of the fission product barrier thresholds will need to be performed in conjunction with dose assessments to ensure correct and timely escalation of the emergency classification. For example, an evaluation of the fission product barrier thresholds may result in a Site Area Emergency classification while a dose assessment may indicate that an EAL for General Emergency IC RG1 has been exceeded.

- The fission product barrier thresholds specified within a scheme reflect plant-specific MNS design and operating characteristics.

- As used in this category, the term NCS leakage encompasses not just those types defined in Technical Specifications but also includes the loss of NCS mass to any location– inside the primary containment, an interfacing system, or outside of the primary containment. The release of liquid or steam mass from the NCS due to the as- designed/expected operation of a relief valve is not considered to be NCS leakage.

- At the Site Area Emergency level, EAL users should maintain cognizance of how far present conditions are from meeting a threshold that would require a General Emergency declaration. For example, if the Fuel Clad and NCS fission product barriers were both lost, then there should be frequent assessments of containment radioactive inventory and integrity. Alternatively, if both the Fuel Clad and NCS fission product barriers were potentially lost, the Emergency Coordinator would have more assurance that there was no immediate need to escalate to a General Emergency.

ATTACHMENT 1
EAL Basis

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: **Any** loss or **any** potential loss of either Fuel Clad or NCS

EAL:

FA1.1	**Alert**
Any loss **OR any** potential loss of either Fuel Clad or NCS (Table F-1)	

Mode Applicability:

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

Definition(s):

None

Basis:

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

At the Alert classification level, Fuel Clad and NCS barriers are weighted more heavily than the Containment barrier. Unlike the Containment barrier, loss or potential loss of either the Fuel Clad or NCS barrier may result in the relocation of radioactive materials or degradation of core cooling capability. Note that the loss or potential loss of Containment barrier in combination with loss or potential loss of either Fuel Clad or NCS barrier results in declaration of a Site Area Emergency under EAL FS1.1

MNS Basis Reference(s):

1. NEI 99-01 FA1

ATTACHMENT 1
EAL Basis

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: Loss or potential loss of **any** two barriers

EAL:

FS1.1 Site Area Emergency

Loss **OR** potential loss of **any** two barriers (Table F-1)

Mode Applicability:

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

Definition(s):

None

Basis:

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

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

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

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

MNS Basis Reference(s):

1. NEI 99-01 FS1

ATTACHMENT 1
EAL Basis

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: Loss of **any** two barriers and loss or potential loss of third barrier

EAL:

FG1.1 General Emergency

Loss of **any** two barriers

AND

Loss **OR** potential loss of third barrier (Table F-1)

Mode Applicability:

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

Definition(s):

None

Basis:

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

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

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

MNS Basis Reference(s):

1. NEI 99-01 FG1

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Introduction

Table F-1 lists the threshold conditions that define the Loss and Potential Loss of the three fission product barriers (Fuel Clad, Reactor Coolant System, and Containment). The table is structured so that each of the three barriers occupies adjacent columns. Each fission product barrier column is further divided into two columns; one for Loss thresholds and one for Potential Loss thresholds.

The first column of the table (to the left of the Fuel Clad Loss column) lists the categories (types) of fission product barrier thresholds. The fission product barrier categories are:

A. NCS or SG Tube Leakage
B. Inadequate Heat removal
C. CMT Radiation / NCS Activity
D. CMT Integrity or Bypass
E. Emergency Coordinator Judgment

Each category occupies a row in Table F-1 thus forming a matrix defined by the categories. The intersection of each row with each Loss/Potential Loss column forms a cell in which one or more fission product barrier thresholds appear. If NEI 99-01 does not define a threshold for a barrier Loss/Potential Loss, the word “None” is entered in the cell.

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

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

Subdivision of Table F-1 by category facilitates association of plant conditions to the applicable fission product barrier Loss and Potential Loss thresholds. This structure promotes a systematic approach to assessing the classification status of the fission product barriers.

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

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

If the EAL-user determines that any threshold has been exceeded, by definition, the barrier is lost or potentially lost – even if multiple thresholds in the same barrier column are exceeded, only that one barrier is lost or potentially lost. The EAL-user must examine each of the three fission product barriers to determine if other barrier thresholds in the category are lost or potentially lost. For example, if containment radiation is sufficiently high, a Loss of the Fuel Clad and NCS barriers and a Potential Loss of the Containment barrier can occur. Barrier Losses and Potential Losses are then applied to the algorithms given in EALs FG1.1, FS1.1, and FA1.1 to determine the appropriate emergency classification.

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

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Table F-1 Fission Product Barrier Threshold Matrix

	Fuel Clad (FC) Barrier		Reactor Coolant System (NCS) Barrier		Containment (CMT) Barrier	
Category	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**	**Loss**	**Potential Loss**
A **NCS or SG Tube Leakage**	None	None	1. An automatic or manual ECCS (SI) actuation required by EITHER: • UNISOLABLE NCS leakage • SG tube RUPTURE	1. Operation of a standby charging pump is required by **EITHER:** • UNISOLABLE NCS leakage • SG tube leakage 2. Integrity-RED PATH conditions met	1. A leaking or RUPTURED SG is FAULTED outside of containment	None
B **Inadequate Heat Removal**	1. Core Cooling-RED PATH conditions met	1. Core Cooling-ORANGE PATH conditions met 2. Heat Sink-RED PATH conditions met **AND** Heat sink is required	None	1. Heat Sink-RED PATH conditions met **AND** Heat sink is required	None	1. Core Cooling-RED PATH conditions met **AND** Restoration procedures **not** effective within 15 min. (Note 1)
C **CMT Radiation / NCS Activity**	1. EMF51A/B > Table F-2 column "FC Loss" 2. Dose equivalent I-131 coolant activity > 300 µCi/gm	None	1. EMF51A/B > Table F-2 column "NCS Loss"	None	None	1. EMF51A/B > Table F-2 column "CMT Potential Loss"
D **CMT Integrity or Bypass**	None	None	None	None	1. Containment isolation is required **AND EITHER:** • Containment integrity has been lost based on Emergency Coordinator judgment • UNISOLABLE pathway from Containment to the environment exists 2. Indications of NCS leakage outside of containment	1. Containment-RED Path conditions met 2. Containment hydrogen concentration > 6% 3. Containment pressure > 3 psig with **EITHER** a failure of both trains of NS **OR** failure of both trains of VX-CARF for ≥ 15 min. (Notes 1, 10)
E **EC Judgment**	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the fuel clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the fuel clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the containment barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the containment barrier

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: 1. NCS or SG Tube Leakage

Degradation Threat: Loss

Threshold:

Non e

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: 1. NCS or SG Tube Leakage

Degradation Threat: Potential Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: B. Inadequate Heat Removal

Degradation Threat: Loss

Threshold:

1. Core Cooling-RED PATH conditions met

Definition(s):

None

Basis:

Critical Safety Function Status Tree (CSFST) Core Cooling-RED path indicates significant core exit superheating and core uncovery. The CSFSTs are normally monitored using the SPDS display on the Operator Aid Computer (OAC) (ref. 1).

This reading indicates temperatures within the core are sufficient to cause significant superheating of reactor coolant.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-C.1 Response to Inadequate Core Cooling
3. EP/1(2)/A/5000/FR-C.2 Response to Degraded Core Cooling
4. NEI 99-01 Inadequate Heat Removal Fuel Clad Loss 2.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: B. Inadequate Heat Removal

Degradation Threat: Potential Loss

Threshold:

1. Core Cooling-**ORANGE** Path conditions met

Definition(s):

None

Basis:

Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path indicates subcooling has been lost and that some fuel clad damage may potentially occur. The CSFSTs are normally monitored using the SPDS display on the Operator Aid Computer (OAC) (ref. 1).

This reading indicates a reduction in reactor vessel water level sufficient to allow the onset of heat-induced cladding damage.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-C.1 Response to Inadequate Core Cooling
3. EP/1(2)/A/5000/FR-C.2 Response to Degraded Core Cooling
4. NEI 99-01 Inadequate Heat Removal Fuel Clad Loss 2.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: B. Inadequate Heat Removal

Degradation Threat: Potential Loss

Threshold:

2. Heat Sink-RED Path conditions met

   AND

   Heat sink is required

Definition(s):

None

Basis:

In combination with NCS Potential Loss B.1, meeting this threshold results in a Site Area Emergency.

Critical Safety Function Status Tree (CSFST) Heat Sink-RED path indicates the ultimate heat sink function is under extreme challenge and that some fuel clad damage may potentially occur (ref. 1).

The CSFSTs are normally monitored using the SPDS display on the Operator Aid Computer (OAC) (ref. 1).

The phrase “and heat sink required” precludes the need for classification for conditions in which NCS pressure is less than SG pressure or Heat Sink-RED path entry was created through operator action directed by an EOP. For example, FR-H.1 is entered from CSFST Heat Sink-Red. Step 2 tells the operator to determine if heat sink is required by checking that NCS pressure is greater than any non-faulted SG pressure and NCS T_{hot} is greater than 350ºF (347ºF ACC). If these conditions exist, Heat Sink is required. Otherwise, the operator is to either return to the procedure and step in effect or place ND in service for heat removal. For large LOCA events inside the Containment, the SGs are moot because heat removal through the containment heat removal systems takes place. Therefore, Heat Sink Red should not be required and, should not be assessed for EAL classification because a LOCA event alone should not require higher than an Alert classification. (ref. 2).

This condition indicates an extreme challenge to the ability to remove NCS heat using the steam generators (i.e., loss of an effective secondary-side heat sink). This condition represents a potential loss of the Fuel Clad Barrier. In accordance with EOPs, there may be unusual accident conditions during which operators intentionally reduce the heat removal capability of the steam generators; during these conditions, classification using threshold is not warranted.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-H.1 Response to Loss of Secondary Heat Sink
3. NEI 99-01 Inadequate Heat Removal Fuel Clad Loss 2.B

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: C. CMT Radiation / NCS Activity

Degradation Threat: Loss

Threshold:

1. EMF51A/B > Table F-2 column "FC Loss"

Table F-2 Containment Radiation – R/hr (EMF51A & B)

Time After S/D (Hrs.)	NCS Loss	FC Loss	CMT Potential Loss
0-1	8.8	550	5500
1-2	8.4	400	4000
2-8	7.0	160	1600
>8	6.2	100	1000

Definition(s):

None

Basis:

The gamma dose rate resulting from a postulated loss of coolant accident (LOCA) is monitored by the containment high range monitors, EMF51A & B. EMF51 & B are located inside containment. The detector range is approximately 1 to 1E8 R/hr (logarithmic scale). Radiation Monitors EMF51A & B provide a diverse means of measuring the containment for high level gamma radiation. (ref. 1).

The Table F-2 values, column FC Loss represents, based on core damage assessment procedure, the expected containment high range radiation monitor (EMF51A & B) response based on a LOCA, for periods of 1, 2, 8 and >8 hours after shutdown, no sprays and NCS pressure < 1600 psig with ~2% fuel failure (ref. 1).

The value is derived as follows:

RP/0/A/5700/019 Figure 3 Containment Radiation Level vs. Time for 100% Clad Damage 1, 2, and 8 and >8 hours after shutdown without spray and NCS pressure < 1600 psig x 0.02 (rounded) (ref. 1).

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that reactor coolant activity equals 300 µCi/gm dose equivalent I-131. Reactor coolant activity above this level is greater than that expected for iodine spikes and corresponds to an approximate range of 2% to 5% fuel clad damage. Since this condition indicates that a significant amount of fuel clad damage has occurred, it represents a loss of the Fuel Clad Barrier.

The radiation monitor reading in this threshold is higher than that specified for NCS Barrier Loss threshold C.1 since it indicates a loss of both the Fuel Clad Barrier and the NCS Barrier. Note that a combination of the two monitor readings appropriately escalates the ECL to a Site Area Emergency.

MNS Basis Reference(s):

1. RP/0/A/5700/019 Core Damage Assessment
2. NEI 99-01 CMT Radiation / RCS Activity Fuel Clad Loss 3.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: C. CMT Radiation / NCS Activity

Degradation Threat: Loss

Threshold:

2. Dose equivalent I-131 coolant activity > 300 µCi/gm

Definition(s):

None

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. The threshold dose equivalent I-131 concentration is well above that expected for iodine spikes and corresponds to about 2% fuel clad damage. When reactor coolant activity reaches this level the Fuel Clad barrier is considered lost. (ref. 1).

This threshold indicates that NCS radioactivity concentration is greater than 300 µCi/gm dose equivalent I-131. Reactor coolant activity above this level is greater than that expected for iodine spikes and corresponds to an approximate range of 2% to 5% fuel clad damage. Since this condition indicates that a significant amount of fuel clad damage has occurred, it represents a loss of the Fuel Clad Barrier.

There is no Potential Loss threshold associated with NCS Activity / Containment Radiation.

MNS Basis Reference(s):

1. RP/0/A/5700/019 Core Damage Assessment
2. NEI 99-01 CMT Radiation / RCS Activity Fuel Clad Loss 3.B

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: C. CMT Radiation / NCS Activity

Degradation Threat: Potential Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: D. CMT Integrity or Bypass

Degradation Threat: Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: D. CMT Integrity or Bypass

Degradation Threat: Potential Loss **Threshold:**

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: E. Emergency Coordinator Judgment

Degradation Threat: Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the Fuel Clad barrier

Definition(s):

None

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that are to be used by the Emergency Coordinator in determining whether the Fuel Clad barrier is lost

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment Fuel Clad Loss 6.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Fuel Clad

Category: E. Emergency Coordinator Judgment

Degradation Threat: Potential Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the Fuel Clad barrier

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the Fuel Clad barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that are to be used by the Emergency Coordinator in determining whether the Fuel Clad barrier is potentially lost. The Emergency Coordinator should also consider whether or not to declare the barrier potentially lost in the event that barrier status cannot be monitored.

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment Potential Fuel Clad Loss 6.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: A. NCS or SG Tube Leakage

Degradation Threat: Loss

Threshold:

1. An automatic or manual ECCS (SI) actuation required by **EITHER:**
   - UNISOLABLE NCS leakage
   - SG tube RUPTURE

Definition(s):

UNISOLABLE - An open or breached system line that cannot be isolated, remotely or locally.

RUPTURE - The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

Basis:

ECCS (SI) actuation is caused by (ref. 1):

- Pressurizer pressure < 1845 psig
- Containment pressure > 1.0 psig

This threshold is based on an UNISOLABLE NCS leak of sufficient size to require an automatic or manual actuation of the Emergency Core Cooling System (ECCS). This condition clearly represents a loss of the NCS Barrier.

This threshold is applicable to unidentified and pressure boundary leakage, as well as identified leakage. It is also applicable to UNISOLABLE NCS leakage through an interfacing system. The mass loss may be into any location – inside containment, to the secondary-side (i.e., steam generator tube leakage) or outside of containment.

A steam generator with primary-to-secondary leakage of sufficient magnitude to require a safety injection is considered to be RUPTURED. If a RUPTURED steam generator is also FAULTED outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier Loss threshold 1.A will also be met.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

If EOPs direct operators to open the Pressurizer pressure relief valves to implement a core cooling strategy (i.e., a “feed and bleed” cooldown), then there will exist a reactor coolant flow path from the RCS, past the “pressurizer safety and relief valves” and into the containment that operators cannot isolate without compromising the effectiveness of the strategy (i.e., for the strategy to be effective, the valves must be kept in the open position); therefore, the flow through the pressure relief line is UNISOLABLE. In this case, the ability of the RCS pressure boundary to serve as an effective barrier to a release of fission products has been eliminated and thus this condition constitutes a loss of the RCS barrier.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/E-0 Reactor Trip or Safety Injection
2. EP/1(2)/A/5000/E-3 Steam Generator Tube Rupture
3. NEI 99-01 RCS or SG Tube Leakage Reactor Coolant System Loss 1.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: A. NCS or SG Tube Leakage

Degradation Threat: Potential Loss

Threshold:

1. Operation of a standby charging pump is required by **EITHER:**
   - UNISOLABLE NCS leakage
   - SG tube leakage

Definition(s):

UNISOLABLE - An open or breached system line that cannot be isolated, remotely or locally.

Basis:

The Chemical and Volume Control System (CVCS) includes two centrifugal charging pumps which take suction from the Volume Control Tank and return cooled, purified reactor coolant to the NCS. Normal charging flow is handled by one of the two charging pumps. Each charging pump is designed for a flow rate of 150 gpm. A second charging pump being required is indicative of a substantial NCS leak. (ref. 1).

This threshold is based on an UNISOLABLE NCS leak that results in the inability to maintain pressurizer level within specified limits by operation of a normally used charging (makeup) pump, but an ECCS (SI) actuation has not occurred. The threshold is met when an operating procedure, or operating crew supervision, directs that a standby charging (makeup) pump be placed in service to restore and maintain pressurizer level.

This threshold is applicable to unidentified and pressure boundary leakage, as well as identified leakage. It is also applicable to UNISOLABLE NCS leakage through an interfacing system. The mass loss may be into any location – inside containment, to the secondary-side (i.e., steam generator tube leakage) or outside of containment.

If a leaking steam generator is also FAULTED outside of containment, the declaration escalates to a Site Area Emergency since the Containment Barrier Loss threshold 1.A will also be met.

MNS Basis Reference(s):

1. UFSAR Section 9.3.4 Chemical and Volume Control System
2. NEI 99-01 RCS or SG Tube Leakage Reactor Coolant System Potential Loss 1.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: A. NCS or SG Tube Leakage

Degradation Threat: Potential Loss

Threshold:

2. Integrity-RED path conditions met

Definition(s):

None

Basis:

The "Potential Loss" threshold is defined by the CSFST Reactor Coolant Integrity - RED path. CSFST NCS Integrity - Red Path plant conditions and associated PTS Limit A indicates an extreme challenge to the safety function when plant parameters are to the right of the limit curve following excessive NCS cooldown under pressure (ref. 1, 2).

This condition indicates an extreme challenge to the integrity of the NCS pressure boundary due to pressurized thermal shock – a transient that causes rapid NCS cooldown while the NCS is in Mode 3 or higher (i.e., hot and pressurized).

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-P.1 Response to Imminent Pressurized Thermal Shock Condition
3. NEI 99-01 RCS or SG Tube Leakage Reactor Coolant System Potential Loss 1.B

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: B. Inadequate Heat Removal

Degradation Threat: Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: B. Inadequate Heat Removal

Degradation Threat: Potential Loss

Threshold:

1. Heat Sink-RED path conditions met

   AND

   Heat sink is required

Definition(s):

None

Basis:

In combination with FC Potential Loss B.2, meeting this threshold results in a Site Area Emergency.

Critical Safety Function Status Tree (CSFST) Heat Sink-RED path indicates the ultimate heat sink function is under extreme challenge and that some fuel clad damage may potentially occur (ref. 1).

The CSFSTs are normally monitored using the SPDS display on the Operator Aid Computer (OAC) (ref. 1).

The phrase “and heat sink required” precludes the need for classification for conditions in which NCS pressure is less than SG pressure or Heat Sink-RED path entry was created through operator action directed by an EOP. For example, FR-H.1 is entered from CSFST Heat Sink-Red. Step 2 tells the operator to determine if heat sink is required by checking that NCS pressure is greater than any non-faulted SG pressure and NCS T_{hot} is greater than 350ºF. If these conditions exist, Heat Sink is required. Otherwise, the operator is to either return to the procedure and step in effect or place ND in service for heat removal. For large LOCA events inside the Containment, the SGs are moot because heat removal through the containment heat removal systems takes place. Therefore, Heat Sink Red should not be required and, should not be assessed for EAL classification because a LOCA event alone should not require higher than an Alert classification. (ref. 1, 2)

This condition indicates an extreme challenge to the ability to remove NCS heat using the steam generators (i.e., loss of an effective secondary-side heat sink). This condition represents a potential loss of the NCS Barrier. In accordance with EOPs, there may be unusual accident conditions during which operators intentionally reduce the heat removal capability of the steam generators; during these conditions, classification using threshold is not warranted.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Meeting this threshold results in a Site Area Emergency because this threshold is identical to Fuel Clad Barrier Potential Loss threshold B.2; both will be met. This condition warrants a Site Area Emergency declaration because inadequate NCS heat removal may result in fuel heat-up sufficient to damage the cladding and increase NCS pressure to the point where mass will be lost from the system.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-H.1 Response to Loss of Secondary Heat Sink
3. NEI 99-01 Inadequate Heat Removal NCS Loss 2.B

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: C. CMT Radiation/ NCS Activity

Degradation Threat: Loss

Threshold:

1. EMF51A/B > Table F-2 column "NCS Loss"

Table F-2 Containment Radiation – R/hr (EMF51A & B)

Time After S/D (Hrs.)	NCS Loss	FC Loss	CMT Potential Loss
0-1	8.8	550	5500
1-2	8.4	400	4000
2-8	7.0	160	1600
>8	6.2	100	1000

Definition(s):

N/A

Basis:

The gamma dose rate resulting from a postulated loss of coolant accident (LOCA) is monitored by the containment high range monitors, EMF51A & B. EMF51A & B are located inside containment. The detector range is approximately 1 to 1E8 R/hr (logarithmic scale). Radiation Monitors EMF51A & B provide a diverse means of measuring the containment for high level gamma radiation. (ref. 1).

The value specified represents, based on core damage assessment procedure RP/0/A/5700/019 Figure 1, the expected containment high range radiation monitor (EMF51A & B) response based on a LOCA, for periods of 1, 2, 8 and >8 hours after shutdown with no fuel failure (ref. 1).

