

LR-N17-0002

Attachment 4

HCGS EAL Comparison Matrix

(115 Pages)



**Hope Creek Generating Station  
NEI 99-01 Revision 6  
EAL Comparison Matrix**

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## Introduction

This document provides a line-by-line comparison of the Initiating Conditions (ICs), Mode Applicability and Emergency Action Levels (EALs) in NEI 99-01 Rev. 6 Final, Development of Emergency Action Levels for Non-Passive Reactors, ADAMS Accession Number ML12326A805, and Hope Creek Generating Station (HCGS) ICs, OPGON Applicability and EALs. This document provides a means of assessing HCGS differences and deviations from the NRC endorsed guidance given in NEI 99-01. Discussion of HCGS EAL bases and lists of source document references are given in the EAL Technical Bases Document. It is, therefore, advisable to reference the EAL Technical Bases Document for background information while using this document.

## Comparison Matrix Format

The ICs and EALs discussed in this document are grouped according to NEI 99-01 Recognition Categories. Within each Recognition Category, the ICs and EALs are listed in tabular format according to the order in which they are given in NEI 99-01. Generally, each row of the comparison matrix provides the following information:

- NEI EAL/IC identifier
- NEI EAL/IC wording
- HCGS EAL/IC identifier
- HCGS EAL/IC wording
- Description of any differences or deviations

## EAL Wording

In Section 4.1, NEI recommends the following: “The guidance in NEI 99-01 is not intended to be applied to plants “as-is”; however, developers should attempt to keep their site-specific schemes as close to the generic guidance as possible. The goal is to meet the intent of the generic Initiating Conditions (ICs) and Emergency Action Levels (EALs) within the context of site-specific characteristics – locale, plant design, operating features, terminology, etc. Meeting this goal will result in a shorter and less cumbersome NRC review and approval process, closer alignment with the schemes of other nuclear

power plant sites and better positioning to adopt future industry-wide scheme enhancements”

To assist the Emergency Coordinator (EC), the HCGS EALs have been written in a clear and concise style (to the extent that the differences from the NEI EAL wording could be reasonably documented and justified). This supports timely and accurate classification in the tense atmosphere of an emergency event. The EAL differences introduced to reduce reading burden comprise almost all of the differences justified in this document.

## EAL Emphasis Techniques

Due to the width of the table columns and table formatting constraints in this document, line breaks and indentation may differ slightly from the appearance of comparable wording in the source documents. NEI 99-01 is the source document for the NEI EALs; the HCGS EAL Technical Bases Document for the HCGS EALs.

Development of the HCGS IC/EAL wording has attempted to minimize inconsistencies and apply sound human factors principles. As a result, differences occur between NEI and HCGS ICs/EALs for these reasons alone. When such difference may infer a technical difference in the associated NEI IC/EAL, the difference is identified and a justification provided.

The print and paragraph formatting conventions summarized below guide presentation of the HCGS EALs in accordance with the EAL writing criteria. Space restrictions in the EAL table of this document sometimes override this criteria in cases when following the criteria would introduce undesirable complications in the EAL layout.

- Upper case-bold underline print is used for the logic terms **AND**, **OR** and **EITHER**.
- Upper case-bold underline print is also used for certain logic terms, negative terms (**NOT**, **CANNOT**, etc.), **ANY**, **ALL**.
- Upper case bold print is reserved for defined terms, acronyms, system abbreviations, logic terms (and, or, etc. when not used as a conjunction), annunciator window engravings.
- Three or more items in a list are normally introduced with “**ANY** of the following...” or “**ALL** of the following...” Items of the list begin with bullets when a priority or sequence is not inferred.

- The use of **AND/OR** logic within the same EAL has been avoided when possible. When such logic cannot be avoided, indentation and separation of subordinate contingent phrases is employed.

### Global Differences

The differences listed below generally apply throughout the set of EALs and are not repeated in the Justification sections of this document. The global differences do not decrease the effectiveness of the intent of NEI 99-01.

1. The NEI phrase “Notification of Unusual Event” has been changed to “Unusual Event” or abbreviated “UE” to reduce EAL-user reading burden.
2. The title “Emergency Director” is replaced with the HCGS-specific title “Emergency Coordinator”
3. NEI 99-01 IC Example EALs are implemented in separate plant EALs to improve clarity and readability. For example, NEI lists all IC HU3 Example EALs under one IC. The corresponding HCGS EALs appear as unique EALs (e.g., HU3.1 through HU3.4).
4. Operational Condition (OPCON) applicability identifiers (numbers/letter) modify the NEI 99-01 mode applicability names as follows: 1 - Power Operations, 2 - Startup, 3 - Hot Shutdown, 4 - Cold Shutdown, 5 - Refueling, D – Defueled. NEI 99-01 defines Defueled as follows: “All reactor fuel removed from RPV. (Full core off load during refueling or extended outage).”
5. NEI 99-01 uses the terms greater than, less than, greater than or equal to, etc. in the wording of some example EALs. For consistency and reduce EAL-user reading burden, HCGS has adopted use of boolean symbols in place of the NEI 99-01 text modifiers within the EAL wording.
6. “min.” is the standard abbreviation for “minutes” and is used to reduce EAL user reading burden.
7. IC/EAL identification:
  - NEI Recognition Category A “Abnormal Radiation Levels/ Radiological Effluents” has been changed to Category R “Abnormal Rad Levels / Rad Effluents.” The designator “R” is more intuitively associated with radiation (rad) or radiological

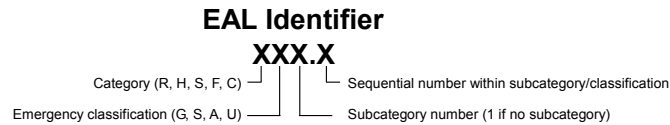
events. NEI IC designators beginning with “A” have likewise been changed to “R.”

- NEI 99-01 defines the thresholds requiring emergency classification (example EALs) and assigns them to ICs which, in turn, are grouped in “Recognition Categories.” HCGS endeavors to optimize the NEI EAL organization and identification scheme to enhance usability of the plant-specific EAL set. To this end, the HCGS IC/EAL scheme includes the following features:
  - a. Division of the NEI EAL set into three groups:
    - EALs applicable under all plant operating conditions – This group would be reviewed by the EAL-user any time emergency classification is considered.
    - EALs applicable only under hot operating conditions – This group would only be reviewed by the EAL-user when the plant is in Hot Shutdown, Startup or Power Operations OPCON.
    - EALs applicable only under cold operating conditions – This group would only be reviewed by the EAL-user when the plant is in Cold Shutdown, Refueling or Defueled OPCON.

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.
  - b. Within each of the above three groups, assignment of EALs to categories/subcategories – Category and subcategory titles are selected to represent conditions that are operationally significant to the EAL-user. Subcategories are used as necessary to further divide the EALs of a category into logical sets of possible emergency classification thresholds. The HCGS EAL categories/subcategories and their relationship to NEI Recognition Categories are listed in Table 1.

- c. Unique identification of each EAL – Four characters comprise the EAL identifier as illustrated in Figure 1.

**Figure 1 – EAL Identifier**



The first character is a letter associated with the category in which the EAL is located. The second character is a letter associated with the emergency classification level (G for General Emergency, S for Site Area Emergency, A for Alert, and U for Notification of Unusual Event). The third character is a number associated with one or more subcategories within a given category. Subcategories are sequentially numbered beginning with the number “1”. If a category does not have a subcategory, this character is assigned the number “1”. The fourth character is a number preceded by a period for each EAL within a subcategory. EALs are sequentially numbered within the emergency classification level of a subcategory beginning with the number “1”.