The value is derived as follows:

RP/0/A/5000/019 Figure 1 Containment Radiation Level vs. Time for NCS Release for periods of 1, 2, 8 and >8 hours after shutdown (rounded) (ref. 1).

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that reactor coolant activity equals Technical

Specification allowable limits. This value is lower than that specified for Fuel Clad Barrier Loss threshold C.1 since it indicates a loss of the NCS Barrier only.

There is no Potential Loss threshold associated with NCS Activity / Containment Radiation.

MNS Basis Reference(s):

1. RP/0/A/5700/019 Core Damage Assessment
2. NEI 99-01 CMT Radiation / RCS Activity NCS Loss 3.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: C. CMT Radiation/ NCS Activity

Degradation Threat: Potential Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: D. CMT Integrity or Bypass

Degradation Threat: Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: D. CMT Integrity or Bypass

Degradation Threat: Potential Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: E. Emergency Coordinator Judgment

Degradation Threat: Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the NCS barrier

Definition(s):

None

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the NCS barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to the recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that may be used by the Emergency Coordinator in determining whether the NCS Barrier is lost.

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment NCS Loss 6.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Reactor Coolant System

Category: E. Emergency Coordinator Judgment

Degradation Threat: Potential Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the NCS barrier

Definition(s):

None

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the NCS barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to the inability to reach final safety acceptance criteria before completing all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that may be used by the Emergency Coordinator in determining whether the NCS Barrier is potentially lost. The Emergency Coordinator should also consider whether or not to declare the barrier potentially lost in the event that barrier status cannot be monitored.

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment NCS Potential Loss 6.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: A. NCS or SG Tube Leakage

Degradation Threat: Loss

Threshold:

1. A leaking or RUPTURED SG is FAULTED outside of containment

Definition(s):

FAULTED - The term applied to a steam generator that has a steam leak on the secondary side of sufficient size to cause an uncontrolled drop in steam generator pressure or the steam generator to become completely depressurized.

RUPTURED - The condition of a steam generator in which primary-to-secondary leakage is of sufficient magnitude to require a safety injection.

Basis:

This threshold addresses a leaking or RUPTURED Steam Generator (SG) that is also FAULTED outside of containment. The condition of the SG, whether leaking or RUPTURED, is determined in accordance with the thresholds for NCS Barrier Potential Loss A.1 and Loss A.1, respectively. This condition represents a bypass of the containment barrier.

FAULTED is a defined term within the NEI 99-01 methodology; this determination is not necessarily dependent upon entry into, or diagnostic steps within, an EOP. For example, if the pressure in a steam generator is decreasing uncontrollably (part of the FAULTED definition) and the FAULTED steam generator isolation procedure is not entered because EOP user rules are dictating implementation of another procedure to address a higher priority condition, the steam generator is still considered FAULTED for emergency classification purposes.

The FAULTED criterion establishes an appropriate lower bound on the size of a steam release that may require an emergency classification. Steam releases of this size are readily observable with normal Control Room indications. The lower bound for this aspect of the containment barrier is analogous to the lower bound criteria specified in IC SU4 for the fuel clad barrier (i.e., NCS activity values) and IC SU5 for the NCS barrier (i.e., NCS leak rate values).

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

This threshold also applies to prolonged steam releases necessitated by operational considerations such as the forced steaming of a leaking or RUPTURED steam generator directly to atmosphere to cooldown the plant, or to drive an auxiliary (emergency) feed water pump. These types of conditions will result in a significant and sustained release of radioactive

steam to the environment (and are thus similar to a FAULTED condition). The inability to isolate the steam flow without an adverse effect on plant cooldown meets the intent of a loss of containment.

Steam releases associated with the expected operation of a SG power operated relief valve or safety relief valve do not meet the intent of this threshold. Such releases may occur intermittently for a short period of time following a reactor trip as operators process through emergency operating procedures to bring the plant to a stable condition and prepare to initiate a plant cooldown. Steam releases associated with the unexpected operation of a valve (e.g., a stuck-open safety valve) do meet this threshold.

Following an SG tube leak or rupture, there may be minor radiological releases through a secondary-side system component (e.g., air ejectors, glad seal exhausters, valve packing, etc.). These types of releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

The ECLs resulting from primary-to-secondary leakage, with or without a steam release from the FAULTED SG, are summarized below.

Affected SG is FAULTED Outside of Containment?

P-to-S Leak Rate	**Yes**	**No**
Less than or equal to 25 gpm	No classification	No classification
Greater than 25 gpm	Unusual Event per SU5.1	Unusual Event per SU5.1
Requires operation of a standby charging (makeup) pump (*NCS Barrier Potential Loss*)	Site Area Emergency per FS1.1	Alert per FA1.1
Requires an automatic or manual ECCS (SI) actuation (*NCS Barrier Loss*)	Site Area Emergency per FS1.1	Alert per FA1.1

There is no Potential Loss threshold associated with NCS or SG Tube Leakage.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/E-0 Reactor Trip or Safety Injection
2. EP/1(2)/A/5000/E-3 Steam Generator Tube Rupture
3. NEI 99-01 RCS or SG Tube Leakage Containment Loss 1.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: A. NCS or SG Tube Leakage

Degradation Threat: Potential Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: B. Inadequate Heat Removal

Degradation Threat: Potential Loss

Threshold:

1. Core Cooling-RED path conditions met

   AND

   Restoration procedures **not** effective within 15 min. (Note 1)

Definition(s):

None

Basis:

Critical Safety Function Status Tree (CSFST) Core Cooling-RED path indicates significant core exit superheating and core uncovery. The CSFSTs are normally monitored using the SPDS display on the Operator Aid Computer (OAC) (ref. 1).

The function restoration procedures are those emergency operating procedures that address the recovery of the core cooling critical safety functions. The procedure is considered effective if the temperature is decreasing or if the vessel water level is increasing (ref. 1, 2, 3).

A direct correlation to status trees can be made if the effectiveness of the restoration procedures is also evaluated. If core exit thermocouple (TC) readings are greater than 1,200°F (ref. 1), Fuel Clad barrier is also lost.

This condition represents an IMMINENT core melt sequence which, if not corrected, could lead to vessel failure and an increased potential for containment failure. For this condition to occur, there must already have been a loss of the NCS Barrier and the Fuel Clad Barrier. If implementation of a procedure(s) to restore adequate core cooling is not effective (successful) within 15 minutes, it is assumed that the event trajectory will likely lead to core melting and a subsequent challenge of the Containment Barrier.

The restoration procedure is considered “effective” if core exit thermocouple readings are decreasing and/or if reactor vessel level is increasing. Whether or not the procedure(s) will be effective should be apparent within 15 minutes. The Emergency Coordinator should escalate the emergency classification level as soon as it is determined that the procedure(s) will not be effective.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation in a significant fraction of core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide 15 minutes beyond the required entry point to determine if procedural actions can reverse the core melt sequence.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. EP/1(2)/A/5000/FR-C.1 Response to Inadequate Core Cooling
3. EP/1(2)/A/5000/FR-C.2 Response to Degraded Core Cooling
4. NEI 99-01 Inadequate Heat Removal Containment Potential Loss 2.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: C. CMT Radiation/NCS Activity

Degradation Threat: Loss

Threshold:

None

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: C. CMT Radiation/NCS Activity

Degradation Threat: Potential Loss

Threshold:

1. EMF51A/B > Table F-2 column "CMT Potential Loss"

Table F-2 Containment Radiation – R/hr (EMF51A & B)

Time After S/D (Hrs.)	NCS Loss	FC Loss	CMT Potential Loss
0-1	8.8	550	5500
1-2	8.4	400	4000
2-8	7.0	160	1600
>8	6.2	100	1000

Definition(s):

None

Basis:

The gamma dose rate resulting from a postulated loss of coolant accident (LOCA) is monitored by the containment high range monitors, EMF51A & B. EMF51A & B are located inside containment. The detector range is approximately 1 to 1E8 R/hr (logarithmic scale). Radiation Monitors EMF51A & B provide a diverse means of measuring the containment for high level gamma radiation. (ref. 1).

The Table F-2 values, column CMT Potential Loss represents, based on core damage assessment procedure, the expected containment high range radiation monitor (EMF51A & B) response based on a LOCA, for periods of 1, 2, 8 and >8 hours after shutdown, no sprays and NCS pressure < 1600 psig with ~20% fuel failure (ref. 1).

The value is derived as follows:

RP/0/A/5700/019 Figure 3 Containment Radiation Level vs. Time for 100% Clad Damage 1, 2, 8 and >8 hours after shutdown without spray and NCS pressure < 1600 psig x 0.20 (rounded) (ref. 1).

The radiation monitor reading corresponds to an instantaneous release of all reactor coolant mass into the containment, assuming that 20% of the fuel cladding has failed. This level of

fuel clad failure is well above that used to determine the analogous Fuel Clad Barrier Loss and NCS Barrier Loss thresholds.

NUREG-1228, Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents, indicates the fuel clad failure must be greater than approximately 20% in order for there to be a major release of radioactivity requiring offsite protective actions. For this condition to exist, there must already have been a loss of the NCS Barrier and the Fuel Clad Barrier. It is therefore prudent to treat this condition as a potential loss of containment which would then escalate the ECL to a General Emergency.

MNS Basis Reference(s):

1. RP/0/A/5700/019 Core Damage Assessment
2. NEI 99-01 CMT Radiation / RCS Activity Containment Potential Loss 3.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: D. CMT Integrity or Bypass

Degradation Threat: Loss

Threshold:

1. Containment isolation is required

   AND EITHER:

   - Containment integrity has been lost based on EC judgment
   - UNISOLABLE pathway from containment to the environment exists

Definition(s):

UNISOLABLE - An open or breached system line that cannot be isolated, remotely or locally.

Basis:

These thresholds address a situation where containment isolation is required and one of two conditions exists as discussed below. Users are reminded that there may be accident and release conditions that simultaneously meet both bulleted thresholds.

First Threshold – Containment integrity has been lost, i.e., the actual containment atmospheric leak rate likely exceeds that associated with allowable leakage (or sometimes referred to as design leakage). Following the release of NCS mass into containment, containment pressure will fluctuate based on a variety of factors; a loss of containment integrity condition may (or may not) be accompanied by a noticeable drop in containment pressure. Recognizing the inherent difficulties in determining a containment leak rate during accident conditions, it is expected that the Emergency Coordinator will assess this threshold using judgment, and with due consideration given to current plant conditions, and available operational and radiological data (e.g., containment pressure, readings on radiation monitors outside containment, operating status of containment pressure control equipment, etc.).

Refer to the middle piping run of Figure 1. Two simplified examples are provided. One is leakage from a penetration and the other is leakage from an in-service system valve.
Depending upon radiation monitor locations and sensitivities, the leakage could be detected by any of the four monitors depicted in the figure.

Another example would be a loss or potential loss of the NCS barrier, and the simultaneous occurrence of two FAULTED locations on a steam generator where one fault is located inside containment (e.g., on a steam or feedwater line) and the other outside of containment. In this case, the associated steam line provides a pathway for the containment atmosphere to escape to an area outside the containment.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Following the leakage of NCS mass into containment and a rise in containment pressure, there may be minor radiological releases associated with allowable (design) containment leakage through various penetrations or system components. These releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

Second Threshold – Conditions are such that there is an UNISOLABLE pathway for the migration of radioactive material from the containment atmosphere to the environment. As used here, the term "environment" includes the atmosphere of a room or area, outside the containment, that may, in turn, communicate with the outside-the-plant atmosphere (e.g., through discharge of a ventilation system or atmospheric leakage). Depending upon a variety of factors, this condition may or may not be accompanied by a noticeable drop in containment pressure.

Refer to the top piping run of Figure 1. In this simplified example, the inboard and outboard isolation valves remained open after a containment isolation was required (i.e., containment isolation was not successful). There is now an UNISOLABLE pathway from the containment to the environment.

The existence of a filter is not considered in the threshold assessment. Filters do not remove fission product noble gases. In addition, a filter could become ineffective due to iodine and/or particulate loading beyond design limits (i.e., retention ability has been exceeded) or water saturation from steam/high humidity in the release stream.

Leakage between two interfacing liquid systems, by itself, does not meet this threshold.

Refer to the bottom piping run of Figure 1. In this simplified example, leakage in an NCP seal cooler is allowing radioactive material to enter the Auxiliary Building. The radioactivity would be detected by the Process Monitor. If there is no leakage from the closed water cooling system to the Auxiliary Building, then no threshold has been met. If the pump developed a leak that allowed steam/water to enter the Auxiliary Building, then second threshold would be met. Depending upon radiation monitor locations and sensitivities, this leakage could be detected by any of the four monitors depicted in the figure and cause the first threshold to be met as well.

Following the leakage of NCS mass into containment and a rise in containment pressure, there may be minor radiological releases associated with allowable containment leakage through various penetrations or system components. Minor releases may also occur if a containment isolation valve(s) fails to close but the containment atmosphere escapes to an enclosed system. These releases do not constitute a loss or potential loss of containment but should be evaluated using the Recognition Category R ICs.

The status of the containment barrier during an event involving steam generator tube leakage is assessed using Loss Threshold A.1.

MNS Basis Reference(s):

1. NEI 99-01 CMT Integrity or Bypass Containment Loss 4.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: D. CMT Integrity or Bypass

Degradation Threat: Loss

Threshold:

2. Indications of NCS leakage outside of containment

Definition(s):

None

Basis:

ECA-1.2 LOCA Outside Containment (ref. 1) provides instructions to identify and isolate a LOCA outside of the containment. Potential NCS leak pathways outside containment include (ref. 1, 2):

- Residual Heat Removal (ND)
- Safety Injection (NI)
- Chemical & Volume Control (NV)
- NCP seals (NC)
- PZR/NCS Loop sample lines (NM)

Containment sump, temperature, pressure and/or radiation levels will increase if reactor coolant mass is leaking into the containment. If these parameters have not increased, then the reactor coolant mass may be leaking outside of containment (i.e., a containment bypass sequence). Increases in sump, temperature, pressure, flow and/or radiation level readings outside of the containment may indicate that the NCS mass is being lost outside of containment.

Unexpected elevated readings and alarms on radiation monitors with detectors outside containment should be corroborated with other available indications to confirm that the source is a loss of NCS mass outside of containment. If the fuel clad barrier has not been lost, radiation monitor readings outside of containment may not increase significantly; however, other unexpected changes in sump levels, area temperatures or pressures, flow rates, etc. should be sufficient to determine if NCS mass is being lost outside of the containment.

Refer to the middle piping run of Figure 1. In this simplified example, a leak has occurred at a reducer on a pipe carrying reactor coolant in the Auxiliary Building. Depending upon radiation monitor locations and sensitivities, the leakage could be detected by any of the four monitors depicted in the figure and cause threshold D.1 to be met as well.

To ensure proper escalation of the emergency classification, the NCS leakage outside of containment must be related to the mass loss that is causing the NCS Loss and/or Potential Loss threshold A.1 to be met.

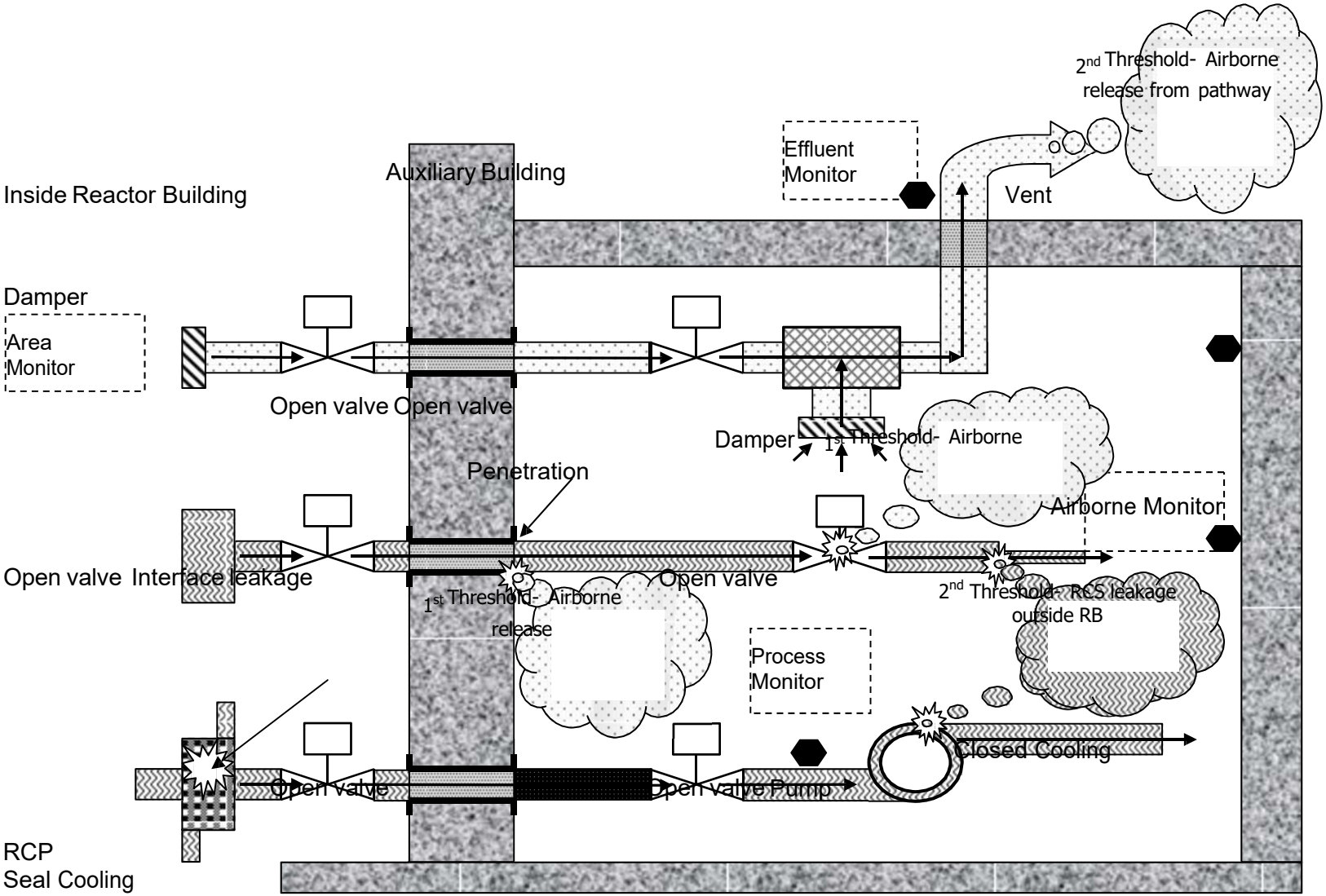
ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

MNS Basis Reference(s):

1. EP/1(2)/A/5000/ECA-1.2 LOCA Outside Containment
2. EP/1(2)/A/5000/E-1 Loss of Reactor or Secondary Coolant
3. NEI 99-01 CMT Integrity or Bypass Containment Loss

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Figure 1: Containment Integrity or Bypass Examples



ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: D. CMT Integrity or Bypass

Degradation Threat: Potential Loss **Threshold:**

1. Containment-RED Path conditions met

Definition(s):

None

Basis:

Critical Safety Function Status Tree (CSFST) Containment-RED path is entered if containment pressure is greater than or equal to 15 psig and represents an extreme challenge to safety function. (ref. 1).

15 psig is based on the containment design pressure (ref. 2).

If containment pressure exceeds the design pressure, there exists a potential to lose the Containment Barrier. To reach this level, there must be an inadequate core cooling condition for an extended period of time; therefore, the NCS and Fuel Clad barriers would already be lost. Thus, this threshold is a discriminator between a Site Area Emergency and General Emergency since there is now a potential to lose the third barrier.

MNS Basis Reference(s):

1. EP/1(2)/A/5000/F-0 Critical Safety Function Status Trees
2. UFSAR Section 6.2 Containment Systems
3. NEI 99-01 CMT Integrity or Bypass Containment Potential Loss 4.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: D. CMT Integrity or Bypass

Degradation Threat: Potential Loss **Threshold:**

2. Containment hydrogen concentration > 6%

Definition(s):

None

Basis:

Following a design basis accident, hydrogen gas may be generated inside the containment by reactions such as zirconium metal with water, corrosion of materials of construction and radiolysis of aqueous solution in the core and sump. (ref. 1).

The lower limit of deflagration of hydrogen in air is > 6% and is the maximum concentration at which hydrogen igniters can be placed in service (ref. 2).

To generate such levels of combustible gas, loss of the Fuel Clad and NCS barriers must have occurred. With the Potential Loss of the containment barrier, the threshold hydrogen concentration, therefore, will likely warrant declaration of a General Emergency.

The existence of an explosive mixture means, at a minimum, that the containment atmospheric hydrogen concentration is sufficient to support a hydrogen burn (i.e., at the lower deflagration limit). A hydrogen burn will raise containment pressure and could result in collateral equipment damage leading to a loss of containment integrity. It therefore represents a potential loss of the Containment Barrier.

MNS Basis Reference(s):

1. UFSAR Section 6.2 Containment Systems
2. EP/1(2)/A/5000/FR-Z.4 Response to High Containment Hydrogen Concentration
3. NEI 99-01 CMT Integrity or Bypass Containment Potential Loss 4.B

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: D. CMT Integrity or Bypass

Degradation Threat: Potential Loss **Threshold:**

3. Containment pressure > 3 psig with **EITHER** a failure of both trains of NS **OR** failure of both trains of VX-CARF for ≥ 15 min. (Notes 1, 10)

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL **only** applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Definition(s):

None

Basis:

The containment Phase B pressure setpoint (3 psig, ref. 1, 2) is the pressure at which the containment cooling systems should actuate and begin performing their function.

One full train of containment cooling operating per design is considered (ref. 1, 2):

- One train of Containment Air Return Fan System (VX-CARF), and
- One train of Containment Spray System (NS)

Once the Residual Heat Removal system is taking suction from the containment sump, with containment pressure greater than 3 psig and procedural guidance, one train of containment spray is manually aligned to the containment sump. If unable to place one NS train in service or without an operating train of VX-CARF (the CARF with a 10-minute delay) within 15 minutes a potential loss of containment exists. At this point a significant portion of the ice in the ice condenser would have melted and the NS system would be needed for containment pressure control. The potential loss of containment applies after automatic or manual alignment of the containment spray system has been attempted with containment pressure greater than 3 psig and less than one full train of NS is operating for greater than or equal to 15 minutes.

The potential loss of containment also applies if containment pressure is greater than 3 psig and at least one train of VX-CARF is not operating after a 10 minute delay for greater than or equal to 15 minutes. Without a single train of VX-CARF in service following actuation, the potential loss should be credited regardless of whether ECCS is in injection or sump recirculation mode after 15 minutes.

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

This threshold describes a condition where containment pressure is greater than the setpoint at which containment energy (heat) removal systems are designed to automatically actuate, and less than one full train of equipment is capable of operating per design. The 15-minute criterion is included to allow operators time to manually start equipment that may not have automatically started, if possible. This threshold represents a potential loss of containment in that containment heat removal/depressurization systems (e.g., containment sprays, ice condenser fans, etc., but not including containment venting strategies) are either lost or performing in a degraded manner.

MNS Basis Reference(s):

1. MNS Technical Specification 3.6.6
2. MNS Technical Specification 3.6.6 Bases
3. MNS Technical Specification 3.3.2
4. UFSAR Section 6.2 Containment Systems
5. NEI 99-01 CMT Integrity or Bypass Containment Potential Loss 4.C

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: F. Emergency Coordinator Judgment

Degradation Threat: Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the Containment barrier

Definition(s):

None

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the Primary Containment barrier is lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that may be used by the Emergency Coordinator in determining whether the Containment Barrier is lost.

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment PC Loss 6.A

ATTACHMENT 2
Fission Product Barrier Loss/Potential Loss Matrix and Basis

Barrier: Containment

Category: F. Emergency Coordinator Judgment

Degradation Threat: Potential Loss

Threshold:

1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the Containment barrier

Definition(s):

None

Basis:

The Emergency Coordinator judgment threshold addresses any other factors relevant to determining if the Primary Containment barrier is potentially lost. Such a determination should include imminent barrier degradation, barrier monitoring capability and dominant accident sequences.

- Imminent barrier degradation exists if the degradation will likely occur within two hours based on a projection of current safety system performance. The term “imminent” refers to recognition of the inability to reach safety acceptance criteria before completion of all checks.

- Barrier monitoring capability is decreased if there is a loss or lack of reliable indicators. This assessment should include instrumentation operability concerns, readings from portable instrumentation and consideration of offsite monitoring results.

- Dominant accident sequences lead to degradation of all fission product barriers and likely entry to the EOPs. The Emergency Coordinator should be mindful of the Loss of AC power (Station Blackout) and ATWS EALs to assure timely emergency classification declarations.

This threshold addresses any other factors that may be used by the Emergency Coordinator in determining whether the Containment Barrier is lost.

MNS Basis Reference(s):

1. NEI 99-01 Emergency Director Judgment PC Potential Loss 6.A

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

Background

NEI 99-01 Revision 6 ICs AA3 and HA5 prescribe declaration of an Alert based on impeded access to rooms or areas (due to either area radiation levels or hazardous gas concentrations) where equipment necessary for normal plant operations, cooldown or shutdown is located.
These areas are intended to be plant operating mode dependent. Specifically the Developers Notes for AA3 and HA5 states:

The "site-specific list of plant rooms or areas with entry-related mode applicability identified" should specify those rooms or areas that contain equipment which require a manual/local action as specified in operating procedures used for normal plant operation, cooldown and shutdown. Do not include rooms or areas in which actions of a contingent or emergency nature would be performed (e.g., an action to address an off-normal or emergency condition such as emergency repairs, corrective measures or emergency operations). In addition, the list should specify the plant mode(s) during which entry would be required for each room or area.

The list should not include rooms or areas for which entry is required solely to perform actions of an administrative or record keeping nature (e.g., normal rounds or routine inspections).

Further, as specified in IC HA5:

The list need not include the Control Room if adequate engineered safety/design features are in place to preclude a Control Room evacuation due to the release of a hazardous gas. Such features may include, but are not limited to, capability to draw air from multiple air intakes at different and separate locations, inner and outer atmospheric boundaries, or the capability to acquire and maintain positive pressure within the Control Room envelope.

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

MNS Table R-2 and H-2 Basis

A review of station operating procedures identified the following mode dependent in-plant actions and associated areas that are required for normal plant operation, cooldown or shutdown:

MNS Procedure and Step	Step Action	Building/Elevation/Room	Mode	If action not performed does this prevent cooldown/ shutdown?
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.4.1	Perform OP/1/A/6100/SD 1 (Prepare For Cooldown).	N/A	N/A	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.6	Perform NC System degas per OP/1/A/6100/SD-10 (NC System, PRT and NCDT Degas).	N/A	N/A	No
OP/1&2/A/6100/003, Enclosure 4.2, Steps 3.8.8.1 & 3.8.9.1	Open breakers on Transformer Cooling Groups.	Transfer Yard	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.14	Perform Main Steam Safety Valve testing.	Main Steam Doghouses	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.17.1	Check transfer of Aux Steam from C htr Bleed to Main Steam (Close 1SP-1 (Main Steam to 1A CF Pump Turb Isol) and 1SP-2 (Main Steam to 1B CF Pump Turb Isol).1AS-11).	Turbine Bldg. Basement (739') North Wall	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.21	Stop G HDT Pumps per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).	Turbine Bldg. Basement (739') West Wall	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.23	Stop C HDT Pumps per OP/1/B/6250/004 (Feedwater Heater Vents, Drains, and Bleed System).	Turbine Bldg. Basement (739') HP Heater Panel	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.8.34	Transfer of Aux Steam to Unit 2 or Aux Electric Boilers per OP/1/B/6250/007 B (Auxiliary Electric Boilers).	Service Bldg. (739') or Auxiliary Boiler Room	1	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.12.7	Close 1SP-1 (Main Steam to 1A CF Pump Turb Isol) and 1SP-2 (Main Steam to 1B CF Pump Turb Isol).	Turbine Bldg. Mezz (760') at CF Pumps	1	No

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

MNS Procedure and Step	Step Action	Building/Elevation/Room	Mode	If action not performed does this prevent cooldown/ shutdown?
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.13.16.6	Shutdown MG Sets per OP/1/A/6150/008 (Rod Control), Enclosure 4.5 (M/G Shutdown).	MG Set Room (767')	3	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.14.4	Secondary System Wet Layup Chemical addition (Chemistry).	Secondary Chemistry Lab and TB Basement (739')	3	No
OP/1&2/A/6100/003, Enclosure 4.2, Step 3.14.6.2	Begin performance of stroke time testing of Pzr PORVs.	Inside Containment	3	No
OP/1&2/A/6100/SD-1, Step 3.5	When RP allows access to Lower Containment, begin Enclosure 4.2 (Pre-Cooldown Containment Entry). This enclosure performs a Containment Inspection with RP, Engineering and Operations involvement.	Inside Containment	3	No
OP/1&2/A/6100/SD-1, Step 3.3.4	After required amount of boron is added for SDM requirements for blocking P-11, Primary Chemistry samples NC System.	Aux. Bldg. (NM Lab 716') Counting Room (767')	3	No
OP/1&2/A/6100/SD-1, Step 3.4.9	After required amount of boron is added for SDM Shutdown Boron Concentration, Primary Chemistry samples NC System.	Aux. Bldg. (NM Lab 716') Counting Room (767')	3	No
OP/1&2/A/6100/SD-1, Step 3.5.7	After required amount of boron is added for Crud Burst Boron Concentration, Primary Chemistry samples NC System.	Aux. Bldg. (NM Lab 716') Counting Room (767')	3	No
OP/1&2/A/6100/SD-1, Step 3.6.7	After required amount of boron is added for Refueling Boron Concentration, Primary Chemistry samples NC System.	Aux. Bldg. (NM Lab 716') Counting Room (767')	3	No

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

MNS Procedure and Step	Step Action	Building/Elevation/Room	Mode	If action not performed does this prevent cooldown/ shutdown?
OP/1&2/A/6100/SD-10, Step 3.5.1.1	Have Radwaste align Nitrogen for NCDT Degas per OP/1/A/6200/600 (WG Support of Unit 1	Aux. Bldg. (716') Radwaste Area	1-3	No
OP/1&2/A/6100/SD-10, Step 3.6.2	Radwaste performs Phase 1 PRT Degas per OP/0/A/6200/518 (Waste Gas Operation).	Aux. Bldg. (716') Radwaste Area	1-3	No
OP/1&2/A/6100/SD-10, Step 3.7.1	Radwaste performs NC System Degas per OP/1&2/A/6200/600 (WG Support Of Unit 1/2 Shutdown).	Aux. Bldg. (716') Radwaste Area	1-3	No
OP/1&2/A/6100/SD-10, Step 3.8.3	Radwaste performs NCDT Degas per OP/0/A/6200/518 (Waste Gas Operation).	Aux. Bldg. (716') Radwaste Area	1-3	No
OP/1&2/A/6100/SD-10, Step 3.9.1 & 3.9.2	Radwaste performs Phase 2 PRT Degas per OP/1&2/A/6200/600 (WG Support Of Unit 1/2 Shutdown) and OP/0/A/6200/518 (Waste Gas Operation).	Aux. Bldg. (716') Radwaste Area	1-3	No
OP/1&2/A/6100/SD-2, Step 3.2.3	Radwaste crossties BATs.	Aux. Bldg. (733') BAT Area	3	No
OP/1&2/A/6100/SD-2, Step 3.5	When less than 1000 psig, IAE places NC System Narrow Range Pressure Transmitters in service.	Aux. Bldg. (733') Electrical Pene (733' and 750')	3	Yes
OP/1&2/A/6100/SD-2, Enclosure 4.2, Step 3.2.3.2	To maximize charging flow, adjust NC Pump Seal Water Injection Throttles to 8-10 gpm.	Aux. Bldg. (733') Ledge Outside VCT Room	3	No
OP/1&2/A/6100/SD-4, Step 3.2.3	Radwaste crossties BATs.	Aux. Bldg. (733') BAT Area	3	No
OP/1&2/A/6100/SD-4, Steps 3.11.1, 3.11.2, & 3.12.3	Perform plant shutdown tagging.	ETA, ETB, Aux. Bldg. (733' and 750') South End	3	Yes
OP/1&2/A/6100/SD-4, Enclosure 4.2, Step 3.10.2	To maximize charging flow, adjust NC Pump Seal Water Injection Throttles to 8-10 gpm.	Aux. Bldg. (733') Ledge Outside VCT Room	3	No

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

MNS Procedure and Step	Step Action	Building/Elevation/Room	Mode	If action not performed does this prevent cooldown/ shutdown?
OP/1&2/A/6100/SD-4, Step 3.15	Secondary Chemistry to check S/G sulfate meets chemistry criteria for continued cooldown.	Chemistry Lab and Turbine Bldg. (739') North Wall	4	No
OP/1&2/A/6100/SO-10, Step 3.8	Stroke time testing of PORVs per PT/1/A/4151/005 (NC Valve Stroke Timing Test Using Air). Enclosures 13.4, 13.5, 13.6	Inside Containment	4	No
OP/1&2/A/6100/SO-10, Step 3.11.1, 3.11.2, 3.11.3	Rack out and tag one NV and both NI Pumps per OP/0/A/6350/008 (Operation of Station Breakers).	ETA (750'), ETB (733')	4	Yes
OP/1&2/A/6100/SO-10, Step 3.12	If LTOP vent requirements are to be satisfied by securing 1NC-36B (Pzr PORV) open, Maintenance gags 1NC-36B (Pzr PORV).	Inside Containment	4	No
OP/1&2/A/6100/SD-6A(B), Step 3.3	Unlock and close 1/2ND-119 (1/2 A ND ECCS Sump Suction Relief Inlet Isol #2).	P/C, RHole, near 1NI-185, Outside CAD 212 (716') ABPC thru CAD Door, FF59 (716')	4	Yes
OP/1&2/A/6100/SD-6A(B), Enclosure 4.1, Step 3.6	Perform PT/1/A/4206/030 (Draining ECCS Sump Piping Drain Reservoir Train A), Enclosure 13.1 (Draining ECCS Sump Piping Drain Reservoir Train A in Modes 1 4) and PT/1/A/4206/031 (Draining ECCS Sump Piping Drain Reservoir Train B), Enclosure 13.1 (Draining ECCS Sump Piping Drain Reservoir Train B in Modes 1 4).	Aux Building Pipechase (716')	4	No
OP/1&2/A/6100/SD- 6A(B), Encl. 4.1, Step 3.8	Monitor and shift NC System Filters on high DP.	Aux Building (716'/733') at NC Filters Room	4	No

ATTACHMENT 3
Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis

MNS Procedure and Step	Step Action	Building/Elevation/Room	Mode	If action not performed does this prevent cooldown/ shutdown?
OP/1&2/A/6100/SD-6A(B), Encl. 4.2 Step 3.7	De-energize 1/2ND-68A (A ND Pump & A Hx Miniflow) in the open position at 1/2EMXA-F12B (1/2ND-68A).	ETA Aux. Bldg. (750')	4	Yes
OP/1&2/A/6100/SD- 6A(B), Step 3.31.1	Adjust flow through Cation Bed Demineralizer per OP/1/A/6200/001 D (Chemical and Volume Control System Demineralizers).	Aux Building (750') over Demin Pits	4	No
OP/1&2/A/6100/S0-6, Step 3.4.3	De-energize 1/2ND-67B (B ND Pump & B Hx Miniflow) in the open position at 1/2EMXB1-2C (1/2ND-67B).	ETB Aux. Bldg. (733')	4	Yes

Table R-2 & H-2 Results

Table R-2/H-2	Safe Operation & Shutdown Rooms/Areas		
Bldg. Elevation	**Unit 1 Room/Area**	**Unit 2 Room/Area**	**Modes**
Auxiliary 716'	P/C,RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750'	800 (1EMXA)	820 (2EMXA)	3, 4
	803 (1ETA)	805 (2ETA)	3, 4
Auxiliary 733'	702 (Elec. Pene.)	713 (Elec. Pene.)	3
	722 (1EMXB-1)	724 (2EMXB-1)	3, 4
	705 (1ETB)	716 (2ETB)	3, 4

Plant Operating Procedures Reviewed

1. OP/1&2/A/6100/003
2. OP/1&2/A/6100/SD-1
3. OP/1&2/A/6100/SD-2
4. OP/1&2/A/6100/SD-4
5. OP/1&2/A/6100/SD-10
6. OP/1&2/A/6100/SD-6A(B)
7. OP/1&2/A/6100/SO-6
8. OP/1&2/A/6100/SO-10

R — Abnorm. Rad Levels / Rad Effluent

General Emergency

1 — Rad Effluent

RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE
1 2 3 4 5 6 NM

RG1.1
Reading on **any** Table R-1 effluent radiation monitor > column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RG1.2
Dose assessment using actual meteorology indicates doses > 1,000 mrem TEDE or 5,000 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RG1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 1,000 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 5,000 mrem for 60 min. of inhalation.

(Notes 1, 2)

2 — Irradiated Fuel Event

RG2 Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer
1 2 3 4 5 6 NM

RG2.1
Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	---------	---------	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	---------
Liquid	Liquid Waste Effluent Line High	EMF49H	---------	---------	---------	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	---------	---------	---------	4.29E+2 cpm

3 — Area Rad Levels

None

Table R-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Modes
Auxiliary 716'	P/C, RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750'	800 (1EMXA)	820 (2EMXA)	3, 4
	803 (1ETA)	805 (2ETA)	3, 4
Auxiliary 733'	702 (Elec. Pene.)	713 (Elec. Pene.)	3
	722 (1EMXB-1)	724 (2EMXB-1)	3, 4
	705 (1ETB)	716 (2ETB)	3, 4

Site Area Emergency

1 — Rad Effluent

RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE
1 2 3 4 5 6 NM

RS1.1
Reading on **any** Table R-1 effluent radiation monitor > column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4)

RS1.2
Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RS1.3
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 500 mrem for 60 min. of inhalation.

(Notes 1, 2)

2 — Irradiated Fuel Event

RS2 Spent fuel pool level at the top of the fuel racks
1 2 3 4 5 6 NM

RS2.1
Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)

3 — Area Rad Levels

None

Alert

1 — Rad Effluent

RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE
1 2 3 4 5 6 NM

RA1.1
Reading on **any** Table R-1 effluent radiation monitor > column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4)

RA1.2
Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4)

RA1.3
Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY for 60 min. of exposure (Notes 1, 2)

RA1.4
Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY:
- Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min.
- Analyses of field survey samples indicate thyroid CDE > 50 mrem for 60 min. of inhalation.

(Notes 1, 2)

2 — Irradiated Fuel Event

RA2 Significant lowering of water level above, or damage to, irradiated fuel
1 2 3 4 5 6 NM

RA2.1
Uncovery of irradiated fuel in the REFUELING PATHWAY

RA2.2
Damage to irradiated fuel resulting in a release of radioactivity
AND
A Trip 2 radiation alarm on **any** of the following radiation monitor indications:
- 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6)
- 1EMF42 (2EMF42) Fuel Building Ventilation
- 1EMF39 (2EMF39) Containment Gas

RA2.3
Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)

3 — Area Rad Levels

RA3 Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown
1 2 3 4 5 6 NM

RA3.1
Dose rates > 15 mR/hr in **EITHER** of the following areas:
Control Room (1EMF12)
OR
Central Alarm Station (by survey)

RA3.2
An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **any** Table R-2 rooms or areas (Note 5)

None

Unusual Event

1 — Rad Effluent

RU1 Release of gaseous or liquid radioactivity greater than 2 times the SLC limits for 60 minutes or longer
1 2 3 4 5 6 NM

RU1.1
Reading on **any** Table R-1 effluent radiation monitor > column "UE" for ≥ 60 min. (Notes 1, 2, 3)

RU1.2
Sample analysis for a gaseous or liquid release indicates a concentration or release rate > 2 x SLC limits for ≥ 60 min. (Notes 1, 2)

2 — Irradiated Fuel Event

RU2 Unplanned loss of water level above irradiated fuel
1 2 3 4 5 6 NM

RU2.1
UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication
AND
UNPLANNED rise in corresponding area radiation levels as indicated by **EITHER** of the following radiation monitors:
- 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge
- 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6)

3 — Area Rad Levels

None

H — Hazards

General Emergency

1 — Security

None

2 — Seismic Event

None

3 — Natural or Tech. Hazard

None

4 — Fire

None

5 — Hazardous Gases

None

6 — Control Room Evacuation

MNS

7 — EC Judgment

HG7 Other conditions exist which in the judgment of the Emergency Coordinator warrant declaration of a General Emergency
1 2 3 4 5 6 NM

HG7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area

Site Area Emergency

1 — Security

HS1 HOSTILE ACTION within the Protected Area
1 2 3 4 5 6 NM

HS1.1
A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision

2 — Seismic Event

None

3 — Natural or Tech. Hazard

None

4 — Fire

[Refer to EAL CA6.1 OR SA9.1 for escalation due to FIRE]

Table H-1 Fire Areas
- Containment
- Auxiliary Building
- Diesel Generator Rooms
- FWST
- Dog Houses
- Standby Shutdown Facility (SSF)

5 — Hazardous Gases

HA5 Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown
3 4

HA5.1
Release of a toxic, corrosive, asphyxiant or flammable gas into **any** Table H-2 rooms or areas
AND
Entry into the room or area is prohibited or IMPEDED (Note 5)

6 — Control Room Evacuation

HS6 Inability to control a key safety function from outside the Control Room
1 2 3 4 5 6

HS6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF)
AND
Control of **any** of the following key safety functions is not reestablished within 15 min. (Note 1):
- Reactivity (Modes 1, 2, and 3 **only**)
- Core Cooling
- NCS heat removal

7 — EC Judgment

HS7 Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a Site Area Emergency
1 2 3 4 5 6 NM

HS7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.