The EAL identifier is designed to fulfill the following objectives:

- Uniqueness – The EAL identifier ensures that there can be no confusion over which EAL is driving the need for emergency classification.
- Speed in locating the EAL of concern – When the EALs are displayed in a matrix format, knowledge of the EAL identifier alone can lead the EAL-user to the location of the EAL within the classification matrix. The identifier conveys the category, subcategory and classification level. This assists ERO responders (who may not be in the same facility as the EC) to find the EAL of concern in a

timely manner without the need for a word description of the classification threshold.

- Possible classification upgrade – The category/subcategory/identifier scheme helps the EAL-user find higher emergency classification EALs that may become active if plant conditions worsen.

Table 2 lists the HCGS ICs and EALs that correspond to the NEI ICs/Example EALs when the above EAL/IC organization and identification scheme is implemented.

### Differences and Deviations

In accordance NRC Regulatory Issue Summary (RIS) 2003-18 “Use of Nuclear Energy Institute (NEI) 99-01, Methodology for Development of Emergency Action Levels” Supplements 1 and 2, a difference is an EAL change in which the basis scheme guidance differs in wording but agrees in meaning and intent, such that classification of an event would be the same, whether using the basis scheme guidance or the HCGS EAL. A deviation is an EAL change in which the basis scheme guidance differs in wording and is altered in meaning or intent, such that classification of the event could be different between the basis scheme guidance and the HCGS proposed EAL.

Administrative changes that do not actually change the textual content are neither differences nor deviations. Likewise, any format change that does not alter the wording of the IC or EAL is considered neither a difference nor a deviation.

The following are examples of differences:

- Choosing the applicable EAL based upon plant type (i.e., BWR vs. PWR).
- Using a numbering scheme other than that provided in NEI 99-01 that does not change the intent of the overall scheme.
- Where the NEI 99-01 guidance specifically provides an option to not include an EAL if equipment for the EAL does not exist at HCGS (e.g., automatic real-time dose assessment capability).
- Pulling information from the bases section up to the actual EAL that does not change the intent of the EAL.

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- Choosing to state ALL Operating Modes are applicable instead of stating N/A, or listing each mode individually under the Abnormal Rad Level/Radiological Effluent and Hazard and Other Conditions Affecting Plant Safety sections.
- Using synonymous wording (e.g., greater than or equal to vs. at or above, less than or equal vs. at or below, greater than or less than vs. above or below, etc.)
- Adding HCGS equipment/instrument identification and/or noun names to EALs.
- Combining like ICs that are exactly the same but have different operating modes as long as the intent of each IC is maintained and the overall progression of the EAL scheme is not affected.
- Any change to the IC and/or EAL, and/or basis wording, as stated in NEI 99-01, that does not alter the intent of the IC and/or EAL, i.e., the IC and/or EAL continues to:
  - Classify at the correct classification level.
  - Logically integrate with other EALs in the EAL scheme.
  - Ensure that the resulting EAL scheme is complete (i.e., classifies all potential emergency conditions).

The following are examples of deviations:

- Use of altered mode applicability.
- Altering key words or time limits.
- Changing words of physical reference (protected area, safety-related equipment, etc.).
- Eliminating an IC. This includes the removal of an IC from the Fission Product Barrier Degradation category as this impacts the logic of Fission Product Barrier ICs.
- Changing a Fission Product Barrier from a Loss to a Potential Loss or vice-versa.
- Not using NEI 99-01 definitions as the intent is for all NEI 99-01 users to have a standard set of defined terms as defined in NEI 99-01. Differences due to plant types are permissible (BWR or PWR). Verbatim compliance to the wording in NEI 99-01 is not necessary as long as the intent of the defined word is maintained. Use of the

wording provided in NEI 99-01 is encouraged since the intent is for all users to have a standard set of defined terms as defined in NEI 99-01.

- Any change to the IC and/or EAL, and/or basis wording as stated in NEI 99-01 that does alter the intent of the IC and/or EAL, i.e., the IC and/or EAL:
  - Does not classify at the classification level consistent with NEI 99-01.
  - Is not logically integrated with other EALs in the EAL scheme.
  - Results in an incomplete EAL scheme (i.e., does not classify all potential emergency conditions).

The “Difference/Deviation Justification” columns in the remaining sections of this document identify each difference between the NEI 99-01 IC/EAL wording and the HCGS IC/EAL wording. An explanation that justifies the reason for each difference is then provided. If the difference is determined to be a deviation, a statement is made to that effect and explanation is given that states why classification may be different from the NEI 99-01 IC/EAL and the reason for its acceptability. In all cases, however, the differences and deviations do not decrease the effectiveness of the intent of NEI 99-01. A summary list of HCGS EAL deviations from NEI 99-01 is given in Table 3.

**Table 1 – HCGS EAL Categories/Subcategories**

| HCGS EALs  |  | NEI<br>Recognition Category  |
|--|--|--|
| Category   | Subcategory                                  |  |
| <u>Group: Any Operating Mode:</u>                              |  |  |
| <b>A</b> – Abnormal Rad Levels/Rad Effluent                    | 1 – Offsite Rad Conditions                   | Abnormal Rad Levels/Radiological Effluent ICs/EALs<br>ISFSI ICs/EALs |
|  | 2 – Irradiated Fuel Event                    |  |
|  | 3 – Area Radiation Levels                    |  |
|  | 4 – Spent Fuel Transit & Storage             |  |
| <b>H</b> – Hazards and Other Conditions Affecting Plant Safety | 1 – Security                                 | Hazards and Other Conditions Affecting Plant Safety ICs/EALs         |
|  | 2 – Seismic Event                            |  |
|  | 3 – Natural or Technological Hazard          |  |
|  | 4 – Fire                                     |  |
|  | 5 – Hazardous Gases                          |  |
|  | 6 – Control Room Evacuation                  |  |
|  | 7 – Emergency Coordinator Judgment           |  |
| <u>Group: Hot Conditions:</u>                                  |  |  |
| <b>S</b> – System Malfunction                                  | 1 – Loss of AC Power                         | System Malfunction ICs/EALs  |
|  | 2 – Loss of DC Power                         |  |
|  | 3 – Loss of Control Room Indications         |  |
|  | 4 – RCS Activity                             |  |
|  | 5 – RCS Leakage                              |  |
|  | 6 – RPS Failure                              |  |
|  | 7 – Loss of Communications                   |  |
|  | 8 – Hazardous Event Affecting Safety Systems |  |
| <b>F</b> – Fission Product Barrier                             | None   | Fission Product Barrier ICs/EALs                                     |
| <u>Group: Cold Conditions:</u>                                 |  |  |
| <b>C</b> – Cold Shutdown/Refueling System Malfunction          | 1 – RPV Level                                | Cold Shutdown./ Refueling System Malfunction ICs/EALs                |
|  | 2 – Loss of AC Power                         |  |
|  | 3 – RCS Temperature                          |  |
|  | 4 – Loss of DC Power                         |  |
|  | 5 – Loss of Communications                   |  |
|  | 6 – Hazardous Event Affecting Safety Systems |  |