Alert

1 — Security

HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes
1 2 3 4 5 6 NM

HA1.1
A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision

HA1.2
A validated notification from NRC of an aircraft attack threat within 30 min. of the site

2 — Seismic Event

[Refer to EAL CA6.1 OR SA9.1 for escalation due to seismic event]

3 — Natural or Tech. Hazard

[Refer to EAL CA6.1 OR SA9.1 for escalation due to natural or technological hazard]

4 — Fire

[Refer to EAL CA6.1 OR SA9.1 for escalation due to FIRE]

5 — Hazardous Gases

None

6 — Control Room Evacuation

HA6 Control Room evacuation resulting in transfer of plant control to alternate locations
1 2 3 4 5 6 NM

HA6.1
An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF)

7 — EC Judgment

HA7 Other conditions exist that in the judgment of the Emergency Coordinator warrant declaration of an Alert
1 2 3 4 5 6 NM

HA7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Unusual Event

1 — Security

HU1 Confirmed SECURITY CONDITION or threat
1 2 3 4 5 6 NM

HU1.1
A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by Security Shift Supervision

HU1.2
Notification of a credible security threat directed at the site

HU1.3
A validated notification from the NRC providing information of an aircraft threat

2 — Seismic Event

HU2 Seismic event greater than OBE levels
1 2 3 4 5 6 NM

HU2.1
Seismic event > OBE as indicated by OBE EXCEEDED alarm on 1AD-13, E7

3 — Natural or Tech. Hazard

HU3 Hazardous event
1 2 3 4 5 6 NM

HU3.1
A tornado strike within the PROTECTED AREA

HU3.2
Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode

HU3.3
Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release)

HU3.4
A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)

4 — Fire

HU4 FIRE potentially degrading the level of safety of the plant
1 2 3 4 5 6 NM

HU4.1
A FIRE is **not** extinguished within 15 min. of **any** of the following FIRE detection indications (Note 1):
- Report from the field (i.e., visual observation)
- Receipt of multiple (more than 1) fire alarms or indications
- Field verification of a single fire alarm

AND
The FIRE is located within any Table H-1 area

HU4.2
Receipt of a single fire alarm (i.e., no other indications of a FIRE)
AND
The fire alarm is indicating a FIRE within any Table H-1 area
AND
The existence of a FIRE is not verified within 30 min. of alarm receipt (Note 1)

HU4.3
A FIRE within the plant PROTECTED AREA not extinguished within 60 min. of the initial report, alarm or indication (Note 1)

HU4.4
A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish

5 — Hazardous Gases

None

6 — Control Room Evacuation

None

7 — EC Judgment

HU7 Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a UE
1 2 3 4 5 6 NM

HU7.1
Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

E — ISFSI

Table E-1 ISFSI Dose Limits

NAC Magnastor	NAC UMS	Transnuclear (TN-32)
• 240 mrem/hr (gamma) on the side of the cask (excludes air inlet/outlet ports) • 10 mrem/hr (neutron) on the side of the cask (excludes air inlet/outlet ports) • 900 mrem/hr (neutron + gamma) on the top of the cask (excludes air inlet/outlet ports)	• 100 mrem/hr (neutron + gamma) on the side of the cask • 100 mrem/hr (neutron + gamma) on the top of the cask • 200 mrem/hr (neutron + gamma) at air inlets and outlets	• 120 mrem/hr (gamma) or 20 mrem/hr (neutron) on top of the cask • 340 mrem/hr (gamma) or 40 mrem/hr (neutron) on the sides of the radial neutron shield • 560 mrem/hr (gamma) or 280 mrem/hr (neutron) on the side surfaces above the radial neutron shield region • 220 mrem/hr (gamma) or 400 mrem/hr (neutron) on the side surfaces below the radial neutron shield region

EU1 Damage to a loaded cask CONFINEMENT BOUNDARY
1 2 3 4 5 6 NM

EU1.1
Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading on the surface of a loaded spent fuel cask > **any** Table E-1 dose limit

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the NCS pressure increase criteria when in Mode 5 or based on time to boil data when in Mode 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL **only** applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Modes: 1 Power Operations | 2 Startup | 3 Hot Standby | 4 Hot Shutdown | 5 Cold Shutdown | 6 Refuel | NM No Mode

DUKE ENERGY.

McGuire Nuclear Station

CSD-EP-MNS-0101-02 Rev 002

S — System Malfunct.

General Emergency

1 — Loss of Essential AC Power

SG1 Prolonged loss of **all** offsite and **all** onsite AC power to essential buses
1 2 3 4

SG1.1
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB
AND EITHER:
- Restoration of at least one essential bus in < 4 hours is **not** likely (Note 1)
- Core Cooling RED PATH conditions met

SG1 Loss of **all** essential AC and vital DC power sources for 15 minutes or longer
1 2 3 4

SG1.2
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min.
AND
Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **both** vital DC buses EVDA and EVDD for ≥ 15 min.
(Note 1)

2 — Loss of Vital DC Power

None

3 — Loss of CR Indications

None

4 — NCS Activity

None

5 — NCS Leakage

None

6 — RPS Failure

None

7 — Loss of Comm.

None

8 — CMT Failure

None

9 — Hazardous Event Affecting Safety Systems

None

Site Area Emergency

1 — Loss of Essential AC Power

SS1 Loss of **all** offsite and **all** onsite AC power to essential buses for 15 minutes or longer
1 2 3 4

SS1.1
Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

2 — Loss of Vital DC Power

SS2 Loss of all vital DC power for 15 minutes or longer
1 2 3 4

SS2.1
Loss of **all** 125 VDC power based on battery bus voltage indications < 105 VDC on **both** vital DC buses EVDA and EVDD for ≥ 15 min. (Note 1)

3 — Loss of CR Indications

Table S-3 Significant Transients
- Reactor trip
- Runback > 25% thermal power
- Electrical load rejection > 25% electrical load
- Safety injection actuation

4 — NCS Activity

None

5 — NCS Leakage

None

6 — RPS Failure

SS6 Inability to shut down the reactor causing a challenge to core cooling or NCS heat removal
1

SS6.1
An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%
AND
All actions to shut down the reactor are **not** successful as indicated by reactor power ≥ 5%
AND EITHER:
- Core Cooling RED PATH conditions met
- Heat Sink RED PATH conditions met

7 — Loss of Comm.

None

8 — CMT Failure

None

9 — Hazardous Event Affecting Safety Systems

None

Alert

1 — Loss of Essential AC Power

SA1 Loss of **all but one** AC power source to essential buses for 15 minutes or longer
1 2 3 4

SA1.1
AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1)
AND
Any additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

Table S-1 AC Power Sources

Offsite
- ATC (Train A)
- SATA (Train A)
- ATD (Train B)
- SATB (Train B)

Onsite
- D/G 1(2) A (Train A)
- D/G 1(2) B (Train B)

2 — Loss of Vital DC Power

None

3 — Loss of CR Indications

SA3 UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress
1 2 3 4

SA3.1
An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)
AND
Any significant transient is in progress, Table S-3

4 — NCS Activity

Table S-2 Safety System Parameters
- Reactor power
- NCS level
- NCS pressure
- Core exit T/C temperature
- Level in at least one S/G
- Auxiliary feed flow in at least one S/G

5 — NCS Leakage

None

6 — RPS Failure

SA6 Automatic or manual trip fails to shut down the reactor and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor
1

SA6.1
An automatic or manual trip fails to shut down the reactor as indicated by reactor power ≥ 5%
AND
Manual trip actions taken at the reactor control console (manual reactor trip switches or turbine manual trip) are **not** successful in shutting down the reactor as indicated by reactor power ≥ 5% (Note 8)

Table S-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

Table S-5 Hazardous Events
- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

7 — Loss of Comm.

None

8 — CMT Failure

None

9 — Hazardous Event Affecting Safety Systems

None

Unusual Event

1 — Loss of Essential AC Power

SU1 Loss of **all** offsite AC power capability to essential buses for 15 minutes or longer
1 2 3 4

SU1.1
Loss of **all** offsite AC power capability, Table S-1, to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)

2 — Loss of Vital DC Power

None

3 — Loss of CR Indications

SU3 UNPLANNED loss of Control Room indications for 15 minutes or longer
1 2 3 4

SU3.1
An UNPLANNED event results in the inability to monitor one or more Table S-2 parameters from within the Control Room for ≥ 15 min. (Note 1)

4 — NCS Activity

SU4 NCS activity greater than Technical Specification allowable limits
1 2 3 4

SU4.1
NCS activity > **any** of the following Technical Specification 3.4.16 limits:
- Dose Equivalent I-131 > 1.0 µCi/gm for > 48 hrs.
- Dose Equivalent I-131 > 60 µCi/gm
- Dose Equivalent Xe-133 > 280 µCi/gm

5 — NCS Leakage

SU5 NCS leakage for 15 minutes or longer
1 2 3 4

SU5.1
NCS unidentified or pressure boundary leakage > 10 gpm for ≥ 15 min.
OR
NCS identified leakage > 25 gpm for ≥ 15 min.
OR
Leakage from the NCS to a location outside containment > 25 gpm for ≥ 15 min.
(Note 1)

6 — RPS Failure

SU6 Automatic or manual trip fails to shut down the reactor
1

SU6.1
An automatic trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** RPS setpoint is exceeded
AND
A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

SU6.2
A manual trip did **not** shut down the reactor as indicated by reactor power ≥ 5% after **any** manual trip action was initiated
AND
A subsequent automatic trip or manual trip action taken at the reactor control console (manual reactor trip switches or turbine manual trip) is successful in shutting down the reactor as indicated by reactor power < 5% (Note 8)

7 — Loss of Comm.

SU7 Loss of **all** onsite or offsite communications capabilities
1 2 3 4

SU7.1
Loss of **all** Table S-4 onsite communication methods
OR
Loss of **all** Table S-4 ORO communication methods
OR
Loss of **all** Table S-4 NRC communication methods

8 — CMT Failure

SU8 Failure to isolate containment or loss of containment pressure control
1 2 3 4

SU8.1
EITHER:
Any penetration is not isolated within 15 min. of a VALID containment isolation signal (Note 1)
OR
Containment pressure > 3 psig with **EITHER** a failure of both trains of NS **OR** failure of both trains of VX-CARF for ≥ 15 min. (Notes 1, 10)

9 — Hazardous Event Affecting Safety Systems

None

MNS

Table F-2 Containment Radiation - R/hr (EMF51A & B)

Time After S/D (Hrs)	NCS Loss	FC Loss	CMT Potential Loss
0 - 1	8.8	550	5500
1 - 2	8.4	400	4000
2 - 8	7.0	160	1600
>8	6.2	100	1000

F — Fission Product Barriers

FG1.1 1 2 3 4
Loss of **any** two barriers
AND
Loss **OR** potential loss of third barrier (Table F-1)

FS1.1 1 2 3 4
Loss **OR** potential loss of **any** two barriers (Table F-1)

FA1.1 1 2 3 4
Any loss **OR any** potential loss of either Fuel Clad or NCS (Table F-1)

Table F-1 Fission Product Barrier Threshold Matrix

Category	Fuel Clad (FC) Barrier		Reactor Coolant System (NCS) Barrier		Containment (CMT) Barrier	
	Loss	Potential Loss	Loss	Potential Loss	Loss	Potential Loss
A. NCS or SG Tube Leakage	None	None	1. An automatic or manual ECCS (SI) actuation required by EITHER: • UNISOLABLE NCS leakage • SG tube RUPTURE	1. Operation of a standby charging pump is required by EITHER: • UNISOLABLE NCS leakage • SG tube leakage 2. Integrity-RED PATH conditions met	1. A leaking or RUPTURED SG is FAULTED outside of containment	None
B. Inadequate Heat Removal	1. Core Cooling-RED PATH conditions met	1. Core Cooling-ORANGE PATH conditions met 2. Heat Sink-RED PATH conditions met **AND** Heat Sink is required	None	1. Heat Sink-RED PATH conditions met **AND** Heat Sink is required	None	1. Core Cooling-RED PATH conditions met **AND** Restoration procedures **not** effective within 15 min. (Note 1)
C. CMT Radiation / NCS Activity	1. EMF51A/B > Table F-2 column "FC Loss" 2. Dose equivalent I-131 coolant activity > 300 µCi/gm	None	1. EMF51A/B > Table F-2 column "NCS Loss"	None	None	1. EMF51A/B > Table F-2 column "CMT Potential Loss"
D. CMT Integrity or Bypass	None	None	None	None	1. Containment isolation is required **AND EITHER** • Containment integrity has been lost based on EC judgment • UNISOLABLE pathway from Containment to the environment exists 2. Indications of NCS leakage outside of containment	1. Containment-RED PATH conditions met 2. Containment hydrogen concentration > 6% 3. Containment pressure > 3 psig with **EITHER** a failure of both trains of NS **OR** failure of both trains of VX-CARF for ≥ 15 min. (Notes 1, 10)
E. EC Judgment	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the fuel clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the fuel clad barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the NCS barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates loss of the containment barrier	1. **Any** condition in the opinion of the Emergency Coordinator that indicates potential loss of the containment barrier

EAL- HOT MODES 1, 2, 3 & 4

R — Abnorm. Rad Levels / Rad Effluent

R1 — Rad Effluent

General Emergency	Site Area Emergency	Alert	Unusual Event
RG1 Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE 1 2 3 4 5 6 NM **RG1.1** Reading on **any** Table R-1 effluent radiation monitor > column "GE" for ≥ 15 min. (Notes 1, 2, 3, 4) **RG1.2** Dose assessment using actual meteorology indicates doses > 1,000 mrem TEDE or 5,000 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4) **RG1.3** Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY: • Closed window dose rates > 1,000 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate thyroid CDE > 5,000 mrem for 60 min. of inhalation. (Notes 1, 2)	RS1 Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE 1 2 3 4 5 6 NM **RS1.1** Reading on **any** Table R-1 effluent radiation monitor > column "SAE" for ≥ 15 min. (Notes 1, 2, 3, 4) **RS1.2** Dose assessment using actual meteorology indicates doses > 100 mrem TEDE or 500 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4) **RS1.3** Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY: • Closed window dose rates > 100 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate thyroid CDE > 500 mrem for 60 min. of inhalation. (Notes 1, 2)	RA1 Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE 1 2 3 4 5 6 NM **RA1.1** Reading on **any** Table R-1 effluent radiation monitor > column "ALERT" for ≥ 15 min. (Notes 1, 2, 3, 4) **RA1.2** Dose assessment using actual meteorology indicates doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY (Note 4) **RA1.3** Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses > 10 mrem TEDE or 50 mrem thyroid CDE at or beyond the SITE BOUNDARY for 60 min. of exposure (Notes 1, 2) **RA1.4** Field survey results indicate **EITHER** of the following at or beyond the SITE BOUNDARY: • Closed window dose rates > 10 mR/hr expected to continue for ≥ 60 min. • Analyses of field survey samples indicate thyroid CDE > 50 mrem for 60 min. of inhalation. (Notes 1, 2)	RU1 Release of gaseous or liquid radioactivity greater than 2 times the SLC limits for 60 minutes or longer 1 2 3 4 5 6 NM **RU1.1** Reading on **any** Table R-1 effluent radiation monitor > column "UE" for ≥ 60 min. (Notes 1, 2, 3) **RU1.2** Sample analysis for a gaseous or liquid release indicates a concentration or release rate > 2 x SLC limits for ≥ 60 min. (Notes 1, 2)

R2 — Irradiated Fuel Event

General Emergency	Site Area Emergency	Alert	Unusual Event
RG2 Spent fuel pool level cannot be restored to at least the top of the fuel racks for 60 minutes or longer 1 2 3 4 5 6 NM **RG2.1** Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	RS2 Spent fuel pool level at the top of the fuel racks 1 2 3 4 5 6 NM **RS2.1** Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)	RA2 Significant lowering of water level above, or damage to, irradiated fuel 1 2 3 4 5 6 NM **RA2.1** Uncovery of irradiated fuel in the REFUELING PATHWAY **RA2.2** Damage to irradiated fuel resulting in a release of radioactivity **AND** A Trip 2 radiation alarm on **any** of the following radiation monitor indications: • 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge • 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6) • 1EMF42 (2EMF42) Fuel Building Ventilation • 1EMF39 (2EMF39) Containment Gas **RA2.3** Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)	RU2 Unplanned loss of water level above irradiated fuel 1 2 3 4 5 6 NM **RU2.1** UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication **AND** UNPLANNED rise in corresponding area radiation levels as indicated by **EITHER** of the following radiation monitors: • 1EMF17 (2EMF4) Spent Fuel Building Refueling Bridge • 1EMF16 (2EMF3) Containment Building Refueling Bridge (Mode 6)

Table R-1 Effluent Monitor Classification Thresholds

	Release Point	Monitor	GE	SAE	Alert	UE
Gaseous	Unit Vent Noble Gas Low	1(2)EMF36L	---------	---------	4.85E+6 cpm	3.10E+3 cpm
Gaseous	Unit Vent Noble Gas High	1(2)EMF36H	2.61E+4 cpm	2.61E+3 cpm	2.70E+2 cpm	---------
Liquid	Liquid Waste Effluent Line High	EMF49H	---------	---------	---------	2.15E+2 cpm
Liquid	CVUCDT High	1(2)EMF44H	---------	---------	---------	4.29E+2 cpm

R3 — Area Rad Levels

General Emergency	Site Area Emergency	Alert	Unusual Event
		RA3 Radiation levels that IMPEDE access to equipment necessary for normal plant operations, cooldown or shutdown 1 2 3 4 5 6 NM **RA3.1** Dose rates > 15 mR/hr in **EITHER** of the following areas: Control Room (1EMF12) **OR** Central Alarm Station (by survey) **RA3.2** An UNPLANNED event results in radiation levels that prohibit or IMPEDE access to **any** Table R-2 rooms or areas (Note 5)	None

Table R-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Modes
Auxiliary 716'	P/C, RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750'	800 (1EMXA) 803 (1ETA)	820 (2EMXA) 805 (2ETA)	3, 4 3, 4
Auxiliary 733'	702 (Elec. Pene.) 722 (1EMXB-1) 705 (1ETB)	713 (Elec. Pene.) 724 (2EMXB-1) 716 (2ETB)	3 3, 4 3, 4

H — Hazards

H1 — Security

General Emergency	Site Area Emergency	Alert	Unusual Event
None	HS1 HOSTILE ACTION within the Protected Area 1 2 3 4 5 6 NM **HS1.1** A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Shift Supervision	HA1 HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes 1 2 3 4 5 6 NM **HA1.1** A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervision **HA1.2** A validated notification from NRC of an aircraft attack threat within 30 min. of the site	HU1 Confirmed SECURITY CONDITION or threat 1 2 3 4 5 6 NM **HU1.1** A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by the Security Shift Supervision **HU1.2** Notification of a credible security threat directed at the site **HU1.3** A validated notification from the NRC providing information of an aircraft threat

H2 — Seismic Event

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	[Refer to EAL CA6.1 OR SA9.1 for escalation due to seismic event]	HU2 Seismic event greater than OBE levels 1 2 3 4 5 6 NM **HU2.1** Seismic event > OBE as indicated by OBE EXCEEDED alarm on 1AD-13, E7

H3 — Natural or Tech. Hazard

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	[Refer to EAL CA6.1 OR SA9.1 for escalation due to natural or technological hazard]	HU3 Hazardous event 1 2 3 4 5 6 NM **HU3.1** A tornado strike within the PROTECTED AREA **HU3.2** Internal room or area FLOODING of a magnitude sufficient to require manual or automatic electrical isolation of a SAFETY SYSTEM component needed for the current operating mode **HU3.3** Movement of personnel within the PROTECTED AREA is IMPEDED due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release) **HU3.4** A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles (Note 7)

H4 — Fire

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	[Refer to EAL CA6.1 OR SA9.1 for escalation due to FIRE]	HU4 FIRE potentially degrading the level of safety of the plant 1 2 3 4 5 6 NM **HU4.1** A FIRE is **not** extinguished within 15 min. of **any** of the following FIRE detection indications (Note 1): • Report from the field (i.e., visual observation) • Receipt of multiple (more than 1) fire alarms or indications • Field verification of a single fire alarm **AND** The FIRE is located within any Table H-1 area **HU4.2** Receipt of a single fire alarm (i.e., no other indications of a FIRE) **AND** The fire alarm is indicating a FIRE within any Table H-1 area **AND** The existence of a FIRE is not verified within 30 min. of alarm receipt (Note 1) **HU4.3** A FIRE within the plant PROTECTED AREA not extinguished within 60 min. of the initial report, alarm or indication (Note 1) **HU4.4** A FIRE within the plant PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish

Table H-1 Fire Areas

- Containment
- Auxiliary Building
- Diesel Generator Rooms
- FWST
- Dog Houses
- Standby Shutdown Facility (SSF)

H5 — Hazardous Gases

General Emergency	Site Area Emergency	Alert	Unusual Event
		HA5 Gaseous release IMPEDING access to equipment necessary for normal plant operations, cooldown or shutdown 3 4 **HA5.1** Release of a toxic, corrosive, asphyxiant or flammable gas into **any** Table H-2 rooms or areas **AND** Entry into the room or area is prohibited or IMPEDED (Note 5)	None

Table H-2 Safe Operation & Shutdown Rooms/Areas

Bldg. Elevation	Unit 1 Room/Area	Unit 2 Room/Area	Modes
Auxiliary 716'	P/C, RHole, near 1NI-185, Outside CAD 212	ABPC thru CAD Door, FF59	4
Auxiliary 750'	800 (1EMXA) 803 (1ETA)	820 (2EMXA) 805 (2ETA)	3, 4 3, 4
Auxiliary 733'	702 (Elec. Pene.) 722 (1EMXB-1) 705 (1ETB)	713 (Elec. Pene.) 724 (2EMXB-1) 716 (2ETB)	3 3, 4 3, 4

H6 — Control Room Evacuation

General Emergency	Site Area Emergency	Alert	Unusual Event
MNS	HS6 Inability to control a key safety function from outside the Control Room 1 2 3 4 5 6 **HS6.1** An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF) **AND** Control of **any** of the following key safety functions is **not** reestablished within 15 min. (Note 1): • Reactivity (Modes 1, 2, and 3 **only**) • Core Cooling • NCS heat removal	HA6 Control Room evacuation resulting in transfer of plant control to alternate locations 1 2 3 4 5 6 NM **HA6.1** An event has resulted in plant control being transferred from the Control Room to the Auxiliary Shutdown Panels or Standby Shutdown Facility (SSF)	None

H7 — EC Judgment

General Emergency	Site Area Emergency	Alert	Unusual Event
HG7 Other conditions exist which in the judgment of the Emergency Coordinator warrant declaration of a General Emergency 1 2 3 4 5 6 NM **HG7.1** Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area	HS7 Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a Site Area Emergency 1 2 3 4 5 6 NM **HS7.1** Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the SITE BOUNDARY.	HA7 Other conditions exist that in the judgment of the Emergency Coordinator warrant declaration of an Alert 1 2 3 4 5 6 NM **HA7.1** Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.	HU7 Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a UE 1 2 3 4 5 6 NM **HU7.1** Other conditions exist which in the judgment of the Emergency Coordinator indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of SAFETY SYSTEMS occurs.

E — ISFSI

General Emergency	Site Area Emergency	Alert	Unusual Event
			EU1 Damage to a loaded cask CONFINEMENT BOUNDARY 1 2 3 4 5 6 NM **EU1.1** Damage to a loaded canister CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading on the surface of a loaded spent fuel cask > **any** Table E-1 dose limit

Table E-1 ISFSI Dose Limits

NAC Magnastor	NAC UMS	Transnuclear (TN-32)
• 240 mrem/hr (gamma) on the side of the cask (excludes air inlet/outlet ports) • 10 mrem/hr (neutron) on the side of the cask (excludes air inlet/outlet ports) • 900 mrem/hr (neutron + gamma) on the top of the cask (excludes air inlet/outlet ports)	• 100 mrem/hr (neutron + gamma) on the side of the cask • 100 mrem/hr (neutron + gamma) on the top of the cask • 200 mrem/hr (neutron + gamma) at air inlets and outlets	• 120 mrem/hr (gamma) or 20 mrem/hr (neutron) on top of the cask • 340 mrem/hr (gamma) or 40 mrem/hr (neutron) on the sides of the radial neutron shield • 560 mrem/hr (gamma) or 280 mrem/hr (neutron) on the side surfaces above the radial neutron shield region • 220 mrem/hr (gamma) or 400 mrem/hr (neutron) on the side surfaces below the radial neutron shield region

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the NCS pressure increase criteria when in Mode 5 or based on time to boil data when in Mode 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL **only** applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Modes: 1 Power Operations | 2 Startup | 3 Hot Standby | 4 Hot Shutdown | 5 Cold Shutdown | 6 Refuel | NM No Mode

DUKE ENERGY.

McGuire Nuclear Station

CSD-EP-MNS-0101-02 Rev 002

C — Cold SD/ Refuel System Malfunct.

C1 — NCS Level

General Emergency	Site Area Emergency	Alert	Unusual Event
CG1 Loss of NCS inventory affecting fuel clad integrity with containment challenged 5 6 **CG1.1** NCS water level **cannot** be monitored for ≥ 30 min. (Note 1) **AND** Core uncovery is indicated by **any** of the following: • UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory • Visual observation of UNISOLABLE NCS leakage • Reactor Building Refueling Bridge Monitor 1EMF16 (2EMF3) reading > 9,000 mR/hr • Erratic Source Range or Wide Range Flux Monitor indication **AND** **Any** Containment Challenge indication, Table C-1	CS1 Loss of NCS inventory affecting core decay heat removal capability 5 6 **CS1.1** NCS water level cannot be monitored for ≥ 30 min. (Note 1) **AND** Core uncovery is indicated by **any** of the following: • UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory • Visual observation of unisolable NCS leakage • Reactor Building Refueling Bridge Monitor 1EMF16 (2EMF3) reading > 9000 mR/hr (Mode 6) • Erratic Source Range or Wide Range Flux Monitor indication	CA1 Loss of NCS inventory 5 6 **CA1.1** Loss of NCS inventory as indicated by NCS water level < 5 in. above hotleg centerline **CA1.2** NCS water level cannot be monitored for ≥ 15 min. (Note 1) **AND EITHER** • UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory • Visual observation of unisolable NCS leakage	CU1 UNPLANNED loss of NCS inventory for 15 minutes or longer 5 6 **CU1.1** UNPLANNED loss of reactor coolant results in NCS water level less than a required lower limit for ≥ 15 min. (Note 1) **CU1.2** NCS water level cannot be monitored **AND EITHER** • UNPLANNED increase in **any** Table C-6 sump or tank level due to a loss of NCS inventory • Visual observation of unisolable NCS leakage

Table C-1 Containment Challenge Indications

- CONTAINMENT CLOSURE **not** established (Note 6)
- Containment hydrogen concentration > 6%
- UNPLANNED rise in containment pressure

Table C-6 Sumps/Tanks

- NCDT
- PRT
- CFAE sump
- ND/NS sump
- RHT
- WDT
- WEFT
- SRST

Table C-2 AC Power Sources

Offsite
- ATC (Train A)
- SATA (Train A)
- ATD (Train B)
- SATB (Train B)

Onsite
- D/G 1(2) A (Train A)
- D/G 1(2) B (Train B)

C2 — Loss of Essential AC Power

General Emergency	Site Area Emergency	Alert	Unusual Event
		CA2 Loss of **all** offsite and **all** onsite AC power to essential buses for 15 minutes or longer 5 6 NM **CA2.1** Loss of **all** offsite and **all** onsite AC power capability to essential 4160V buses 1(2)ETA and 1(2)ETB for ≥ 15 min. (Note 1)	CU2 Loss of all but one AC power source to essential buses for 15 minutes or longer 5 6 NM **CU2.1** AC power capability, Table C-2, to essential 4160V buses 1(2)ETA and 1(2)ETB reduced to a single power source for ≥ 15 min. (Note 1) **AND** **Any** additional single power source failure will result in loss of **all** AC power to SAFETY SYSTEMS

C3 — NCS Temp.

General Emergency	Site Area Emergency	Alert	Unusual Event
		CA3 Inability to maintain plant in cold shutdown 5 6 **CA3.1** UNPLANNED increase in NCS temperature to > 200°F for > Table C-3 duration (Notes 1,9) **OR** UNPLANNED NCS pressure increase > 20 psig due to a loss of NCS cooling (this does **not** apply during water-solid plant conditions)	CU3 UNPLANNED increase in NCS temperature 5 6 **CU3.1** UNPLANNED increase in NCS temperature to > 200°F due to loss of decay heat removal capability **CU3.2** Loss of **all** NCS temperature and NCS level indication for ≥ 15 min. (Note 1)

Table C-3 NCS Heat-up Duration Thresholds

NCS Status	Containment Closure Status	Heat-up Duration
Intact (but **not** reduced inventory)	N/A	60 min.*
Not intact **OR** At reduced inventory	established	20 min.*
	not established	0 min.

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

C4 — Loss of Vital DC Power

General Emergency	Site Area Emergency	Alert	Unusual Event
None			CU4 Loss of Vital DC power for 15 minutes or longer 5 6 **CU4.1** < 105 VDC bus voltage indications on Technical Specification **required** 125 VDC buses for ≥ 15 min. (Note 1)

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

C5 — Loss of Comm.

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None		CU5 Loss of **all** onsite or offsite communications capabilities 5 6 NM **CU5.1** Loss of **all** Table C-4 onsite communication methods **OR** Loss of **all** Table C-4 ORO communication methods **OR** Loss of **all** Table C-4 NRC communication methods

C6 — Hazardous Event Affecting Safety Systems

General Emergency	Site Area Emergency	Alert	Unusual Event
None		CA6 Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode 5 6 **CA6.1** The occurrence of **any** Table C-5 hazardous event **AND** Event damage has caused indications of degraded performance on one train of a SAFETY SYSTEM needed for the current operating mode **AND EITHER** of the following: • Event damage has caused indications of degraded performance to a second train of the SAFETY SYSTEM needed for the current operating mode. • Event damage has resulted in VISIBLE DAMAGE to the second train of the SAFETY SYSTEM needed for the current operating mode (Note 11, 12)	None

Table C-5 Hazardous Events

- Seismic event (earthquake)
- Internal or external FLOODING event
- High winds or tornado strike
- FIRE
- EXPLOSION
- Other events with similar hazard characteristics as determined by the Shift Manager

NOTES

Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.

Note 2: If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded the specified time limit.

Note 3: If the effluent flow past an effluent monitor is known to have stopped, indicating that the release path is isolated, the effluent monitor reading is no longer VALID for classification purposes.

Note 4: The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then no emergency classification is warranted.

Note 6: If CONTAINMENT CLOSURE is re-established prior to exceeding the 30-minute time limit, declaration of a General Emergency is not required.

Note 7: This EAL does not apply to routine traffic impediments such as fog, snow, ice, or vehicle breakdowns or accidents.

Note 8: A manual trip action is any operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and **does not** include manually driving in control rods or implementation of boron injection strategies.

Note 9: In the absence of reliable NCS temperature indication caused by the loss of decay heat removal capability, classification should be based on the NCS pressure increase criteria when in Mode 5 or based on time to boil data when in Mode 6.

Note 10: If the loss of containment cooling threshold is exceeded due to loss of both trains of VX-CARF, this EAL **only** applies if at least one train of VX-CARF is not operating, per design, after the 10 minute actuation delay for greater than or equal to 15 minutes.

Note 11: If the affected SAFETY SYSTEM train was already inoperable or out of service before the hazardous event occurred, then this emergency classification is not warranted.

Note 12: If the hazardous event only resulted in VISIBLE DAMAGE, with no indications of degraded performance to at least one train of a SAFETY SYSTEM, then this emergency classification is not warranted.

Date & Time of Shutdown

_____ Date _____ Time

MNS

EAL Identifier

XXX.X

Category (R, H, E, C, S, F) — Sequential number within subcategory/classification

Emergency classification (G, S, A, U) — Subcategory number (1 if no subcategory)

EAL - COLD MODES 5, 6 & No Mode

<< 10 CFR 50.54(q) Screening Evaluation Form >>

Screening and Evaluation Number	Applicable Sites	
EREG #: 02364374	BNP	☐
	CNS	☐
	HNP	☐
5AD #: CSD-EP-MNS-0101-01 Rev. 1 - 02364859 CSD-EP-ALL-0101-02 Rev. 2 - 02364861	MNS	■
	ONS	☐
	RNP	☐
	GO	☐

Document and Revision	CSD-EP-MNS-0101-01, EAL Technical Basis Document, Revision 001 CSD-EP-MNS-0101-02, EAL Wallcharts, Revision 002

Part I. Description of Activity Being Reviewed (event or action, or series of actions that may result in a change to the emergency plan or affect the implementation of the emergency plan):

CSD-EP-MNS-0101-01 is the EAL Technical Basis Document and CSD-EP-MNS-0101-02 is the EAL Wallcharts for MNS.

- Changes 1 through 11 are EAL revisions.
- Changes 12 and after are editorial changes and EAL Basis information changes.

MNS EAL and EAL Technical Basis Document Proposed Changes

Change #	Section or Step #	Change From	Change to
1	CSD-EP-MNS-0101-02 RG2.1	**RG2.1** Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	**RG2.1** **Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)**
2	CSD-EP-MNS-0101-01 Page 64 RG2.1	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)
3	CSD-EP-MNS-0101-02 RS2.1	**RS2.1** Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	**RS2.1** **Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)**

<< 10 CFR 50.54(q) Screening Evaluation Form >>

4	CSD-EP-MNS-0101-01 Page 62 RS2.1	RS2.1 Site Area Emergency Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	RS2.1 Site Area Emergency Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)
5	CSD-EP-MNS-0101-02 RA2.3	**RA2.3** **Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)**	**RA2.3** **Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)**
6	CSD-EP-MNS-0101-01 Page 60 RA2.3	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)
7	CSD-EP-MNS-0101-02 Table S-4	**Table S-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Offsite Radio System: X Commercial Telephones: X, X NRC Emergency Telecommunications System (ETS): X	**Table S-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Commercial Telephones: X, X NRC Emergency Telecommunications System (ETS): X
8	CSD-EP-MNS-0101-02 Table C-4	**Table C-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Offsite Radio System: X Commercial Telephones: X, X NRC Emergency Telecommunications System (ETS): X	**Table C-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Commercial Telephones: X, X NRC Emergency Telecommunications System (ETS): X
9	CSD-EP-MNS-0101-01 Page 185 [Rev 0], Page 186 [Rev 1] Table S-4	**Table S-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Offsite Radio System: X Commercial Telephones: X, X NRC Emergency Telephone System (ETS): X	**Table S-4 Communication Methods** System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Commercial Telephones: X, X NRC Emergency Telecommunications System (ETS): X

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- ATC (Train A)
- SATA (Train A)
- ATD (Train B)
- SATB (Train B)
Onsite
- D/G 1(2) A (Train A)
- D/G 1(2) B (Train B
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15	CSD-EP-MNS-0101-01 Page 2 Table of Contents	7.0 ATTACHMENTS ..... 27 1 Emergency Action Level Technical Basis ..... 28 Category R Abnormal Rad Release / Rad Effluent ..... 28 Category C Cold Shutdown / Refueling System Malfunction ..... 71 Category H Hazards ..... 107 Category S System Malfunction ..... 152 Category E ISFSI ..... 194 Category F Fission Product Barrier Degradation. ..... 198 2 Fission Product Barrier Loss / Potential Loss Matrix and Basis ..... 200 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis 253	7.0 ATTACHMENTS ..... 27 1 Emergency Action Level Technical Basis ..... 28 Category R Abnormal Rad Release / Rad Effluent ..... 28 Category C Cold Shutdown / Refueling System Malfunction ..... 71 Category H Hazards ..... 109 Category S System Malfunction ..... 152 Category E ISFSI ..... 196 Category F Fission Product Barrier Degradation. ..... 200 2 Fission Product Barrier Loss / Potential Loss Matrix and Basis ..... 200 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis 255

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16	CSD-EP-MNS-0101-01 Page 55 MNS Basis Reference(s):	1. OP/1(2)/A/6102/001	1. AD-DC-MNS-0303
17	CSD-EP-MNS-0101-01 Page 60 1st and 2nd Paragraphs of Basis Information	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 2 is a SFP level of -15 ft. (756' ft. ele.) or approximately 10 ft. above the top of the SFP racks (ref. 2, 3).	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2)and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 2 corresponds to a SFP level of -15 ft. (756.4 ft. elev.) or approximately 10 ft. above the top of the SFP racks (ref. 2, 3, 5).
18	CSD-EP-MNS-0101-01 Page 61 MNS Basis Reference(s):	Added to document	5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint

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19	CSD-EP-MNS-0101-01 Page 62 1st and 2nd Paragraphs of Basis Information	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 3 is a SFP level of -25 ft. (746' ft. ele.) or approximately the top of the SFP racks (ref. 2, 3).	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.
20	CSD-EP-MNS-0101-01 Page 63 MNS Basis Reference(s):	Added to document	5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint

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21	CSD-EP-MNS-0101-01 Page 64 1st and 2nd Paragraphs of Basis Information	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 3 is a SFP level of -25 ft. (746' ft. ele.) or approximately the top of the SFP racks (ref. 2, 3).	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.
22	CSD-EP-MNS-0101-01 Page 65 MNS Basis Reference(s):	Added to document	5. Engineering Change 418061 Rev. 0 - SFP WR Level EAL Adjusted Setpoint
23	CSD-EP-MNS-0101-01 Page 76 MNS Basis Reference(s):	1. AP/1(2)/A/5500/10 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001D Identifying NC System Leakage	1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
24	CSD-EP-MNS-0101-01 Page 77	Subcategory: 1 – NCS Level Initiating Condition: Loss of NCS inventory	Subcategory: 1 – NCS Level Initiating Condition: Loss of NCS inventory

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25	CSD-EP-MNS-0101-01 Page 78 Note 1 location	Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded.	Note 1: The Emergency Coordinator should declare the event promptly upon determining that time limit has been exceeded, or will likely be exceeded. [Note 1 moved from laying on top of EAL CA1.2 box.]
26	CSD-EP-MNS-0101-01 Page 79 MNS Basis Reference(s):	1. AP/1(2)/A/5500/10 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001D Identifying NC System Leakage	1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
27	CSD-EP-MNS-0101-01 Page 82 MNS Basis Reference(s):	1. AP/1(2)/A/5500/10 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001D Identifying NC System Leakage	1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001 D Identifying NC System Leakage
28	CSD-EP-MNS-0101-01 Page 86 MNS Basis Reference(s):	1. AP/1(2)/A/5500/10 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001D Identifying NC System Leakage 3. PT/1(2)/A/4200/002 C Containment Closure 4. CALC MCC-1552-08-00-0208 Emergency Procedure Setpoints 5. NEI 99-01 CG1	1. AP/1(2)/A/5500/010 NC System Leakage Within the Capacity of Both NV Pumps 2. PT/1(2)/A/4150/001 D Identifying NC System Leakage 3. PT/1(2)/A/4200/002 C Containment Closure 4. CALC-MCC-1552-08-00-0208 Emergency Procedure Setpoints 5. NEI 99-01 CG1
29	CSD-EP-MNS-0101-01 Page 102	<u>Offsite Radio System</u> A dedicated radio network can be used for communication with county and state warning points.	Removed from document

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30	CSD-EP-MNS-0101-01 Page 102	NRC Emergency Telephone System The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.	NRC Emergency Telecommunications System (ETS) The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.
31	CSD-EP-MNS-0101-01 Page 106 1st Paragraph of Basis Information on page	Added to document	This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.
32	CSD-EP-MNS-0101-01 Page 107 2nd Paragraph and new table of Basis Information on page	Added to document	The examples below can assist in determining the threshold meeting the two train criteria. [See attached page 25 for new table information.]
33	CSD-EP-MNS-0101-01 Page 107 [Rev 0], Page 108 [Rev 1] MNS Basis Reference(s):	6. AP/0/A/5500/45 Plant Fire	6. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak

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34	CSD-EP-MNS-0101-01 Page 111 [Rev 0], Page 112 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation
35	CSD-EP-MNS-0101-01 Page 113 [Rev 0], Page 114 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation
36	CSD-EP-MNS-0101-01 Page 115 [Rev 0], Page 116 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation
37	CSD-EP-MNS-0101-01 Page 117 [Rev 0], Page 118 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation

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38	CSD-EP-MNS-0101-01 Page 119 [Rev 0], Page 120 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation
39	CSD-EP-MNS-0101-01 Page 121 [Rev 0], Page 122 [Rev 1] MNS Basis Reference(s):	2. AP/0/A/5500/47 Security Events 3. AP/0/A/5500/48 Extensive Damage Mitigation	2. AP/0/A/5500/047 Security Events 3. AP/0/A/5500/048 Extensive Damage Mitigation
40	CSD-EP-MNS-0101-01 Page 126 [Rev 0], Page 127 [Rev 1] MNS Basis Reference(s):	1. AP/0/A/5500/44 Plant Flooding	1. AP/0/A/5500/044 Plant Flooding

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41	CSD-EP-MNS-0101-01 Page 130 [Rev 0], Page 131 [Rev 1] 1st and 2nd Paragraphs of Basis Information on page	The 15 minute requirement begins with a credible notification that a fire is occurring, or receipt of multiple valid fire detection system alarms or field validation of a single fire alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Table H-1 Fire Areas are based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).	The 15 minute requirement begins with a credible notification that a fire is occurring, or receipt of multiple valid fire detection system alarms or field validation of a single fire alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).
42	CSD-EP-MNS-0101-01 Page 130 [Rev 0], Page 131 [Rev 1] MNS Basis Reference(s):	1. MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis 2. AP/0/A/5500/45 Plant Fire 3. NEI 99-01 HU4	1. MCS-1465.00-00-0008 Fire Protection 2. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak 3. NEI 99-01 HU4 4. National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants

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43	CSD-EP-MNS-0101-01 Pages 131-132 [Rev 0], Page 133 [Rev 1] Basis Information on page	Basis: The 30 minute requirement begins upon receipt of a single valid fire detection system alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it ATTACHMENT 1 EAL Basis is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Actual field reports must be made within the 30 minute time limit or a classification must be made. If a fire is verified to be occurring by field report, classification shall be made based on EAL HU4.1. Table H-1 Fire Areas are based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).	ATTACHMENT 1 EAL Basis Basis: The 30 minute requirement begins upon receipt of a single valid fire detection system alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Actual field reports must be made within the 30 minute time limit or a classification must be made. If a fire is verified to be occurring by field report, classification shall be made based on EAL HU4.1. Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).
44	CSD-EP-MNS-0101-01 Pages 132 [Rev 0], Page 133 [Rev 1] Basis Information on page	<u>Basis-Related Requirements from Appendix R</u> Appendix R to 10 CFR 50, states in part: Criterion 3 of Appendix A to this part specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."	<u>Basis-Related Requirements from NFPA 0805</u> General Design Criterion (GDC) 3 specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."