**Table 2 – NEI / HCGS EAL Identification Cross-Reference**

| NEI |             | HCGS  |       |
|-----|-------------|---|-------|
| IC  | Example EAL | Category and Subcategory  | EAL   |
| AU1 | 1           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RU1.1 |
| AU1 | 2           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RU1.1 |
| AU1 | 3           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RU1.2 |
| AU2 | 1           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event | RU2.1 |
| AA1 | 1           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RA1.1 |
| AA1 | 2           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RA1.2 |
| AA1 | 3           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RA1.3 |
| AA1 | 4           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RA1.4 |
| AA2 | 1           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event | RA2.1 |
| AA2 | 2           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event | RA2.2 |
| AA2 | 3           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event | RA2.3 |
| AA3 | 1           | A – Abnormal Rad Levels / Rad Effluent, 3 – Area Radiation Levels | RA3.1 |
| AA3 | 2           | A – Abnormal Rad Levels / Rad Effluent, 3 – Area Radiation Levels | RA3.2 |
| AS1 | 1           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RS1.1 |
| AS1 | 2           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RS1.2 |
| AS1 | 3           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent | RS1.3 |

EAL Comparison Matrix

| NEI |             | HCGS  |       |
|-----|-------------|---|-------|
| IC  | Example EAL | Category and Subcategory  | EAL   |
| AS2 | 1           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event                       | RS2.1 |
| AG1 | 1           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent                       | RG1.1 |
| AG1 | 2           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent                       | RG1.2 |
| AG1 | 3           | A – Abnormal Rad Levels / Rad Effluent, 1 – Radiological Effluent                       | RG1.3 |
| AG2 | 1           | A – Abnormal Rad Levels / Rad Effluent, 2 – Irradiated Fuel Event                       | RG2.1 |
| CU1 | 1           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                | CU1.1 |
| CU1 | 2           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                | CU1.2 |
| CU2 | 1           | C – Cold SD/ Refueling System Malfunction, 2 – Loss of AC Power                         | CU2.1 |
| CU3 | 1           | C – Cold SD/ Refueling System Malfunction, 3 – RCS Temperature                          | CU3.1 |
| CU3 | 2           | C – Cold SD/ Refueling System Malfunction, 3 – RCS Temperature                          | CU3.2 |
| CU4 | 1           | C – Cold SD/ Refueling System Malfunction, 4 – Loss of DC Power                         | CU4.1 |
| CU5 | 1, 2, 3     | C – Cold SD/ Refueling System Malfunction, 5 – Loss of Communications                   | CU5.1 |
| CA1 | 1           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                | CA1.1 |
| CA1 | 2           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                | CA1.2 |
| CA2 | 1           | C – Cold SD/ Refueling System Malfunction, 1 – Loss of AC Power                         | CA2.1 |
| CA3 | 1, 2        | C – Cold SD/ Refueling System Malfunction, 3 – RCS Temperature                          | CA3.1 |
| CA6 | 1           | C – Cold SD/ Refueling System Malfunction, 6 – Hazardous Event Affecting Safety Systems | HA4.1 |
| CS1 | 1           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                | CS1.1 |

EAL Comparison Matrix

| NEI   |             | HCGS  |       |
|-------|-------------|---|-------|
| IC    | Example EAL | Category and Subcategory  | EAL   |
| CS1   | 2           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                  | CS1.2 |
| CS1   | 3           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                  | CS1.3 |
| CG1   | 1           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                  | CG1.1 |
| CG1   | 2           | C – Cold SD/ Refueling System Malfunction, 1 – RPV Level                                  | CG1.2 |
| E-HU1 | 1           | A – Abnormal Rad Levels / Rad Effluent, 4 – Spent Fuel Transit & Storage                  | RU4.1 |
| HU1   | 1, 2, 3     | H – Hazards and Other Conditions Affecting Plant Safety, 1 – Security                     | HU1.1 |
| HU2   | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 2 – Seismic Event                | HU2.1 |
| HU3   | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 3 – Natural or Technology Hazard | HU3.1 |
| HU3   | 2           | H – Hazards and Other Conditions Affecting Plant Safety, 3 – Natural or Technology Hazard | HU3.2 |
| HU3   | 3           | H – Hazards and Other Conditions Affecting Plant Safety, 3 – Natural or Technology Hazard | HU3.3 |
| HU3   | 4           | H – Hazards and Other Conditions Affecting Plant Safety, 3 – Natural or Technology Hazard | HU3.4 |
| HU3   | 5           | H – Hazards and Other Conditions Affecting Plant Safety, 3 – Natural or Technology Hazard | N/A   |
| HU4   | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 4 – Fire or Explosion            | HU4.1 |
| HU4   | 2           | H – Hazards and Other Conditions Affecting Plant Safety, 4 – Fire or Explosion            | HU4.2 |
| HU4   | 3           | H – Hazards and Other Conditions Affecting Plant Safety, 4 – Fire or Explosion            | HU4.3 |
| HU4   | 4           | H – Hazards and Other Conditions Affecting Plant Safety, 4 – Fire or Explosion            | HU4.4 |
| HU7   | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 7 – Judgment                     | HU7.1 |
| HA1   | 1, 2        | H – Hazards and Other Conditions Affecting Plant Safety, 1 – Security                     | HA1.1 |

EAL Comparison Matrix

| NEI |             | HCGS   |       |
|-----|-------------|--|-------|
| IC  | Example EAL | Category and Subcategory   | EAL   |
| HA5 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 5 – Hazardous Gases         | HA5.1 |
| HA6 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 6 – Control Room Evacuation | HA6.1 |
| HA7 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 7 – Judgment                | HA7.1 |
| HS1 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 1 – Security                | HS1.1 |
| HS6 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 6 – Control Room Evacuation | HS6.1 |
| HS7 | 1           | H – Hazards and Other Conditions Affecting Plant Safety, 7 – Judgment                | HS7.1 |
| HG1 | 1           | N/A  | N/A   |
| HG7 | 2           | H – Hazards and Other Conditions Affecting Plant Safety, 7 – Judgment                | HG7.1 |
| SU1 | 1           | S – System Malfunction, 1 – Loss of AC Power   | SU1.1 |
| SU2 | 1           | S – System Malfunction, 3 – Loss of Control Room Indications                         | SU3.1 |
| SU3 | 1           | S – System Malfunction, 4 – RCS Activity   | SU4.1 |
| SU3 | 2           | S – System Malfunction, 4 – RCS Activity   | SU4.2 |
| SU4 | 1, 2, 3     | S – System Malfunction, 5 – RCS Leakage  | SU5.1 |
| SU5 | 1, 2        | S – System Malfunction, 6 – RPS Failure  | SU6.1 |
| SU6 | 1, 2, 3     | S – System Malfunction, 7 – Loss of Communications                                   | SU7.1 |
| SU7 | 1, 2        | N/A  | N/A   |
| SA1 | 1           | S – System Malfunction, 1 – Loss of AC Power   | SA1.1 |
| SA2 | 1           | S – System Malfunction, 3 – Loss of Control Room Indications                         | SA3.1 |

EAL Comparison Matrix

| NEI |             | HCGS   |       |
|-----|-------------|--|-------|
| IC  | Example EAL | Category and Subcategory                     | EAL   |
| SA5 | 1           | S – System Malfunction, 6 – RPS Failure      | SA6.1 |
| SA9 | 1           | S – Hazardous Event Affecting Safety Systems | SA8.1 |
| SS1 | 1           | S – System Malfunction, 1 – Loss of AC Power | SS1.1 |
| SS5 | 1           | S – System Malfunction, 6 – RPS Failure      | SS6.1 |
| SS8 | 1           | S – System Malfunction, 2 – Loss of DC Power | SS2.1 |
| SG1 | 1           | S – System Malfunction, 1 – Loss of AC Power | SG1.1 |
| SG8 | 2           | S – System Malfunction, 2 – Loss of DC Power | SG2.1 |

**Table 3 – Summary of Deviations**

| NEI |             | HCGS EAL | Description   |
|-----|-------------|----------|---|
| IC  | Example EAL |          |   |
| HG1 | 1           | N/A      | <p>IC HG1 and associated example EAL is not implemented in the HCGS scheme.</p> <p>There are several other ICs that are redundant with this IC, and are better suited to ensure timely and effective emergency declarations. In addition, the development of new spent fuel pool level EALs, as a result of NRC Order EA-12-051, clarified the intended emergency classification level for spent fuel pool level events. This deviation is justified because:</p> <ol style="list-style-type: none"> <li>1. Hostile Action in the Protected Area is bounded by ICs HS1 and HS7. Hostile Action resulting in a loss of physical control is bound by EAL HG7, as well as any event that may lead to radiological releases to the public in excess of Environmental Protection Agency (EPA) Protective Action Guides (PAGs).               <ol style="list-style-type: none"> <li>a. If, for whatever reason, the Control Room must be evacuated, and control of safety functions (e.g., reactivity control, core cooling, and RCS heat removal) cannot be reestablished, then IC HS6 would apply, as well as IC HS7 if desired by the EAL decision-maker.</li> <li>b. Also, as stated above, any event (including Hostile Action) that could reasonably be expected to have a release exceeding EPA PAGs would be bound by IC HG7.</li> <li>c. From a Hostile Action perspective, ICs HS1, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.</li> <li>d. From a loss of physical control perspective, ICs HS6, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.</li> </ol> </li> <li>2. Any event which causes a loss of spent fuel pool level will be bounded by ICs AA2, AS2 and AG2, regardless of whether it was based upon a Hostile Action or not, thus making this part of HG1 redundant and unnecessary.               <ol style="list-style-type: none"> <li>a. An event that leads to a radiological release will be bounded by ICs AU1, AA1, AS1 and AG1. Events that lead to radiological releases in excess of</li> </ol> </li> </ol> |

EAL Comparison Matrix

| NEI |             | HCGS<br>EAL | Description   |
|-----|-------------|-------------|---|
| IC  | Example EAL |             |   |
|     |             |             | <p>EPA PAGs will be bounded by EALs AG1 and HG7, thus making this part of HG1 redundant and unnecessary.</p> <p>ICs AA2, AS2, AG2, AS1, AG1, HS1, HS6, HS7 and HG7 have been implemented consistent with NEI 99-01 Revision 6 and thus HG1 is adequately bounded as described above.</p> <p><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b></p>  |
| HS6 | 1           | HS6.1       | <p>Deleted defueled mode applicability. Control of the cited safety functions are not critical for a defueled reactor as there is no energy source in the reactor vessel or RCS.</p> <p>The Mode applicability for the reactivity control safety function has been limited to Modes 1, 2, and 3 (hot operating conditions). In the cold operating modes adequate shutdown margin exists under all conditions.</p> <p><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b></p> |

**Category A**

**Abnormal Rad Levels / Radiological Effluent**



EAL Comparison Matrix

| NEI IC# | NEI IC Wording and Mode Applicability   | HCGS IC#(s) | HCGS IC Wording and Mode Applicability   | Difference/Deviation Justification  |
|---------|---|-------------|--|---|
| AU1     | Release of gaseous or liquid radioactivity greater than 2 times the (site-specific effluent release controlling document) limits for 60 minutes or longer.<br>MODE: All | RU1         | Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer<br>OPCON: All | The HCGS ODCM is the site-specific effluent release controlling document. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|--|------------|--|--|
| 1             | Reading on <b>ANY</b> effluent radiation monitor greater than 2 times the (site-specific effluent release controlling document) limits for 60 minutes or longer:<br><br>(site-specific monitor list and threshold values corresponding to 2 times the controlling document limits) | RU1.1      | Reading on <b>ANY</b> Table R-1 effluent radiation monitor > <b>column "UE"</b> for <b>≥ 60 min.</b> (Notes 1, 2, 3)                                     | <p>Example EALs #1 and #2 have been combined into a single EAL to simplify presentation.</p> <p>The NEI phrase "...effluent radiation monitor greater than 2 times the (site-specific effluent release controlling document)" and "effluent radiation monitor greater than 2 times the alarm setpoint established by a current radioactivity discharge permit " have been replaced with "...<b>any</b> Table A-1 effluent radiation monitor &gt; column "UE".</p> <p>UE thresholds for all HCGS continuously monitored gaseous and liquid release pathways are listed in Table A-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL user. The values shown in Table A-1 column "UE", consistent with the NEI bases, represent two times the ODCM release limits for gaseous and liquid releases.</p> |
| 2             | Reading on <b>ANY</b> effluent radiation monitor greater than 2 times the alarm setpoint established by a current radioactivity discharge permit for 60 minutes or longer.   |            |  |  |
| 3             | Sample analysis for a gaseous or liquid release indicates a concentration or release rate greater than 2 times the (site-specific effluent release controlling document) limits for  | RU1.2      | Sample analysis for a gaseous or liquid release indicates a concentration or release rate > <b>Table R-2</b> threshold for <b>≥ 60 min.</b> (Notes 1, 2) |  |

EAL Comparison Matrix

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
|               | 60 minutes or longer.  |            |   |   |
| Notes         | <ul style="list-style-type: none"> <li>● The Emergency Director should declare the Unusual Event promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded.</li> <li>● If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.</li> <li>● 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.</li> </ul> | N/A        | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> <p>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.</p> <p>Note 3: 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 <b><u>NO</u></b> longer <b>VALID</b> for classification purposes.</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>None</p> |

EAL Comparison Matrix

| Table R-1 Effluent Monitor Classification Thresholds* |   |   |                     |                     |                     |                                  |
|---|---|---|---------------------|---------------------|---------------------|----------------------------------|
|   | Release Point   | Monitor   | GE                  | SAE                 | ALERT               | UE*                              |
| Gaseous   | SPDS – (Total)<br>Offsite Gas<br>Rad Release<br><b>OR</b><br><b>SUM of:</b><br>FRVS Vent NG<br>+<br>North Plant Vent NG<br>+<br>South Plant Vent NG<br>+<br>Hardened<br>Torus Vent NG | SPDS Point<br>B5097<br><b>OR</b><br><b>SUM of:</b><br>9RX680<br>+<br>9RX590<br>+<br>9RX580<br>+<br>9RX518 | 5.25E+08<br>μCi/sec | 5.25E+07<br>μCi/sec | 5.25E+06<br>μCi/sec | 3.0E+04<br>μCi/sec               |
| Liquid  | Liquid Radwaste Discharge   | 9RX508  | ----                | ----                | ----                | 2X the High<br>Alarm<br>Setpoint |
|   | Cooling Tower Blowdown  | 9RX506  | ----                | ----                | ----                | 2X the High<br>Alarm<br>Setpoint |
|   | TB Circ Water Discharge   | 9RX505  | ----                | ----                | ----                | 2X the High<br>Alarm<br>Setpoint |