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45	CSD-EP-MNS-0101-01 Pages 133 [Rev 0], Page 134 [Rev 1] Basis Information on page	In addition, Appendix R to 10 CFR 50, requires, among other considerations, the use of 1-hour fire barriers for the enclosure of cable and equipment and associated non-safety circuits of one redundant train (G.2.c). As used in this EAL, the 30-minutes to verify a single alarm is well within this worst-case 1-hour time period.	Removed from document
46	CSD-EP-MNS-0101-01 Page 133 [Rev 0], Page 134 [Rev 1] MNS Basis Reference(s):	1. MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis 2. AP/0/A/5500/45 Plant Fire 3. NEI 99-01 HU4	1. MCS-1465.00-00-0008 Fire Protection 2. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak 3. NEI 99-01 HU4 4. National Fire Protection Association (NFPA) 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants
47	CSD-EP-MNS-0101-01 Page 140 [Rev 0], Page 141 [Rev 1] MNS Basis Reference(s):	2. MCS-1465.00-00-0022 Appendix R Safe Shutdown Analysis	2. MCS-1465.00-00-0008 Fire Protection
48	CSD-EP-MNS-0101-01 Page 142 [Rev 0], Page 143 [Rev 1] MNS Basis Reference(s):	2. MCS-1465.00-00-0022 Appendix R Safe Shutdown Analysis	2. MCS-1465.00-00-0008 Fire Protection

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49	CSD-EP-MNS-0101-01 Page 186 [Rev 0], Page 187 [Rev 1]	Offsite Radio System A dedicated radio network can be used for communication with county and state warning points.	Removed from document
50	CSD-EP-MNS-0101-01 Page 186 [Rev 0], Page 187 [Rev 1]	NRC Emergency Telephone System The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.	NRC Emergency Telecommunications System (ETS) The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.
51	CSD-EP-MNS-0101-01 Page 192 [Rev 0], Page 193 [Rev 1] 1st Paragraph of Basis Information on page	Added to document	This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.

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52	CSD-EP-MNS-0101-01 Page 192 [Rev 0], Page 193-194 [Rev 1] 4th – 6th Paragraphs of Basis Information on page	An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under CA6.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis. An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under CA6.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement. An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under CA6.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted because the event was severe enough to affect the operability or	An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under SA9.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis. An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under SA9.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement. An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under SA9.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted because the event was severe enough to affect the operability or

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		reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.	reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.
53	CSD-EP-MNS-0101-01 Page 193 [Rev 0], Page 194 [Rev 1] 2nd Paragraph and new table of Basis Information on page	Added to document	The examples below can assist in determining the threshold meeting the two train criteria. [See attached page 25 for new table information.]
54	CSD-EP-MNS-0101-01 Page 193 [Rev 0], Page 195 [Rev 1] MNS Basis Reference(s):	6. AP/0/A/5500/45 Plant Fire	6. AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak
55	CSD-EP-MNS-0101-01 Page 229 [Rev 0], Page 231 [Rev 1] Category:	B. CMT Radiation/ NCS Activity	C. CMT Radiation/ NCS Activity
56	CSD-EP-MNS-0101-01 Page 231 [Rev 0], Page 233 [Rev 1]	Degradation Threat: Potential Loss Threshold:	Degradation Threat: Potential Loss Threshold:

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57	CSD-EP-MNS-0101-01 Page 254-258 [Rev 0], Page 256-260 [Rev 1] ATTACHMENT 3	MNS Procedure and Step column	MNS Procedure and Step column [Updated font sizes to eliminate truncation of procedure information – no information changed]
58	CSD-EP-MNS-0101-01 Page 257 [Rev 0], Page 259 [Rev 1] ATTACHMENT 3	MNS Procedure and Step OP/1&2/A/6100/SO-10, Step 3.11.6 Step Action Tag out PD Pump at 1MXKF2C (Reciprocating Charging Pump No 1). Building/Elevation/Room Aux. Bldg. (750') North End Mode 4 If action not performed does this prevent cooldown/ shutdown? Yes	Removed from document

Attachment 6, 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form is attached (required for IC or EAL change)	Yes ■ No □

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Part II. Activity Previously Reviewed?	Yes ☐	No ■
Is this activity Fully bounded by an NRC approved 10 CFR 50.90 submittal or Alert and Notification System Design Report? If yes, identify bounding source document number or approval reference and ensure the basis for concluding the source document fully bounds the proposed change is documented below: Justification:	10 CFR 50.54(q) Effectiveness Evaluation is not required. Enter justification below and complete Attachment 4, Part V.	Continue to Attachment 4 , 10 CFR 50.54(q) Screening Evaluation Form, Part III
Bounding document attached (optional)		☐

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Part III. Editorial Change Is this activity an editorial or typographical change only, such as formatting, paragraph numbering, spelling, or punctuation that does not change intent? Justification: The change(s) below are defined as editorial in accordance with AD-EP-ALL-0602, and do not change the intent of the steps as written. Proposed change # 11 add a missing ')' to the information and does not affect information. Proposed change # 12 updates the revision number of documents. Proposed change # 13 updates the revision number and effective date of documents. Proposed change # 14 updates the revision number of document and page numbering. Proposed change # 15 updates the page numbering on the table of contents. Proposed change # 16 updates a reference from site procedure that was superseded to a Fleet procedure. Proposed changes # 23, 26, 27, 28, 33, 34, 35, 36, 37, 38, 39, 40 and 54 update reference information such as names and numbering. Proposed changes # 24 and 56 corrects spacing and carriage returns to align with formatting standards in document. Proposed change # 25 moves a note text information from being over an EAL text box. Proposed change # 57 changes the font size in the MNS Procedure and Step column to eliminate truncation of procedure information – no information changed.	Yes	☐	No or Partially	■
	10 CFR 50.54(q) Effectiveness Evaluation is not required. Enter justification and complete Attachment 4, Part V.		Continue to Attachment 4, Part IV and address non editorial changes	

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Part IV. Emergency Planning Element and Function Screen (Reference Attachment 1, Considerations for Addressing Screening Criteria) Does this activity involve any of the following, including program elements from NUREG-0654/FEMA REP-1 Section II? If answer is yes, then check box.		
1	10 CFR 50.47(b)(1) Assignment of Responsibility (Organization Control)	
1a	Responsibility for emergency response is assigned.	☐
1b	The response organization has the staff to respond and to augment staff on a continuing basis (24-7 staffing) in accordance with the emergency plan.	☐
2	10 CFR 50.47(b)(2) Onsite Emergency Organization	
2a	Process ensures that onshift emergency response responsibilities are staffed and assigned	☐
2b	The process for timely augmentation of onshift staff is established and maintained.	☐
3	10 CFR 50.47(b)(3) Emergency Response Support and Resources	
3a	Arrangements for requesting and using off site assistance have been made.	☐
3b	State and local staff can be accommodated at the EOF in accordance with the emergency plan.	☐
4	10 CFR 50.47(b)(4) Emergency Classification System	
4a	A standard scheme of emergency classification and action levels is in use. (Requires final approval of Screen and Evaluation by EP CFAM.)	■
5	10 CFR 50.47(b)(5) Notification Methods and Procedures	
5a	Procedures for notification of State and local governmental agencies are capable of alerting them of the declared emergency within 15 minutes after declaration of an emergency and providing follow-up notification.	☐
5b	Administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway.	☐
5c	The public ANS meets the design requirements of FEMA-REP-10, Guide for Evaluation of Alert and Notification Systems for Nuclear Power Plants, or complies with the licensee's FEMA-approved ANS design report and supporting FEMA approval letter.	☐
Part IV. Emergency Planning Element and Function Screen (cont.)		
6	10 CFR 50.47(b)(6) Emergency Communications	
6a	Systems are established for prompt communication among principal emergency response organizations.	☐
6b	Systems are established for prompt communication to emergency response personnel.	☐
7	10 CFR 50.47(b)(7) Public Education and Information	
7a	Emergency preparedness information is made available to the public on a periodic basis within the plume exposure pathway emergency planning zone (EPZ).	☐
7b	Coordinated dissemination of public information during emergencies is established.	☐

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8	10 CFR 50.47(b)(8) Emergency Facilities and Equipment	
8a	Adequate facilities are maintained to support emergency response.	☐
8b	Adequate equipment is maintained to support emergency response.	☐
9	10 CFR 50.47(b)(9) Accident Assessment	
9a	Methods, systems, and equipment for assessment of radioactive releases are in use.	☐
10	10 CFR 50.47(b)(10) Protective Response	
10a	A range of public PARs is available for implementation during emergencies.	☐
10b	Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities.	☐
10c	A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.	☐
10d	KI is available for implementation as a protective action recommendation in those jurisdictions that chose to provide KI to the public.	☐
11	10 CFR 50.47(b)(11) Radiological Exposure Control	
11a	The resources for controlling radiological exposures for emergency workers are established.	☐
12	10 CFR 50.47(b)(12) Medical and Public Health Support	
12a	Arrangements are made for medical services for contaminated, injured individuals.	☐
13	10 CFR 50.47(b)(13) Recovery Planning and Post-accident Operations	
13a	Plans for recovery and reentry are developed.	☐
14	10 CFR 50.47(b)(14) Drills and Exercises	
14a	A drill and exercise program (including radiological, medical, health physics and other program areas) is established.	☐
14b	Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills are assessed via a formal critique process in order to identify weaknesses.	☐
14c	Identified weaknesses are corrected.	☐
15	10 CFR 50.47(b)(15) Emergency Response Training	
15a	Training is provided to emergency responders.	☐
Part IV. Emergency Planning Element and Function Screen (cont.)		
16	10 CFR 50.47(b)(16) Emergency Plan Maintenance	
16a	Responsibility for emergency plan development and review is established.	☐
16b	Planners responsible for emergency plan development and maintenance are properly trained.	☐

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PART IV. Conclusion If no Part IV criteria are checked, then provide Justification and complete Part V below. Justification: Proposed changes # 18, 20 and 22 add new reference documents for EAL Basis and do not affect EALs or EAL Basis. Proposed changes # 42 and 46 revise a reference to a newer document, correct procedure numbers and names, and add new reference documents for EAL Basis and do not affect EALs or EAL Basis. Proposed changes # 47 and 48 revise a reference to a newer document and do not affect EALs or EAL Basis. The change above does not affect any planning standards and does not reduce the effectiveness of the MNS emergency plan. Therefore, there is no further evaluation required.	☐
If any Attachment 4, 10 CFR 50.54(q) Screening Evaluation Form, Part IV criteria are checked, then complete Attachment 4, 10 CFR 50.54(q) Screening Evaluation Form, Part V and perform a 10 CFR 50.54(q) Effectiveness Evaluation. Program Element 4a requires final approval of Screen and Evaluation by EP CFAM.	■

Part V. Signatures:
EP CFAM Final Approval is required for changes affecting Program Element 4a. If CFAM approval is **NOT** required, then mark the EP CFAM signature block as not applicable (N/A) to indicate that signature is not required.

Preparer Name (Print): Barry Kimray	**Preparer Signature:** See CAS	**Date:** See CAS
Reviewer Name (Print): Renard Burris	**Reviewer Signature:** See CAS	**Date:** See CAS
Approver Name (Print): James Smith	**Approver Signature:** See CAS	**Date:** See CAS
Approver (CFAM, as required) Name (Print): David Thompson	**Approver Signature:** See CAS	**Date:** See CAS

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If the proposed activity is a change to the E-Plan, then initiate PRRs.	PRR Number(s): N/A
If required by Section 5.6, Submitting Reports of Changes to the NRC, then create two EREG General Assignments. • One for EP to provide the 10 CFR 50.54(q) summary of the analysis, or the completed 10 CFR 50.54(q), to Licensing.	**EREG Due Date:** 3/8/21
• One for Licensing to submit the 10 CFR 50.54(q) information to the NRC in accordance with 10 CFR 50.4(b)(5)(ii) within 30 days after the change is put in effect.	**EREG Due Date:** 3/22/21

QA RECORD

Scenario	Train A	Train B	Extent of Damage	Classify?	Reason
1	OOS/Under Clearance (Visible Damage)	In Service (NO Degraded Performance)	Event caused damage to Train A only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
2	OOS/Under Clearance (No damage)	In Service (Degraded Performance)	Event caused damage to Train B only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
3	OOS/Under Clearance (Visible Damage)	In Service (Degraded Performance)	Event causes damage to both trains	YES	The event was significant enough to impact two trains.
4	In Stby (Visible Damage)	In Stby (Visible Damage)	Event caused damage to both trains	NO	Cannot classify on Visible Damage only.
5	In Service (Degraded Performance)	In Stby (Visible Damage)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
6	In Service (Degraded Performance)	In Service (Degraded Performance)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
7	In service OR in Stby	In service OR in Stby	Event caused damage to a common component to both trains (i.e. FWST)	YES	The event impacted equipment common to two or more trains.

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Screening and Evaluation Number	Applicable Sites	
EREG #: 02364374	BNP	☐
	CNS	☐
	HNP	☐
5AD #: CSD-EP-MNS-0101-01 Rev. 1 - 02364859 CSD-EP-ALL-0101-02 Rev. 2 - 02364861	MNS	■
	ONS	☐
	RNP	☐
	GO	☐

Document and Revision	CSD-EP-MNS-0101-01, EAL Technical Basis Document, Revision 001 CSD-EP-MNS-0101-02, EAL Wallcharts, Revision 002

Part I. Description of Proposed Change:

CSD-EP-MNS-0101-01 is the EAL Technical Basis Document and CSD-EP-MNS-0101-02 is the EAL Wallcharts for MNS.

MNS EAL and EAL Technical Basis Document Proposed Changes

Change #	Section or Step #	Change From	Change to
1	CSD-EP-MNS-0101-02 RG2.1	**RG2.1** Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	**RG2.1** Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)
2	CSD-EP-MNS-0101-01 Page 64 RG2.1	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)
3	CSD-EP-MNS-0101-02 RS2.1	**RS2.1** Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	**RS2.1** Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)

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4	CSD-EP-MNS-0101-01 Page 62 RS2.1	RS2.1 Site Area Emergency Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	RS2.1 Site Area Emergency Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)
5	CSD-EP-MNS-0101-02 RA2.3	**RA2.3** **Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)**	**RA2.3** **Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)**
6	CSD-EP-MNS-0101-01 Page 60 RA2.3	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)
7	CSD-EP-MNS-0101-02 Table S-4	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Offsite Radio System: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telecommunications System (ETS): NRC X	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telecommunications System (ETS): NRC X
8	CSD-EP-MNS-0101-02 Table C-4	Table C-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Offsite Radio System: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telecommunications System (ETS): NRC X	Table C-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telecommunications System (ETS): NRC X
9	CSD-EP-MNS-0101-01 Page 185 Table S-4	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Offsite Radio System: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telephone System (ETS): NRC X	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: ORO X Commercial Telephones: ORO X, NRC X NRC Emergency Telecommunications System (ETS): NRC X

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Page 101
Table C-4</td>
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<tr><td>Internal Telephones</td><td>X</td><td></td><td></td></tr>
<tr><td>Onsite Radios</td><td>X</td><td></td><td></td></tr>
<tr><td>DEMNET</td><td></td><td>X</td><td></td></tr>
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<tr><td>Commercial Telephones</td><td></td><td>X</td><td>X</td></tr>
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<tr>
<td>17</td>
<td>CSD-EP-MNS-0101-01
Page 60
1st and 2nd Paragraphs of Basis Information</td>
<td>Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3).

The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 2 is a SFP level of -15 ft. (756' ft. ele.) or approximately 10 ft. above the top of the SFP racks (ref. 2, 3).</td>
<td>Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2)and SFP level at the top of the fuel racks (Level 3).

The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 2 corresponds to a SFP level of -15 ft. (756.4 ft. elev.) or approximately 10 ft. above the top of the SFP racks (ref. 2, 3, 5).</td>
</tr>
</table>

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19	CSD-EP-MNS-0101-01 Page 62 1st and 2nd Paragraphs of Basis Information	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 3 is a SFP level of -25 ft. (746' ft. ele.) or approximately the top of the SFP racks (ref. 2, 3).	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.

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21	CSD-EP-MNS-0101-01 Page 64 1st and 2nd Paragraphs of Basis Information	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530) each spanning approximately 30 ft. (-25 ft. – +5 ft.) (745 ft. ele. – 775 ft. ele.). Level 3 is a SFP level of -25 ft. (746' ft. ele.) or approximately the top of the SFP racks (ref. 2, 3).	Post-Fukushima order EA-12-051 (ref.1) required the installation of reliable SFP level indication capable of identifying normal level (Level 1), SFP level 10 ft. above the top of the fuel racks (Level 2) and SFP level at the top of the fuel racks (Level 3). The SFP level instruments consist of a primary channel (1(2)KFP5350) and back-up channel (1(2)NVPG6530). The primary channel provides an indication range of -25 ft. to +5 ft (746.4 ft. elev. to 776.4 ft. elev.) and the back-up channel provides an indication range of -25 ft. to +7.4 ft. (746.4 ft. elev. to 778.8 ft. elev.). Level 3 corresponds to a SFP level of -25 ft. (746.4 ft. elev.) or approximately the top of the SFP racks (ref. 2, 3, 5). The EAL value was adjusted to account for site-specific constraints/limitations and the instrument design.
29	CSD-EP-MNS-0101-01 Page 102	<u>Offsite Radio System</u> A dedicated radio network can be used for communication with county and state warning points.	Removed from document

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30	CSD-EP-MNS-0101-01 Page 102	NRC Emergency Telephone System The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.	NRC Emergency Telecommunications System (ETS) The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.
31	CSD-EP-MNS-0101-01 Page 106 1st Paragraph of Basis Information on page	Added to document	This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.
32	CSD-EP-MNS-0101-01 Page 107 2nd Paragraph and new table of Basis Information on page	Added to document	The examples below can assist in determining the threshold meeting the two train criteria. [See attached page 21 for new table information.]

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41	CSD-EP-MNS-0101-01 Page 130 [Rev 0], Page 131 [Rev 1] 1st and 2nd Paragraphs of Basis Information on page	The 15 minute requirement begins with a credible notification that a fire is occurring, or receipt of multiple valid fire detection system alarms or field validation of a single fire alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Table H-1 Fire Areas are based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).	The 15 minute requirement begins with a credible notification that a fire is occurring, or receipt of multiple valid fire detection system alarms or field validation of a single fire alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).

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43	CSD-EP-MNS-0101-01 Pages 131-132 [Rev 0], Page 133 [Rev 1] Basis Information on page	Basis: The 30 minute requirement begins upon receipt of a single valid fire detection system alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it ATTACHMENT 1 EAL Basis is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Actual field reports must be made within the 30 minute time limit or a classification must be made. If a fire is verified to be occurring by field report, classification shall be made based on EAL HU4.1. Table H-1 Fire Areas are based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).	ATTACHMENT 1 EAL Basis Basis: The 30 minute requirement begins upon receipt of a single valid fire detection system alarm. The alarm is to be validated using available Control Room indications or alarms to prove that it is not spurious, or by reports from the field. Those actions could include visual observation or evaluation of thermal detector or pressure indicator data. Actual field reports must be made within the 30 minute time limit or a classification must be made. If a fire is verified to be occurring by field report, classification shall be made based on EAL HU4.1. Table H-1 Fire Areas are based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. Table H-1 Fire Areas include those structures containing functions and systems required for safe shutdown of the plant (SAFETY SYSTEMS) (ref. 1, 2).

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44	CSD-EP-MNS-0101-01 Pages 132 [Rev 0], Page 133 [Rev 1] Basis Information on page	Basis-Related Requirements from Appendix R Appendix R to 10 CFR 50, states in part: Criterion 3 of Appendix A to this part specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."	Basis-Related Requirements from NFPA 0805 General Design Criterion (GDC) 3 specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."
45	CSD-EP-MNS-0101-01 Pages 133 [Rev 0], Page 134 [Rev 1] Basis Information on page	In addition, Appendix R to 10 CFR 50, requires, among other considerations, the use of 1-hour fire barriers for the enclosure of cable and equipment and associated non-safety circuits of one redundant train (G.2.c). As used in this EAL, the 30-minutes to verify a single alarm is well within this worst-case 1-hour time period.	Removed from document
49	CSD-EP-MNS-0101-01 Page 186 [Rev 0], Page 187 [Rev 1]	Offsite Radio System A dedicated radio network can be used for communication with county and state warning points.	Removed from document

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50	CSD-EP-MNS-0101-01 Page 186 [Rev 0], Page 187 [Rev 1]	NRC Emergency Telephone System The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.	NRC Emergency Telecommunications System (ETS) The NRC uses a Duke Energy dedicated telephone line which allows direct telephone communications from the plant to NRC regional and national offices. The Duke Energy communications line provides a link independent of the local public telephone network. Telephones connected to this network are located in the McGuire Control Room, Technical Support Center, and Emergency Operations Facility and can be used to establish NRC Emergency Notification System (ENS) and Health Physics Network (HPN) capability.
51	CSD-EP-MNS-0101-01 Page 192 [Rev 0], Page 193 [Rev 1] 1st Paragraph of Basis Information on page	Added to document	This EAL is based on a single event that is significant enough to cause damage to 2 trains of the same safety system.