\* For high alarm conditions on offgas pretreatment monitor 9RX621 or 9RX622, refer to EAL SU4.1

| Table R-2 Effluent Sample Classification Thresholds |                           |                   |                            |
|---|---------------------------|-------------------|----------------------------|
|   | Release Point             | Sample            | Threshold                  |
| Gaseous   | FRVS Vent                 | NG                | 7.10E-03 $\mu\text{Ci/cc}$ |
|   |                           | I-131             | 8.20E-06 $\mu\text{Ci/cc}$ |
|   | North Plant Vent          | NG                | 1.52E-03 $\mu\text{Ci/cc}$ |
|   |                           | I-131             | 1.80E-06 $\mu\text{Ci/cc}$ |
|   | South Plant Vent          | NG                | 1.44E-04 $\mu\text{Ci/cc}$ |
|   |                           | I-131             | 1.68E-07 $\mu\text{Ci/cc}$ |
| Unmonitored   | Isotopic                  | 2 x ODCM 3/4.11.2 |                            |
| Liquid  | Liquid Radwaste Discharge | Isotopic          | 2 x ODCM 3/4.11.1          |
|   | Cooling Tower Blowdown    | Isotopic          | 2 x ODCM 3/4.11.1          |
|   | TB Circ Water Discharge   | Isotopic          | 2 x ODCM 3/4.11.1          |
|   | Unmonitored               | Isotopic          | 2 x ODCM 3/4.11.1          |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording and Mode Applicability                             | HCGS IC#(s) | HCGS IC Wording and Mode Applicability                                   | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| AU2     | UNPLANNED loss of water level above irradiated fuel.<br>MODE: All | RU2         | <b>UNPLANNED</b> loss of water level above irradiated fuel<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | <p>a. UNPLANNED water level drop in the REFUELING PATHWAY as indicated by <b>ANY</b> of the following: (site-specific level indications).<br/><b>AND</b></p> <p>b. UNPLANNED rise in area radiation levels as indicated by <b>ANY</b> of the following radiation monitors. (site-specific list of area radiation monitors)</p> | RU2.1      | <p><b>UNPLANNED</b> water level drop in the <b>REFUELING PATHWAY</b> as indicated by <b>ANY</b> of the following:</p> <ul style="list-style-type: none"> <li>• Confirmed SFP low level alarm Annunciator D1-A5 (FUEL POOL LEVEL HI/LO)</li> <li>• Reactor Water Level Shutdown Range Indicator LI-R605-B21</li> <li>• Visual observation (local or remote)</li> </ul> <p><b>AND</b></p> <p><b>UNPLANNED</b> rise in corresponding area radiation levels on <b>ANY</b> of the following:</p> <ul style="list-style-type: none"> <li>• Spent Fuel Storage Pool Area (9RX707)</li> <li>• New Fuel Criticality A Rad (9RX612)</li> <li>• New Fuel Criticality B Rad (9RX613)</li> <li>• Temporary Refueling Bridge ARM</li> </ul> | <p>Site-specific level indications incorporated.</p> <p>Site-specific area radiation monitors incorporated.</p> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| AA1     | Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE.<br>MODE: All | RA1         | Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mrem TEDE or 50 mrem thyroid CDE<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|---|------------|--|--|
| 1             | Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:<br><br>(site-specific monitor list and threshold values)  | RA1.1      | In the absence of dose assessment results, reading on <b>any</b> Table A-1 effluent radiation <b>monitor &gt; column "ALERT"</b> for <b>≥ 15 min.</b> (Notes 1, 2, 3, 4)   | Added the phrase "In the absence of dose assessment..." to emphasize the intent of Note 4.<br><br>The HCGS radiation monitors that detect radioactivity effluent release to the environment are listed in Table A-1. UE, Alert, SAE and GE thresholds for all HCGS continuously monitored gaseous and liquid release pathways are listed in Table A-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL-user. |
| 2             | Dose assessment using actual meteorology indicates doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site-specific dose receptor point).   | RA1.2      | Dose assessment using actual meteorology indicates <b>doses &gt; 10 mrem TEDE or 50 mrem thyroid CDE</b> at or beyond the <b>MINIMUM EXCLUSION AREA</b> (Note 4)   | The minimum exclusion area is the site-specific receptor point.  |
| 3             | Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than 10 mrem TEDE or 50 mrem thyroid CDE at or beyond (site-specific dose receptor point) for one hour of exposure. | RA1.3      | Analysis of a liquid effluent sample indicates a concentration or release rate that would result in <b>doses &gt; 10 mrem TEDE or 50 mrem thyroid CDE</b> at or beyond the <b>MINIMUM EXCLUSION AREA</b> for <b>60 min.</b> of exposure (Notes 1, 2) | The minimum exclusion area is the site-specific receptor point.  |

EAL Comparison Matrix

|              |   |              |   |  |
|--------------|---|--------------|---|--|
| <p>4</p>     | <p>Field survey results indicate <b>EITHER</b> of the following at or beyond (site-specific dose receptor point):</p> <ul style="list-style-type: none"> <li>● Closed window dose rates greater than 10 mR/hr expected to continue for 60 minutes or longer.</li> <li>● Analyses of field survey samples indicate thyroid CDE greater than 50 mrem for one hour of inhalation.</li> </ul>   | <p>RA1.4</p> | <p>Field survey results indicate <b><u>EITHER</u></b> of the following at or beyond the <b>PROTECTED AREA</b> boundary:</p> <ul style="list-style-type: none"> <li>● Closed window dose <b>rates &gt; 10 mR/hr</b> expected to continue for <b>≥ 60 min.</b></li> <li>● Analyses of field survey samples indicate I-131 concentration &gt; <b>3.85E-08 μCi/cc</b></li> </ul> <p>(Notes 1, 2)</p>  | <p>The protected area is the site-specific field survey receptor point.</p> <p>Analyses of field survey samples indicating I-131 concentration &gt; 3.85E-08 μCi/cc corresponds to 50 m/R CDE thyroid for one hour of inhalation.</p>  |
| <p>Notes</p> | <ul style="list-style-type: none"> <li>● The Emergency Director should declare the Alert promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</li> <li>● If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.</li> <li>● 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.</li> <li>● The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification</li> </ul> | <p>N/A</p>   | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> <p>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.</p> <p>Note 3: 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 <b>NO</b> longer valid for classification purposes s.</p> <p>Note 4 The pre-calculated effluent monitor values presented in EALs RA1.1, RS1.1 and RG1.1 should be used for emergency classification</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>None</p> <p>Incorporated site-specific EAL numbers associated with generic EAL#1.</p> |

EAL Comparison Matrix

|  |  |  |  |  |
|--|--|--|--|--|
|  | assessments until the results from a dose assessment using actual meteorology are available. |  | assessments until the results from a dose assessment using actual meteorology are available. |  |
|--|--|--|--|--|



EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| AA2     | Significant lowering of water level above, or damage to, irradiated fuel.<br>MODE: All | RA2         | Significant lowering of water level above, or damage to, irradiated fuel<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification   |
|---------------|--|------------|---|--|
| 1             | Uncovery of irradiated fuel in the REFUELING PATHWAY.  | RA2.1      | Uncovery of irradiated fuel in the REFUELING PATHWAY  | None   |
| 2             | Damage to irradiated fuel resulting in a release of radioactivity from the fuel as indicated by <b>ANY</b> of the following radiation monitors:<br><br>(site-specific listing of radiation monitors, and the associated readings, setpoints and/or alarms) | RA2.2      | Damage to irradiated fuel resulting in a release of radioactivity that causes a High alarm on <b>ANY</b> of the following radiation monitors: <ul style="list-style-type: none"> <li>• Spent Fuel Storage Pool Area (9RX707)</li> <li>• New Fuel Criticality A Rad (9RX612)</li> <li>• New Fuel Criticality B Rad (9RX613)</li> <li>• Refuel Floor Exhaust Duct Rad Channel A (9RX627)</li> <li>• Refuel Floor Exhaust Duct Rad Channel B (9RX628)</li> <li>• Refuel Floor Exhaust Duct Rad Channel C (9RX629)</li> </ul> | Deleted the words "...from the fuel..." as that is implied by the determination that irradiated fuel has been damaged.<br>Site-specific list of radiation monitors are incorporated.<br>Radiation monitor high alarms specified. |
| 3             | Lowering of spent fuel pool level to (site-specific Level 2 value).<br>[See <i>Developer Notes</i> ]   | RA2.3      | Lowering of spent fuel pool level to <b>186 ft.</b>   | For HCGS, Level 2, which corresponds to 10 ft. above the top of the fuel racks in the SFP, is an indicated level of 186 ft.  |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| AA3     | Radiation levels that impede access to equipment necessary for normal plant operations, cooldown or shutdown<br>MODE: All | RA3         | Radiation levels that <b>IMPEDE</b> access to equipment necessary for normal plant operations, cooldown or shutdown<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|--|------------|--|--|
| 1             | Dose rate greater than 15 mR/hr in <b>ANY</b> of the following areas: <ul style="list-style-type: none"> <li>● Control Room</li> <li>● Central Alarm Station</li> <li>● (other site-specific areas/rooms)</li> </ul>             | RA3.1      | Dose rates > <b>15 mR/hr</b> in the Control Room (9RX710 or by survey)   | No other site-specific areas requiring continuous occupancy exist at HCGS.<br><br>The control room is monitored for excessive radiation by 9RX710.<br><br>The HCGS/SGS site has a single Central Alarm Station located at SGS. SGS EAL RA3.1 provides for the site Alert based on high radiation in the CAS. |
| 2             | An UNPLANNED event results in radiation levels that prohibit or impede access to any of the following plant rooms or areas:<br><br>(site-specific list of plant rooms or areas with entry-related mode applicability identified) | RA3.2      | An <b>UNPLANNED</b> event results in radiation levels that prohibit or <b>IMPEDE</b> access to <b>ANY</b> Table R-3 rooms or areas (Note 5)                                  | The site-specific list of plant rooms or areas with entry-related mode applicability are tabularized in Tables R-3.  |
| Note          | 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.   | N/A        | Note 5 If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then <b>NO</b> emergency classification is warranted. | None   |

| <b>Table R-3 Safe Operation &amp; Shutdown Rooms/Areas</b> |                                   |                            |
|--|-----------------------------------|----------------------------|
| <b>Bldg. – Ele.</b>  | <b>Rooms/Areas</b>                | <b>OPCON Applicability</b> |
| RB 54'   | 4113/4109<br>(RHR A/B Pump Rooms) | 3, 4, 5                    |
| RB 77'   | 4201<br>(10B242 MCC)              | 3, 4, 5                    |
| RB 102'  | 4307<br>(B SACS Pump Room)        | 3, 4, 5                    |
| RB 102'  | 4328/4322<br>(North/South HCU)    | 3, 4, 5                    |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|--|-------------|---|------------------------------------|
| AS1     | Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE<br>MODE: All | RS1         | Release of gaseous radioactivity resulting in offsite dose greater than 100 mrem TEDE or 500 mrem thyroid CDE<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:<br>(site-specific monitor list and threshold values)  | RS1.1      | In the absence of dose assessment results, reading on <b>ANY</b> Table R-1 effluent radiation monitor > <b>column "SAE"</b> for <b>≥ 15 min.</b> (Notes 1, 2, 3, 4)  | Added the phrase "In the absence of dose assessment..." to emphasize the intent of Note 4.<br><br>The HCGS radiation monitors that detect radioactivity effluent release to the environment are listed in Tables R-1. UE, Alert, SAE and GE thresholds for all HCGS continuously monitored gaseous and liquid release pathways are listed in Table R-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL-user. |
| 2             | Dose assessment using actual meteorology indicates doses greater than 100 mrem TEDE or 500 mrem thyroid CDE at or beyond (site-specific dose receptor point)  | RS1.2      | Dose assessment using actual meteorology indicates doses > <b>100 mrem TEDE</b> or <b>500 mrem thyroid CDE</b> at or beyond the <b>MINIMUM EXCLUSION AREA</b> (Note 4)   | The minimum exclusion area is the site-specific receptor point.   |
| 3             | Field survey results indicate <b>EITHER</b> of the following at or beyond (site-specific dose receptor point): <ul style="list-style-type: none"> <li>Closed window dose rates greater than 100 mR/hr expected to continue for 60 minutes or longer.</li> <li>Analyses of field survey</li> </ul> | RS1.3      | Field survey results indicate <b>EITHER</b> of the following at or beyond the <b>PROTECTED AREA</b> boundary: <ul style="list-style-type: none"> <li>Closed window dose rates &gt; <b>100 mR/hr</b> expected to continue for <b>≥ 60 min.</b></li> <li>Analyses of field survey samples indicate I-131 concentration &gt; <b>3.85E-07</b></li> </ul> | The protected area boundary is the site-specific field survey receptor point.<br><br>Analyses of field survey samples indicating I-131 concentration > 3.85E-07 μCi/cc corresponds to 500 m/R CDE thyroid for one hour of inhalation.   |

EAL Comparison Matrix

|              |  |  |   |  |
|--------------|--|--|---|--|
|              | <p>samples indicate thyroid CDE greater than 500 mrem for one hour of inhalation.</p>  |  | <p><b>μCi/cc</b><br/>(Notes 1, 2)</p>   |  |
| <p>Notes</p> | <ul style="list-style-type: none"> <li>● The Emergency Director should declare the Site Area Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</li> <li>● If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.</li> <li>● 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.</li> <li>● The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.</li> </ul> |  | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> <p>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.</p> <p>Note 3: 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 <b>NO</b> longer VALID for classification purposes.</p> <p>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.</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>None</p> <p>Incorporated site-specific EAL numbers associated with generic EAL#1.</p> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                              |
|---------|---|-------------|--|---|
| AS2     | Spent fuel pool level at (site-specific Level 3 description)<br>MODE: All | RS2         | Spent fuel pool level at the top of the fuel racks<br>OPCON: All | Top of the fuel racks is the site-specific Level 3 description. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording                                    | Difference/Deviation Justification   |
|---------------|--|------------|---|--|
| 1             | Lowering of spent fuel pool level to (site-specific Level 3 value) | RS2.1      | Lowering of spent fuel pool level to <b>176 ft.</b> | For HCGS, Level 3, which corresponds to the top of the fuel racks in the SFP, is an indicated level of 176 ft. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| AG1     | Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE.<br>MODE: All | RG1         | Release of gaseous radioactivity resulting in offsite dose greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|--|------------|--|--|
| 1             | Reading on ANY of the following radiation monitors greater than the reading shown for 15 minutes or longer:<br>(site-specific monitor list and threshold values)   | RG1.1      | In the absence of dose assessment results, reading on <b>ANY</b> Table R-1 effluent radiation monitor > <b>column "GE"</b> for <b>≥ 15 min.</b><br>(Notes 1, 2, 3, 4)  | Added the phrase "In the absence of dose assessment..." to emphasize the intent of Note 4.<br>The HCGS radiation monitors that detect radioactivity effluent release to the environment are listed in Tables R-1.<br>UE, Alert, SAE and GE thresholds for all HCGS continuously monitored gaseous and liquid release pathways are listed in Table R-1 to consolidate the information in a single location and, thereby, simplify identification of the thresholds by the EAL-user. |
| 2             | Dose assessment using actual meteorology indicates doses greater than 1,000 mrem TEDE or 5,000 mrem thyroid CDE at or beyond (site-specific dose receptor point).  | RG1.2      | Dose assessment using actual meteorology indicates doses > <b>1,000 mrem TEDE</b> or <b>5,000 mrem thyroid CDE</b> at or beyond the <b>MINIMUM EXCLUSION AREA</b> (Notes 3, 4)   | The minimum exclusion area is the site-specific receptor point.  |
| 3             | Field survey results indicate <b>EITHER</b> of the following at or beyond (site-specific dose receptor point):<br><ul style="list-style-type: none"> <li>● Closed window dose rates greater than 1,000 mR/hr expected to continue for 60 minutes or longer.</li> <li>● Analyses of field survey</li> </ul> | RG1.3      | Field survey results indicate <b>EITHER</b> of the following at or beyond the <b>PROTECTED AREA</b> boundary:<br><ul style="list-style-type: none"> <li>● Closed window dose rates &gt; <b>1000 mR/hr</b> expected to continue for <b>≥ 60 min.</b></li> <li>● Analyses of field survey</li> </ul> | The protected area boundary is the site-specific field survey receptor point.<br>Analyses of field survey samples indicating I-131 concentration > 3.85E-06μCi/cc corresponds to 5000 m/R CDE thyroid for one hour of inhalation.  |