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52	CSD-EP-MNS-0101-01 Page 192 [Rev 0], Page 193-194 [Rev 1] 4th – 6th Paragraphs of Basis Information on page	An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under CA6.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis. An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under CA6.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement. An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under CA6.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted	An event affecting equipment common to two or more safety systems or safety system trains (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the common equipment) should be classified as an Alert under SA9.1 as appropriate to the plant mode. By affecting the operability or reliability of multiple system trains, the loss of the common equipment effectively meets the two-train impact criteria that underlie the EALs and Basis. An event affecting a single-train safety system (i.e., there are indications of degraded performance and/or VISIBLE DAMAGE affecting the one train) would not be classified under SA9.1 because the two-train impact criteria that underlie the EALs and Basis would not be met. If an event affects a single-train safety system, then the emergency classification should be made based on plant parameters/symptoms meeting the EALs for another IC. Depending upon the circumstances, classification may also occur based on Shift Manager/Emergency Coordinator judgement. An event that affects two trains of a safety system (e.g., one train has indications of degraded performance and the other VISIBLE DAMAGE) that also has one or more additional trains should be classified as an Alert under SA9.1, as appropriate to the plant mode. This approach maintains consistency with the two-train impact criteria that underlie the EALs and Basis, and is warranted

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		because the event was severe enough to affect the operability or reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.	because the event was severe enough to affect the operability or reliability of two trains of a safety system despite plant design criteria associated with system and system train separation and protection. Such an event may have caused other plant impacts that are not immediately apparent.
53	CSD-EP-MNS-0101-01 Page 193 [Rev 0], Page 194 [Rev 1] 2nd Paragraph and new table of Basis Information on page	Added to document	The examples below can assist in determining the threshold meeting the two train criteria. [See attached page 21 for new table information.]
55	CSD-EP-MNS-0101-01 Page 229 [Rev 0], Page 231 [Rev 1] Category:	B. CMT Radiation/ NCS Activity	C. CMT Radiation/ NCS Activity

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58	CSD-EP-MNS-0101-01 Page 257 [Rev 0], Page 259 [Rev 1] ATTACHMENT 3	MNS Procedure and Step OP/1&2/A/6100/SO-10, Step 3.11.6 Step Action Tag out PD Pump at 1MXKF2C (Reciprocating Charging Pump No 1). Building/Elevation/Room Aux. Bldg. (750') North End Mode 4 If action not performed does this prevent cooldown/ shutdown? Yes	Removed from document

Part II. Description and Review of Licensing Basis Affected by the Proposed Change:

Licensing Basis for NEI 99-01 Rev 6 EALS

MNS: ML16083A208 Letter Dated May 24, 2016. Subject: McGuire Nuclear Station, Units 1 and 2 - Issuance of Amendments regarding Emergency Action Level Scheme Change (CAC NOS. MF6223 and MF6224).

Amendment No. 286 to Renewed Facility Operating License (RFOL) No. NPF-9 and Amendment No. 265 to RFOL No. NPF-17 for the McGuire Nuclear Station, Units 1 and 2, respectively.

Additional Licensing basis to implement FAQs

ML19058A632 Letter dated July 1, 2019. Subject: Catawba Nuclear Station, Units 1 And 2; McGuire Nuclear Station, Units 1 And 2; Oconee Nuclear Station, Units 1, 2, And 3; Brunswick Steam Electric Plant, Units 1 And 2; Shearon Harris Nuclear Power Plant, Unit 1; And H. B. Robinson Steam Electric Plant, Unit No. 2 – Issuance of Amendments To Revise Emergency Action Level Schemes To Incorporate Clarifications Provided By Emergency Preparedness Frequently Asked Questions 2015-013, 2015-014, And 2016-002 (EPID L-2018-LLA-0174)

Amendment Nos. 303 and 299 to Renewed Facility Operating License Nos. NPF-35 and NPF-52 for the Catawba Nuclear Station, Units 1 and 2 (Catawba), respectively; Amendment Nos. 315 and 294 to Renewed Facility Operating License Nos. NPF-9 and NPF-17 for the McGuire Nuclear Station, Units 1 and 2 (McGuire), respectively; Amendment Nos. 412, 414, and 413 to Renewed Facility Operating

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License Nos. DPR-38, DPR-47, and DPR-55 for the Oconee Nuclear Station, Units 1, 2, and 3 (Oconee), respectively; Amendment Nos. 291 and 319 to Renewed Facility Operating License Nos. DPR-71 and DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick), respectively; Amendment No. 172 to Renewed Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit 1 (Harris); and Amendment No. 264 to Renewed Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson).

EALs

Previous McGuire Nuclear Station EMERGENCY ACTION LEVEL TECHNICAL BASES, Section D of McGuire Emergency Plan Revision 19-2.

Current McGuire Nuclear Station Emergency Action Levels, CSD-EP-MNS-0101-01 Revision 000 and CSD-EP-MNS-0101-02 Revision 001

Emergency Plan

McGuire Emergency Plan Change 2 (dated February 1981), additional information submitted April 3, 1981 and July 1, 1981, Revision 97-1 (dated April 1997), and Revision 11-3 (dated October, 2011)

Current McGuire Emergency Plan Revision 20-1.

The differences in approved revisions and the current revisions of the Emergency Plans have been reviewed, and they have been determined to meet the regulatory requirements required during the course of revisions.

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Part III. Description of How the Proposed Change Complies with Regulation and Commitments. If the emergency plan, modified as proposed, no longer complies with planning standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, then ensure the change is rejected, modified, or processed as an exemption request under 10 CFR 50.12, Specific Exemptions, rather than under 10 CFR 50.54(q):

Proposed changes 1, 2, 3, 4, 5, 6, 17, 19 and 21 are Spent Fuel Pool Level Indications (SFPLI) level adjustments based on EC 418061:

The function of the Spent Fuel Pool Level Indications (SFPLI) measurements are to provide reliable continuous indication of the water level in associated spent fuel storage pools capable of supporting identification of the following water level conditions in compliance with NRC Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation and as described in the latest revision of JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation and NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation".

(1)level that is adequate to support operation of the normal fuel pool cooling system,

(2)level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and

(3)level where the spent fuel remains covered and actions to implement make-up water addition should no longer be deferred.

The wide range spent fuel pool (SFP) level instrumentation is only required in a Beyond-Design-Basis External Event (BDBEE), therefore, plant conditions, including postulated accidents defined in the Design Basis Accident, Chapter 15 of the UFSAR are not applicable. However, per NEI 12-02, "the level channels shall be reliable at temperature, humidity and radiation levels consistent with the spent fuel pool water at saturation conditions for an extended period." NEI 12-02 further describes conditions that should be considered near the SFP and the area of use considering both normal and post-event conditions for no fewer than seven days post-event or until off-site resources can be deployed.

The Duke development of the SFPLI Levels (1, 2, and 3) in response to the NRC Order EA-12-051 were not developed with EALs in mind but informed FLEX actions. NEI 12-02, was written to provide guidance to the industry for implementing the order. EA-12-051 and NEI 12-02 predate NEI 99-01 Rev. 6, Development of Emergency Action Levels for Non-Passive Reactors by several months.

NEI developed Rev. 6 of NEI 99-01, which provides guidance to use the values developed in response to the order in establishing SFP level based EALs. The EAL guidance directs developers to "modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 3 value."

A review of the value used in the EAL was conducted. While the Level 3 value in response to the NRC order was accurate and appropriate to meet NEI 12-02 requirements, site-specific constraints or limitations may not have been considered in determining the appropriate threshold value for EALs RS2 and RG2. This new level takes into account site specific constraints and limitations.

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The proposed changes raise the EALs RS2 and RG2 threshold values to -24 ft (747.4 ft. ele.). The proposed EAL modifications do not alter the intent of any specific EAL described in NEI 99-01, Rev. 6. This level still represents Level 3 value because this is a level "where the spent fuel remains covered and action to implement make-up water addition should no longer be deferred". The proposed changes for RA2.3 add precision to the feet elevation value by revising the current value of -15 ft. (756 ft. ele.) to -15 ft. (756.4 ft. ele.).

The new proposed levels do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed change is able to be made because the change to the EAL numeric threshold is based on an Engineering Change evaluating instrument response behavior, SFP configuration, and instrument uncertainty. The meaning or intent of the basis of the approved EAL is unchanged.

As per the bases document, this EAL is not likely to be declared prior to other EAL thresholds being exceeded.
Lowering water level in a fuel pool of the magnitude in this EAL would take significant damage to the fuel pool, or an extended loss of offsite power. Damage of this magnitude would likely be caused by either hostile action, where the Site Area Emergency, would be declared upon a hostile action within the protected area, or an earthquake. A postulated earthquake of such magnitude to impact a spent fuel pool would have more consequential impact on safety related components meeting entry into System EALs or Fission Product Barrier EALs before meeting the level threshold of the SFP. Additionally, the Loss of Power for SFP cooling to reach this degree of inventory loss would exceed the time to declare the EAL under Loss of Offsite Power (LOOP) conditions.

The instrumentation and set points derived for this EAL are consistent with the overall EAL scheme development guidance in NEI 99-01 Revision 6 and address the plant-specific implementation strategies provided. As required by 10 CFR 50.47(b)(4), the proposed changes comply with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

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Proposed changes 7, 8, 9, 10, 29, 30, 49 and 50 update CU5.1 and SU7.1 communication methods:

The proposed changes update the EAL Matrix and bases document Communication Methods tables and bases definitions to match the MNS Emergency Plan. The following changes were made to Tables S-4 and C-4:

- 'Offsite Radio System' for communications with Offsite Response Organizations (OROs) was removed as this radio system is not listed in the MNS Emergency Plan.
- 'NRC Emergency Telephone System (ETS)' was revised to use 'NRC Emergency Telecommunications System (ETS)' as listed in the MNS Emergency Plan.

Multiple communication systems remain in place to assure continued communication methods are available. These communication systems include –

- Public Address for onsite
- Internal Telephones for onsite
- Onsite Radios for onsite
- DEMNET for OROs
- Commercial Telephones for OROs and NRC
- NRC Emergency Telecommunications System (ETS) for NRC

The proposed changes align terminology used at site with no change to intent or how the EAL is determined.

The communications methods updated for this EAL are consistent with the overall EAL scheme development guidance in NEI 99-01 revision 6 and lists communications methods as described in MNS Emergency Plan. As required by 10 CFR 50.47(b)(4), the proposed changes comply with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

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Proposed changes 31, 32, 51 and 53 add clarification for EALs CA6.1 and SA9.1:

Proposed changes 31 and 51 add a sentence to the beginning of the basis section to clarify that the EAL is based off the significance of the event that caused damage. This adds clarification to the reader that the event needs to be of significant size to cause damage to 2 trains of the same safety system or damage to a common component affecting 2 trains of the same safety system the common component supports.

Proposed changes 32 and 53 add a table of nonspecific equipment scenarios. This table is designed to provide a reference of different examples of event significance to aid in classification. The table adds clarifying examples of what does and what does not meet Alert classifications to ensure predictable accurate classification.

The proposed changes add clarifying information that is intended to minimize the potential for an under or over-classification of equipment failure. The proposed clarifications will reduce the potential of declaring an Alert when events are in progress that do not involve an actual or potential substantial degradation of the level of safety of the plant, i.e., does not cause significant concern with shutting down or cooling down the plant.

The proposed changes do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed changes can be made because the meaning or intent of the basis of the approved EAL is unchanged.

Adding additional clarification for these EALs is consistent with the NEI submitted FAQ 2016-002 for Visible Damage approved in Duke Energy EALs as referenced in Part II, and NEI Submitted FAQ 2018-04 that adds additional clarification to FAQ 2016-002. As required by 10 CFR 50.47(b)(4), the proposed changes comply with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

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Proposed change 52 revises basis information for EAL SA9.1 to replace references to CA6.1 in the basis discussion:

Proposed change 52 replaces references to EAL CA6.1 with EAL SA9.1 in the basis discussion for EAL SA9.1. This addresses an error in the basis discussion to eliminate confusion for the reader. The basis discussion for EAL CA6.1 remains unchanged and was not impacted by this proposed change.

The proposed change revises basis information for EAL SA9.1 to assure that information is accurate.

The proposed changes do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed changes can be made because the meaning or intent of the basis of the approved EAL is unchanged.

The proposed change is consistent with the NEI submitted FAQ 2016-002 for Visible Damage approved in Duke Energy EALs as referenced in Part II, and NEI Submitted FAQ 2018-04 that adds additional clarification to FAQ 2016-002. As required by 10 CFR 50.47(b)(4), the proposed change complies with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

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Proposed changes 41, 43, 44 and 45 updates basis discussions based on implementation of NFPA 805:

Proposed changes 41, 43, 44 and 45 updates information based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire to information based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. The proposed changes address the adoption of NFPA 805 at McGuire Nuclear Station. Proposed changes 41 and 43 also reformats the basis information to remove breaks within paragraphs to improve readability.

The proposed changes assure the current Fire Protection Program is considered for EALs HU4.1 and HU4.2.

The proposed changes do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed changes can be made because the meaning or intent of the basis of the approved EAL is unchanged.

As required by 10 CFR 50.47(b)(4), the proposed changes comply with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

Proposed change 55 revises basis information for Category: C. CMT Radiation/ NCS Activity in the basis discussion:

Proposed change 55 replaces 'Category: B. CMT Radiation/ NCS Activity' with 'Category: C. CMT Radiation/ NCS Activity' in the basis discussion. This proposed change addresses an error in the basis discussion to eliminate confusion for the reader.

The proposed change revises basis information to assure that information is accurate.

The proposed changes do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed changes can be made because the meaning or intent of the basis of the approved EAL is unchanged.

As required by 10 CFR 50.47(b)(4), the proposed change complies with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

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Proposed change 58 removes OP/1&2/A/6100/SO-10, Step 3.11.6 from ATTACHMENT 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis in the basis:

Proposed change 58 removes OP/1&2/A/6100/SO-10, Step 3.11.6 from ATTACHMENT 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis in the basis. The proposed change addresses that the actions to tagout PD Pump (Reciprocating Charging Pump No 1) have been removed from OP/1&2/A/6100/SO-10. The PD Pump are no longer used at McGuire.

The proposed change revises basis information to assure that information is accurate.

The proposed changes do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed changes can be made because the meaning or intent of the basis of the approved EAL is unchanged.

As required by 10 CFR 50.47(b)(4), the proposed change complies with the regulations because a standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee.

Part IV. Description of Emergency Plan Planning Standards, Functions and Program Elements Affected by the Proposed Change (Address each function identified in Attachment 4, 10 CFR 50.54(q) Screening Evaluation Form, Part IV of associated Screen):

Planning Standard

10 CFR 50.47(b)(4) states: A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures."

Function

The emergency planning function associated with 10 CFR 50.47(b)(4) states:

- A standard scheme of emergency classification and action levels is in use.

Appendix E

Supporting requirements which are described in 10 CFR 50, Appendix E states:

IV.B:

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that

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are to be used for determining when and what type of protective measures should be considered within and outside the site boundary to protect health and safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite and offsite monitoring. By June 20, 2012, for nuclear power reactor licensees, these action levels must include hostile action that may adversely affect the nuclear power plant. The initial emergency action levels shall be discussed and agreed on by the applicant or licensee and state and local governmental authorities, and approved by the NRC. Thereafter, emergency action levels shall be reviewed with the State and local governmental authorities on an annual basis.

IV.C:

1. The entire spectrum of emergency conditions that involve the alerting or activating of progressively larger segments of the total emergency organization shall be described. The communication steps to be taken to alert or activate emergency personnel under each class of emergency shall be described. Emergency action levels (based not only on onsite and offsite radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency, such as the pressure in containment and the response of the Emergency Core Cooling System) for notification of offsite agencies shall be described. The existence, but not the details, of a message authentication scheme shall be noted for such agencies. The emergency classes defined shall include: (1) Notification of unusual events, (2) alert, (3) site area emergency, and (4) general emergency. These classes are further discussed in NUREG–0654/FEMA–REP–1.
2. By June 20, 2012, nuclear power reactor licensees shall establish and maintain the capability to assess, classify, and declare an emergency condition within 15 minutes after the availability of indications to plant operators that an emergency action level has been exceeded and shall promptly declare the emergency condition as soon as possible following identification of the appropriate emergency classification level. Licensees shall not construe these criteria as a grace period to attempt to restore plant conditions to avoid declaring an emergency action due to an emergency action level that has been exceeded. Licensees shall not construe these criteria as preventing implementation of response actions deemed by the licensee to be necessary to protect public health and safety provided that any delay in declaration does not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety.

Informing Criteria from NUREG-0654

The applicable program elements described in NUREG-0654, Section II.D state:

- D.1: An emergency classification and emergency action level scheme as set forth in Appendix 1 must be established by the licensee. The specific instruments, parameters or equipment status shall be shown for establishing each emergency class, in the in-plant emergency procedures. The plan shall identify the parameter values and equipment status for each emergency class.
- D.2: The initiating conditions shall include the example conditions found in Appendix 1 and all postulated accidents in the Final Safety Analysis Report (FSAR) for the nuclear facility.

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Part V. Description of Impact of the Proposed Change on the Effectiveness of Emergency Plan Functions:

Proposed changes 1, 2, 3, 4, 5, 6, 17, 19 and 21 are Spent Fuel Pool Level Indications (SFPLI) level adjustments based on EC 418061:

The function of the Spent Fuel Pool Level Indications (SFPLI) measurements are to provide reliable continuous indication of the water level in associated spent fuel storage pools capable of supporting identification of the following water level conditions in compliance with NRC Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation and as described in the latest revision of JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation and NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation".

(1) level that is adequate to support operation of the normal fuel pool cooling system,

(2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and

(3) level where the spent fuel remains covered and actions to implement make-up water addition should no longer be deferred.

NEI developed Rev. 6 of NEI 99-01, which provides guidance to use the values developed in response to the order in establishing SFP level based EALs. The EAL guidance directs developers to "modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 3 value."

A review of the value used in the EAL was conducted. While the Level 3 value in response to the NRC order was accurate and appropriate to meet NEI 12-02 requirements, site-specific constraints or limitations may not have been considered in determining the appropriate threshold value for EALs RS2 and RG2. This new level takes into account site specific constraints and limitations.

The proposed changes raise the EALs RS2 and RG2 threshold values to -24 ft (747.4 ft. ele.). The proposed EAL modifications do not alter the intent of any specific EAL described in NEI 99-01, Rev. 6. This level still represents Level 3 value because this is a level "where the spent fuel remains covered and action to implement make-up water addition should no longer be deferred". The proposed changes for RA2.3 add precision to the feet elevation value by revising the current value of -15 ft. (756 ft. ele.) to -15 ft. (756.4 ft. ele.).

The new proposed levels do not reduce the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in a site-specific application or from the endorsed industry EAL scheme that had been approved. The proposed change is able to be made because the change to the EAL numeric threshold is based on an Engineering Change evaluating instrument response behavior, SFP configuration, and instrument uncertainty. The meaning or intent of the basis of the approved EAL is unchanged.

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Proposed changes 7, 8, 9, 10, 29, 30, 49 and 50 update CU5.1 and SU7.1 communication methods:

The proposed changes update the EAL Matrix and bases document Communication Methods tables and bases definitions to match the MNS Emergency Plan. The following changes were made to Tables S-4 and C-4:

- 'Offsite Radio System' for communications with Offsite Response Organizations (OROs) was removed as this radio system is not listed in the MNS Emergency Plan.
- 'NRC Emergency Telephone System (ETS)' was revised to use 'NRC Emergency Telecommunications System (ETS)' as listed in the MNS Emergency Plan.

Multiple communication systems remain in place to assure continued communication methods are available. These communication systems include –

- Public Address for onsite
- Internal Telephones for onsite
- Onsite Radios for onsite
- DEMNET for OROs
- Commercial Telephones for OROs and NRC
- NRC Emergency Telecommunications System (ETS) for NRC

The proposed changes align terminology used at site with no change to intent or how the EAL is determined.

The communications methods updated for this EAL are consistent with the overall EAL scheme development guidance in NEI 99-01 revision 6 and lists communications methods as described in MNS Emergency Plan. The proposed changes maintain the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in the site-specific application reference in Part II. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a loss of all communications methods used to communicate on-site or with OROs or NRC. The meaning or intent of the basis of the approved EAL is unchanged.

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Proposed changes 31, 32, 51 and 53 add clarification for EALs CA6.1 and SA9.1:

Proposed changes 31 and 51 add a sentence to the beginning of the basis section to clarify that the EAL is based off the significance of the event that caused damage. This adds clarification to the reader that the event needs to be of significant size to cause damage to 2 trains of the same safety system or damage to a common component affecting 2 trains of the same safety system the common component supports.

Proposed changes 32 and 53 add a table of nonspecific equipment scenarios. This table is designed to provide a reference of different examples of event significance to aid in classification. The table adds clarifying examples of what does and what does not meet Alert classifications to ensure predictable accurate classification.

The proposed changes add clarifying information that is intended to minimize the potential for an under or over-classification of equipment failure. The proposed clarifications will reduce the potential of declaring an Alert when events are in progress that do not involve an actual or potential substantial degradation of the level of safety of the plant, i.e., does not cause significant concern with shutting down or cooling down the plant.

The proposed changes improve the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC in the site-specific application reference in Part II. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a hazardous event affecting a safety system. The meaning or intent of the basis of the approved EAL is unchanged.

Proposed change 52 revises basis information for EAL SA9.1 to replace references to CA6.1 in the basis discussion:

Proposed change 52 replaces references to EAL CA6.1 with EAL SA9.1 in the basis discussion for EAL SA9.1. This addresses an error in the basis discussion to eliminate confusion for the reader. The basis discussion for EAL CA6.1 remains unchanged and was not impacted by this proposed change.

The proposed change revises basis information for EAL SA9.1 to assure that information is accurate.

The proposed change improves the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a hazardous event affecting a safety system. The meaning or intent of the basis of the approved EAL is unchanged.

<< 10 CFR 50.54(q) Effectiveness Evaluation Form >>

Proposed changes 41, 43, 44 and 45 updates basis discussions based on implementation of NFPA 805:

Proposed changes 41, 43, 44 and 45 updates information based on MCS-1465.00-00-0022 Design Basis Specification for the Appendix R Safe Shutdown Analysis and AP/0/A/5500/45 Plant Fire to information based on MCS-1465.00-00-0008 Fire Protection and AP/0/A/5500/045 Plant Fire or Turbine Bldg Oil System Leak. The proposed changes address the adoption of NFPA 805 at McGuire Nuclear Station. Proposed changes 41 and 43 also reformats the basis information to remove breaks within paragraphs to improve readability.

The proposed changes assure the current Fire Protection Program is considered for EALs HU4.1 and HU4.2.

The proposed changes maintain the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a hazardous event affecting a safety system. The meaning or intent of the basis of the approved EAL is unchanged.

Proposed change 55 revises basis information for Category: C. CMT Radiation/ NCS Activity in the basis discussion:

Proposed change 55 replaces 'Category: B. CMT Radiation/ NCS Activity' with 'Category: C. CMT Radiation/ NCS Activity' in the basis discussion. This proposed change addresses an error in the basis discussion to eliminate confusion for the reader.

The proposed change revises basis information to assure that information is accurate.

The proposed change maintains the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a hazardous event affecting a safety system. The meaning or intent of the basis of the approved EAL is unchanged.

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Proposed change 58 removes OP/1&2/A/6100/SO-10, Step 3.11.6 from ATTACHMENT 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis in the basis:

Proposed change 58 removes OP/1&2/A/6100/SO-10, Step 3.11.6 from ATTACHMENT 3 Safe Operation & Shutdown Areas Tables R-2 & H-2 Basis in the basis. The proposed change addresses that the actions to tagout PD Pump (Reciprocating Charging Pump No 1) have been removed from OP/1&2/A/6100/SO-10. The PD Pump are no longer used at McGuire.

The proposed change revises basis information to assure that information is accurate.

The proposed change maintains the licensee's capability to assess, classify, and declare an emergency condition within 15 minutes of the availability of indications. The classification of the event would NOT be different from that approved by the NRC. Implementation of the clarifications will maintain the accuracy and timeliness of a classification following a hazardous event affecting a safety system. The meaning or intent of the basis of the approved EAL is unchanged.

The emergency plan function of Emergency Classification System is sustained because a standard scheme of emergency classification and action levels remains in use. The proposed changes do not reduce the effectiveness of the McGuire Nuclear Station Emergency Plan because a standard scheme of emergency classification and action levels are in use. These changes continue to provide assurance that the Emergency Response Organization has the ability and capability to:

- respond to an emergency;
- perform functions in a timely manner;
- effectively identify and take measures to ensure protection of the public health and safety; and
- effectively use response equipment and emergency response procedures.

These changes continue to meet NRC requirements, as described in 10 CFR 50.47(b) and 10 CFR 50, Appendix E as well as the requirements of the McGuire Nuclear Station Emergency Plan as written and approved.

<< 10 CFR 50.54(q) Effectiveness Evaluation Form >>

Part VI. Evaluation Conclusion. **Answer the following questions about the proposed change.**			
1	**Does the proposed change comply with 10 CFR 50.47(b) and 10 CFR 50 Appendix E?**	**Yes** ■	**No** ☐
2	**Does the proposed change maintain the effectiveness of the emergency plan (i.e., no reduction in effectiveness)?**	**Yes** ■	**No** ☐
3	**Does the proposed change maintain the current Emergency Action Level (EAL) scheme?**	**Yes** ■	**No** ☐
4	**Choose one of the following conclusions:**		
a	**The activity does continue to comply with the requirements of 10 CFR 50.47(b) and 10 CFR 50, Appendix E, and the activity does not constitute a reduction in effectiveness or change in the current Emergency Action Level (EAL) scheme. Therefore, the activity can be implemented without prior NRC approval. If Yes, then mark Part VII as not applicable (N/A).**		■
b	**The activity does not continue to comply with the requirements of 10 CFR 50.47(b) or 10 CFR 50 Appendix E or the activity does constitute a reduction in effectiveness or EAL scheme change. Therefore, the activity cannot be implemented without prior NRC approval.**		☐

NOTE: If prior NRC approval required, then complete Part VII.			
Part VII. Disposition of Proposed Change Requiring Prior NRC Approval			
Will the proposed change determined to require prior NRC approval be either revised or rejected?	**N/A** ■	**Yes** ☐	**No** ☐
If No, then initiate a License Amendment Request in accordance 10 CFR 50.90, AD-LS-ALL-0002, Regulatory Correspondence, and AD-LS-ALL-0015, License Amendment Request and Changes to SLC, TRM, and TS Bases, and include the tracking number:_____.			

<< 10 CFR 50.54(q) Effectiveness Evaluation Form >>

Part VIII. Signatures: EP CFAM Final Approval is required for changes affecting risk significant planning standard 10 CFR 50.47(b)(4) (i.e., Emergency Action Levels and Emergency Action Level Bases). If CFAM approval is NOT required, then mark the CFAM signature block as not applicable (N/A) to indicate that signature is not required.		
Preparer Name (Print): Barry Kimray	**Preparer Signature:** See CAS	**Date:** See CAS
Reviewer Name (Print): Renard Burris	**Reviewer Signature:** See CAS	**Date:** See CAS
Approver Name (Print): James Smith	**Approver Signature:** See CAS	**Date:** See CAS
Approver (CFAM, as required) Name (Print): David Thompson	**Approver Signature:** See CAS	**Date:** See CAS

If the proposed activity is a change to the E-Plan, then initiate PRRs.	**PRR Number(s): N/A**
If required by Section 5.6, Submitting Reports of Changes to the NRC, then create two EREG General Assignments. • One for EP to provide the 10 CFR 50.54(q) summary of the analysis, or the completed 10 CFR 50.54(q), to Licensing.	**EREG Due Date: 3/8/21**
• One for Licensing to submit the 10 CFR 50.54(q) information to the NRC in accordance with 10 CFR 50.4(b)(5)(ii) within 30 days after the change is put in effect.	**EREG Due Date: 3/22/21**

QA RECORD

Scenario	Train A	Train B	Extent of Damage	Classify?	Reason
1	OOS/Under Clearance (Visible Damage)	In Service (NO Degraded Performance)	Event caused damage to Train A only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
2	OOS/Under Clearance (No damage)	In Service (Degraded Performance)	Event caused damage to Train B only	NO	Train A was OOS prior to the event and the event impacted only 1 train.
3	OOS/Under Clearance (Visible Damage)	In Service (Degraded Performance)	Event causes damage to both trains	YES	The event was significant enough to impact two trains.
4	In Stby (Visible Damage)	In Stby (Visible Damage)	Event caused damage to both trains	NO	Cannot classify on Visible Damage only.
5	In Service (Degraded Performance)	In Stby (Visible Damage)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
6	In Service (Degraded Performance)	In Service (Degraded Performance)	Event caused damage to both trains	YES	The event was significant enough to impact two trains.
7	In service OR in Stby	In service OR in Stby	Event caused damage to a common component to both trains (i.e. FWST)	YES	The event impacted equipment common to two or more trains.

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Screening or Evaluation Number: 02364374

Part I. Identification of ICs and EALs Affected by Proposed Change and the applicable NEI Generic ICs and EALs:

MNS EAL and Basis Proposed Changes

Change #	Section or Step #	Change From	Change to
1	CSD-EP-MNS-0101-02 RG2.1	**RG2.1** Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	**RG2.1** Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)
2	CSD-EP-MNS-0101-01 RG2.1	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)	RG2.1 General Emergency Spent fuel pool level cannot be restored to > -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530) for ≥ 60 min. (Note 1)
3	CSD-EP-MNS-0101-02 RS2.1	**RS2.1** Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	**RS2.1** Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)
4	CSD-EP-MNS-0101-01 RS2.1	RS2.1 Site Area Emergency Spent fuel pool level ≤ -25 ft. (746 ft. ele.) (KFP5350 or NVPG6530)	RS2.1 Site Area Emergency Spent fuel pool level ≤ -24 ft. (747.4 ft. ele.) (KFP5350 or NVPG6530)
5	CSD-EP-MNS-0101-02 RA2.3	**RA2.3** Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)	**RA2.3** Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)
6	CSD-EP-MNS-0101-01 RA2.3	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756 ft. ele.) (KFP5350 or NVPG6530)	RA2.3 Alert Spent fuel pool level ≤ -15 ft. (756.4 ft. ele.) (KFP5350 or NVPG6530)
7	CSD-EP-MNS-0101-02 Table S-4	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Offsite Radio System: X Commercial Telephones: X X NRC Emergency Telecommunications System (ETS): X	Table S-4 Communication Methods System / Onsite / ORO / NRC Public Address: X Internal Telephones: X Onsite Radios: X DEMNET: X Commercial Telephones: X X NRC Emergency Telecommunications System (ETS): X

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

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CSD-EP-MNS-0101-02

Table C-4

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Offsite Radio System		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

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Table S-4

Table S-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Offsite Radio System		X	
Commercial Telephones		X	X
NRC Emergency Telephone System (ETS)			X

Table S-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

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Table C-4

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Offsite Radio System		X	
Commercial Telephones		X	X
NRC Emergency Telephone System (ETS)			X

Table C-4 Communication Methods

System	Onsite	ORO	NRC
Public Address	X		
Internal Telephones	X		
Onsite Radios	X		
DEMNET		X	
Commercial Telephones		X	X
NRC Emergency Telecommunications System (ETS)			X

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CSD-EP-MNS-0101-02

Table S-1

Table S-1 AC Power Sources

Offsite

- ATC (Train A)
- SATA (Train A)
- ATD (Train B)
- SATB (Train B)

Onsite

- D/G 1(2) A (Train A)
- D/G 1(2) B (Train B

Table S-1 AC Power Sources

Offsite

- ATC (Train A)
- SATA (Train A)
- ATD (Train B)
- SATB (Train B)

Onsite

- D/G 1(2) A (Train A)
- D/G 1(2) B (Train B)

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

NEI 99-01 (Revision 6) Generic ICs and EALs

AG2

[See Developer Notes]

ECL: General Emergency

Initiating Condition: Spent fuel pool level cannot be restored to at least (site-specific Level 3 description) for 60 minutes or longer.

Operating Mode Applicability: All

Example Emergency Action Levels:

Note: The Emergency Director should declare the General Emergency promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded.

(1) Spent fuel pool level cannot be restored to at least (site-specific Level 3 value) for 60 minutes or longer.

Basis:

This IC addresses a significant loss of spent fuel pool inventory control and makeup capability leading to a prolonged uncovery of spent fuel. This condition will lead to fuel damage and a radiological release to the environment.

It is recognized that this IC would likely not be met until well after another General Emergency IC was met; however, it is included to provide classification diversity.

Developer Notes:

In accordance with the discussion in Section 1.4, NRC Order EA-12-051, it is recommended that this IC and EAL be implemented when the enhanced spent fuel pool level instrumentation is available for use. The "site-specific Level 3 value" is usually that spent fuel pool level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. This site-specific level is determined in accordance with NRC Order EA-12-051 and NEI 12-02, and applicable owner's group guidance.

Developers should modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 3 value.

AS2

[See Developer Notes]

ECL: Site Area Emergency

Initiating Condition: Spent fuel pool level at (site-specific Level 3 description).

Operating Mode Applicability: All

Example Emergency Action Levels:

(1) Lowering of spent fuel pool level to (site-specific Level 3 value).

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Basis:

This IC addresses a significant loss of spent fuel pool inventory control and makeup capability leading to IMMINENT fuel damage. This condition entails major failures of plant functions needed for protection of the public and thus warrant a Site Area Emergency declaration.

It is recognized that this IC would likely not be met until well after another Site Area Emergency IC was met; however, it is included to provide classification diversity.

Escalation of the emergency classification level would be via IC AG1 or AG2.

Developer Notes:

In accordance with the discussion in Section 1.4, NRC Order EA-12-051, it is recommended that this IC and EAL be implemented when the enhanced spent fuel pool level instrumentation is available for use. The "site-specific Level 3 value" is usually that spent fuel pool level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. This site-specific level is determined in accordance with NRC Order EA-12-051 and NEI 12-02, and applicable owner's group guidance.

Developers should modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 3 value.

AA2

ECL: Alert

Initiating Condition: Significant lowering of water level above, or damage to, irradiated fuel.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3)

(1) Uncovery of irradiated fuel in the REFUELING PATHWAY.

(2) Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by ANY of the following radiation monitors:

(site-specific listing of radiation monitors, and the associated readings, setpoints and/or alarms)

(3) Lowering of spent fuel pool level to (site-specific Level 2 value). [See Developer Notes]

Basis:

This IC addresses events that have caused IMMINENT or actual damage to an irradiated fuel assembly, or a significant lowering of water level within the spent fuel pool (see Developer Notes). These events present radiological safety challenges to plant personnel and are precursors to a release of radioactivity to the environment. As such, they represent an actual or potential substantial degradation of the level of safety of the plant.

This IC applies to irradiated fuel that is licensed for dry storage up to the point that the loaded storage cask is sealed. Once sealed, damage to a loaded cask causing loss of the CONFINEMENT BOUNDARY is classified in accordance with IC E-HU1.

Escalation of the emergency would be based on either Recognition Category A or C ICs.

EAL #3

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Spent fuel pool water level at this value is within the lower end of the level range necessary to prevent significant dose consequences from direct gamma radiation to personnel performing operations in the vicinity of the spent fuel pool. This condition reflects a significant loss of spent fuel pool water inventory and thus it is also a precursor to a loss of the ability to adequately cool the irradiated fuel assembles stored in the pool.

Escalation of the emergency classification level would be via ICs AS1 or AS2 (see AS2 Developer Notes).

Developer Notes For EAL #3

In accordance with the discussion in Section 1.4, NRC Order EA-12-051, it is recommended that this EAL be implemented when the enhanced spent fuel pool level instrumentation is available for use. The "site-specific Level 2 value" is usually the spent fuel pool level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck. This site-specific level is determined in accordance with NRC Order EA-12-051 and NEI 12-02, and applicable owner's group guidance.

Developers should modify the EAL and/or Basis section to reflect any site-specific constraints or limitations associated with the design or operation of instrumentation used to determine the Level 2 value.

CU5

ECL: Notification of Unusual Event

Initiating Condition: Loss of all onsite or offsite communications capabilities.

Operating Mode Applicability: Cold Shutdown, Refueling, Defueled

Example Emergency Action Levels: (1 or 2 or 3)

(1) Loss of ALL of the following onsite communication methods:

(site-specific list of communications methods)

(2) Loss of ALL of the following ORO communications methods:

(site-specific list of communications methods)

(3) Loss of ALL of the following NRC communications methods:

(site-specific list of communications methods)

Basis:

This IC addresses a significant loss of on-site or offsite communications capabilities. While not a direct challenge to plant or personnel safety, this event warrants prompt notifications to OROs and the NRC.

This IC should be assessed only when extraordinary means are being utilized to make communications possible (e.g., use of non-plant, privately owned equipment, relaying of on-site information via individuals or multiple radio transmission points, individuals being sent to offsite locations, etc.).

EAL #1 addresses a total loss of the communications methods used in support of routine plant operations.

EAL #2 addresses a total loss of the communications methods used to notify all OROs of an emergency declaration. The OROs referred to here are (see Developer Notes).

EAL #3 addresses a total loss of the communications methods used to notify the NRC of an emergency declaration.

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Developer Notes:

EAL #1 - The "site-specific list of communications methods" should include all communications methods used for routine plant communications (e.g., commercial or site telephones, page-party systems, radios, etc.). This listing should include installed plant equipment and components, and not items owned and maintained by individuals.

EAL #2 - The "site-specific list of communications methods" should include all communications methods used to perform initial emergency notifications to OROs as described in the site Emergency Plan. The listing should include installed plant equipment and components, and not items owned and maintained by individuals. Example methods are ring-down/dedicated telephone lines, commercial telephone lines, radios, satellite telephones and internet-based communications technology.

In the Basis section, insert the site-specific listing of the OROs requiring notification of an emergency declaration from the Control Room in accordance with the site Emergency Plan, and typically within 15 minutes.

EAL #3 – The "site-specific list of communications methods" should include all communications methods used to perform initial emergency notifications to the NRC as described in the site Emergency Plan. The listing should include installed plant equipment and components, and not items owned and maintained by individuals. These methods are typically the dedicated Emergency Notification System (ENS) telephone line and commercial telephone lines.

ECL: Notification of Unusual Event

Initiating Condition: Loss of all offsite AC power capability to emergency buses for 15 minutes or longer.

Operating Mode Applicability: Power Operation, Startup, Hot Standby, Hot Shutdown

Example Emergency Action Levels:

Note: The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.

(1) Loss of ALL offsite AC power capability to (site-specific emergency buses) for 15 minutes or longer.

Basis:

This IC addresses a prolonged loss of offsite power. The loss of offsite power sources renders the plant more vulnerable to a complete loss of power to AC emergency buses. This condition represents a potential reduction in the level of safety of the plant.

For emergency classification purposes, "capability" means that an offsite AC power source(s) is available to the emergency buses, whether or not the buses are powered from it.

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

Escalation of the emergency classification level would be via IC SA1.

Developer Notes:

The "site-specific emergency buses" are the buses fed by offsite or emergency AC power sources that supply power to the electrical distribution system that powers SAFETY SYSTEMS. There is typically 1 emergency bus per train of SAFETY SYSTEMS.

At multi-unit stations, the EALs may credit compensatory measures that are proceduralized and can be implemented within 15 minutes. Consider capabilities such as power source cross-ties, "swing" generators, other power sources described in abnormal or emergency operating procedures, etc. Plants that have a proceduralized capability to supply offsite AC power to an affected unit via a cross-tie to a companion unit may credit this power source in the EAL provided that the planned cross-tie strategy meets the requirements of 10 CFR 50.63.

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Part II. Determination of Validation Method by Manager, Nuclear Support Services:			
In-Plant Walkdown	☐	Tabletop	☐
Training	☐	Other (Specify) Review and evaluate proposed changes	■
Simulator	☐	NA	☐

Manager, Nuclear Support Services Name (Print): James Smith	Manager, Nuclear Support Services Signature: See CAS	Date: 01/07/21

Part III. Validation. (Answers marked No require resolution)				
Validation Question	Yes	No	NA	Resolution and Comments
Readouts, alarms, indications. etc., available in the Control Room?	■	☐	☐	
Monitor, gauge, etc., designations are correct?	■	☐	☐	
Are correct units of measure displayed on the monitor, gauge, etc.?	■	☐	☐	
All values are within instrumentation display range?	■	☐	☐	
Is instrument display finite enough to distinguish between values?	■	☐	☐	
No miscellaneous issues were identified during walkdown correct?	■	☐	☐	

Part IV. Verification (Answers marked No require resolution)				
Validation Question	Yes	No	NA	Resolution and Comments
Is the IC/EAL change easy to use and does it flow well? Is sequencing logical and correct? Is it written to appropriate level of detail and unambiguous?	■	☐	☐	
Is the IC/EAL Matrix legible and easy to use?	■	☐	☐	
Are correct units of measure displayed on the monitor, gauge, etc.?	■	☐	☐	

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Part IV. Verification (cont.) (No answers require resolution))				
Validation Question	Yes	No	NA	Resolution and Comments
Instrumentation; Plant Computer System (PCS); and/or Plant Process Computer System (PPCS) points specified? • Correct instrument? • Correct units • Adequate instrument range? • Display unit readable? • Proper significant digits? • Instrument number and noun name provided? • Consistent with operations procedures?	■	☐	☐	
References specified in EAL Technical Basis current and updated and source documents for inputs have been identified and verified to be appropriate for use?	■	☐	☐	
Does the change avoid human performance challenges, latent weaknesses, and human performance traps? • No vague or missing critical detail(s). • Decisions are not over-reliant on knowledge for successful performance	■	☐	☐	
Modifications, Emergency Plan, EAL Technical Basis, reference manual and procedure revisions, setpoint changes, software changes, training, etc. are appropriately scheduled to correspond to the EAL revision?	■	☐	☐	
Are alarm setpoints equal to or below EAL thresholds?	☐	☐	■	
Do radiation monitor setpoints account for background?	☐	☐	■	

Part V. Comments:

If an EAL change requires a License Amendment Request, then document the gap analysis review of the site specific EAL versus NEI generic guidance in this section.

License Amendment Request not required.

<< 10 CFR 50.54(q) Initiating Condition (IC) and Emergency Action Level (EAL) and EAL Bases Validation and Verification (V&V) Form >>

Part VI. Completion Review and Approval Signatures		
Validation and Verification (Print Names) [Note1]: Travis Rollins	Validation and Verification Signatures: See CAS	Date: See CAS
Manager, Nuclear Support Services Review (Print Name): James Smith	Manager, Nuclear Support Services Signature: See CAS	Date: See CAS
Senior Operations License Holder (Print Name): Ryan Severns	Senior Operations License Holder Signature: See CAS	Date: See CAS
Qualified Emergency Coordinator (Print Name): Pete Schuerger	Qualified Emergency Coordinator Signature: See CAS	Date: See CAS
Engineering Review (Print Name) [Note2]: Michael Vanhoy	Engineering Signature: See CAS	Date: See CAS
Radiation Protection Review [Note 3]: Celeste Ceva	Radiation Protection Signature: See CAS	Date: See CAS
EP CFAM Review (Print Name): David Thompson	EP CFAM Signature: See CAS	Date: See CAS

Notes:
1. Validation and Verification can be performed by the same individual but must be:
   - Qualified in the subject matter
   - Separate from the author of change
   - A cross-discipline reviewer
2. System specific Engineering Review is required for EAL changes related to process equipment such as radiological instruments and environmental monitoring.
3. Radiation Protection is required for radiological EAL changes.