EAL Comparison Matrix

|              |  |  |  |  |
|--------------|--|--|--|--|
|              | <p>samples indicate thyroid CDE greater than 5,000 mrem for one hour of inhalation.</p>  |  | <p>samples indicate I-131 concentration &gt; <b>3.85E-06</b> <math>\mu\text{Ci/cc}</math>.</p> <p>(Notes 1, 2)</p>   |  |
| <p>Notes</p> | <ul style="list-style-type: none"> <li>● The Emergency Director should declare the Site Area Emergency promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</li> <li>● If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.</li> <li>● 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.</li> <li>● The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.</li> </ul> |  | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> <p>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.</p> <p>Note 3: 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 <b>NO</b> longer VALID for classification purposes.</p> <p>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</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>None</p> <p>Incorporated site-specific EAL numbers associated with generic EAL#1.</p> |



EAL Comparison Matrix

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  | results from a dose assessment using actual meteorology are available. |  |
|--|--|--|--|--|

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                              |
|---------|--|-------------|--|---|
| AG2     | Spent fuel pool level cannot be restored to at least (site-specific Level 3 description) for 60 minutes or longer<br>MODE: All | RG2         | Spent fuel pool level <b>CANNOT</b> be restored to at least the top of the fuel racks for 60 minutes or longer<br>OPCON: All | Top of the fuel racks is the site-specific Level 3 description. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Spent fuel pool level cannot be restored to at least (site-specific Level 3 value) for 60 minutes or longer  | RG2.1      | Spent fuel pool level <b>CANNOT</b> be restored to at least <b>176 ft. for ≥ 60 min.</b> (Note 1)   | For HCGS, Level 3, which corresponds to ~0 ft. above the top of the fuel racks in the SFP, is an indicated level of 176 ft.                           |
| Note          | The Emergency Director should declare the General Emergency promptly upon determining that 60 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

**Category C**

**Cold Shutdown / Refueling System Malfunction**

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification   |
|---------|---|-------------|---|--|
| CU1     | UNPLANNED loss of (reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) inventory for 15 minutes or longer.<br><br>MODE: Cold Shutdown, Refueling | CU1         | <b>UNPLANNED</b> loss of RPV inventory<br><br>OPCON: 4 - Cold Shutdown, 5 - Refueling | Deleted the words "...for 15 minutes or longer" as the 15 minute criteria only applies to EAL #1 |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|--|------------|--|--|
| 1             | UNPLANNED loss of reactor coolant results in (reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level less than a required lower limit for 15 minutes or longer.            | CU1.1      | <b>UNPLANNED</b> loss of reactor coolant results in RPV water level less than a required lower limit for <b>≥ 15 min.</b> (Note 1)                                   | None   |
| 2             | a. (Reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level cannot be monitored.<br><br><b>AND</b><br><br>b. UNPLANNED increase in (site-specific sump and/or tank) levels. | CU1.2      | RPV water level <b>CANNOT</b> be monitored<br><br><b>AND</b><br><b>UNPLANNED</b> increase in <b>ANY</b> Table C-1 sump or tank levels due to a loss of RPV inventory | Added the words "...due to loss of RPV inventory" to be consistent with the IC wording.<br><br>The Table C-1 sumps & tanks are the site-specific applicable sumps and tanks.<br><br>Added bulleted criteria "Observation..." to Table C-1 to include direct observation of significant unisolable RCS leakage. |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.                                   | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.              | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.  |

| <b>Table C-1 Sumps &amp; Tanks</b>  |
|---|
| <ul style="list-style-type: none"><li>• Drywell equipment drain sump</li><li>• Drywell floor drain sump</li><li>• Reactor Building equipment drain sump</li><li>• Reactor Building floor drain sump</li><li>• Suppression Pool</li><li>• Observation of RCS leakage that is <b>UNISOLABLE</b></li></ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                                  |
|---------|--|-------------|--|---|
| CU2     | Loss of all but one AC power source to emergency buses for 15 minutes or longer.<br>MODE: Cold Shutdown, Refueling, Defueled | CU2         | Loss of <b>ALL but one</b> AC power source to vital buses for 15 minutes or longer.<br>OPCON: 4 - Cold Shutdown, 5 - Refueling, D - Defueled | Vital buses is the HCGS-specific terminology for “emergency buses”. |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | a. AC power capability to (site-specific emergency buses) is reduced to a single power source for 15 minutes or longer.<br><br><b>AND</b><br>b. Any additional single power source failure will result in loss of all AC power to SAFETY SYSTEMS. | CU2.1      | AC power capability to 4.16 KV vital buses reduced to a single power source for <b>≥ 15 min.</b> (Note 1)<br><br><b>AND</b><br><b>ANY</b> additional single power source failure will result in loss of <b>ALL</b> AC power to <b>SAFETY SYSTEMS</b> | Vital buses is the HCGS-specific terminology for “emergency buses”.   |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.  | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.  | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| CU3     | UNPLANNED increase in RCS temperature<br>MODE: Cold Shutdown, Refueling | CU3         | <b>UNPLANNED</b> increase in RCS temperature<br>OPCON: 4 - Cold Shutdown, 5 - Refueling | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|---|------------|---|---|
| 1             | UNPLANNED increase in RCS temperature to greater than (site-specific Technical Specification cold shutdown temperature limit)                   | CU3.1      | <b>UNPLANNED</b> increase in RCS temperature to > <b>200°F</b>  | 200°F is the site-specific Tech. Spec. cold shutdown temperature limit.   |
| 2             | Loss of <b>ALL</b> RCS temperature and (reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level indication for 15 minutes or longer.     | CU3.2      | Loss of <b>ALL</b> RCS temperature and RPV water level indication for <b>≥ 15 min.</b> (Note 1)   | None  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| CU4     | Loss of Vital DC power for 15 minutes or longer.<br>MODE: Cold Shutdown, Refueling | CU4         | Loss of Vital DC power for 15 minutes or longer.<br>OPCON 4 - Cold Shutdown, 5 - Refueling | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Indicated voltage is less than (site-specific bus voltage value) on required Vital DC buses for 15 minutes or longer.                            | CU4.1      | Loss of <b>ANY</b> of the following <b>required</b> Vital <b>125 V</b> DC Power Channel combinations as indicated by Voltage < <b>108 V</b> DC for <b>≥ 15 min.</b> (Note 1): <ul style="list-style-type: none"> <li>• Channel A and Channel B</li> <li>• Channel A, Channel C (either bus) and Channel D (either bus)</li> <li>• Channel B, Channel C (either bus) and Channel D (either bus)</li> </ul> | 108 VDC is the site-specific minimum vital DC bus voltage. Safety-related DC bus operability requirements are specified consistent with Technical Specifications. |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.   | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.             |



EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| CU5     | Loss of all onsite or offsite communications capabilities.<br>MODE: Cold Shutdown, Refueling, Defueled | CU5         | Loss of <b>ALL</b> onsite or offsite communications capabilities.<br>OPCON: 4 - Cold Shutdown, 5 - Refueling, D - Defueled | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|---|------------|---|---|
| 1             | Loss of <b>ALL</b> of the following onsite communication methods:<br>(site specific list of communications methods) | CU5.1      | Loss of <b>ALL</b> Table C-4 onsite communication methods<br><b>OR</b><br>Loss of <b>ALL</b> Table C-4 offsite communication methods<br><b>OR</b><br>Loss of <b>ALL</b> Table C-4 NRC communication methods | Example EALs #1, 2 and 3 have been combined into a single EAL for simplification of presentation.<br><br>Table C-4 provides a site-specific list of onsite, offsite (ORO) and NRC communications methods. |
| 2             | Loss of <b>ALL</b> of the following ORO communications methods:<br>(site specific list of communications methods)   |            |   |   |
| 3             | Loss of <b>ALL</b> of the following NRC communications methods:<br>(site specific list of communications methods)   |            |   |   |

| <b>Table C-4 Communication Methods</b>    |               |                |            |
|---|---------------|----------------|------------|
| <b>System</b>                             | <b>Onsite</b> | <b>Offsite</b> | <b>NRC</b> |
| Direct Inward Dial System (DID)           | X             | X              | X          |
| Station Page System (Gaitronics)          | X             |                |            |
| Station Radio System                      | X             |                |            |
| Nuclear Emergency Telephone System (NETS) |               | X              | X          |
| Centrex Phone System (ESSX)               |               | X              | X          |
| NRC (ENS)                                 |               |                | X          |

EAL Comparison Matrix

| NEI IC#       | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification  |
|---------------|---|-------------|---|---|
| CA1           | Loss of (reactor vessel/RCS [PWR] or RPV [BWR]) inventory<br>MODE: Cold Shutdown, Refueling   | CA1         | Significant loss of RPV inventory<br>OPCON: 4 - Cold Shutdown, 5 - Refueling  | Added the word "Significant..." to differentiate the Alert loss of RPV inventory IC from the Unusual Event IC which is "Unplanned loss of RPV inventory."   |
| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL #  | HCGS EAL Wording  | Difference/Deviation Justification  |
| 1             | Loss of (reactor vessel/RCS [PWR] or RPV [BWR]) inventory as indicated by level less than (site-specific level).  | CA1.1       | Loss of RPV inventory as indicated by compensated RPV water level < <b>-38 in.</b>  | -38 in. is the low-low actuation setpoint for ECCS.   |
| 2             | a. (Reactor vessel/RCS [PWR] or RPV [BWR]) level cannot be monitored for 15 minutes or longer<br><br><b>AND</b><br>b. UNPLANNED increase in (site-specific sump and/or tank) levels due to a loss of (reactor vessel/RCS [PWR] or RPV [BWR]) inventory. | CA1.2       | RPV water level <b>CANNOT</b> be monitored for $\geq 15$ min. (Note 1)<br><b>AND</b><br>UNPLANNED increase in <b>ANY</b> Table C-1 sump or pool levels due to a loss of RPV inventory | The Table C-1 components/areas are the site-specific applicable sumps and tanks.<br><br>Added bulleted criteria "Observation" to Table C-1 to include direct observation of significant unisolable RCS leakage. |
| Note          | The Emergency Director should declare the Alert promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded   | N/A         | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.                               | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.   |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification                                    |
|---------|---|-------------|---|---|
| CA2     | Loss of all offsite and all onsite AC power to emergency buses for 15 minutes or longer<br>MODE: Cold Shutdown, Refueling, Defueled | CA2         | Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to vital buses for 15 minutes or longer.<br>OPCON: 4 - Cold Shutdown, 5 - Refueling, D - Defueled | “vital buses” is the HCGS-specific terminology for “emergency buses”. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC Power to (site-specific emergency buses) for 15 minutes or longer.                           | CA2.1      | Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to 4.16 KV vital buses for <b>≥ 15 min.</b> (Note 1)  | 4.16 KV buses are the site-specific vital (emergency) buses.  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| CA3     | Inability to maintain the plant in cold shutdown.<br>MODE: Cold Shutdown, Refueling | CA3         | Inability to maintain plant in cold shutdown.<br>OPCON: 4 - Cold Shutdown, 5 - Refueling | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|---|------------|--|--|
| 1             | UNPLANNED increase in RCS temperature to greater than (site-specific Technical Specification cold shutdown temperature limit) for greater than the duration specified in the following table. | CA3.1      | <b>UNPLANNED</b> increase in RCS temperature to > <b>200°F</b> for > Table C-3 duration (Note 1)<br><br><b>OR</b><br><b>UNPLANNED</b> RPV pressure increase > <b>10 psig</b> | Example EALs #1 and #2 have been combined into a single EAL as EAL # is the alternative threshold based on a loss of RCS temperature indication.<br><br>200°F is the site-specific Tech. Spec. cold shutdown temperature limit.<br><br>Table C-3 is the site-specific implementation of the generic RCS Reheat Duration Threshold table.<br><br>10 psig is the site-specific pressure increase readable by Control Room indications. |
| 2             | UNPLANNED RCS pressure increase greater than (site-specific pressure reading). (This EAL does not apply during water-solid plant conditions. [PWR])   |            |  |  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.  | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.                      |  |

| <b>Table: RCS Heat-up Duration Thresholds</b>   |                                   |                         |
|---|-----------------------------------|-------------------------|
| <b>RCS Status</b>   | <b>Containment Closure Status</b> | <b>Heat-up Duration</b> |
| Intact (but not at reduced inventory [ <i>PWR</i> ])  | Not applicable                    | 60 minutes*             |
| Not intact (or at reduced inventory [ <i>PWR</i> ])   | Established                       | 20 minutes*             |
|   | Not Established                   | 0 minutes               |
| * If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is not applicable. |                                   |                         |

| <b>Table C-3 RCS Heat-up Duration Thresholds</b>   |                                   |                         |
|--|-----------------------------------|-------------------------|
| <b>RCS Status</b>  | <b>CONTAINMENT CLOSURE Status</b> | <b>Heat-up Duration</b> |
| Intact   | <b>NOT</b> Applicable             | 60 min. **              |
| <b>NOT</b> Intact  | Established                       | 20 min. **              |
| <b>NOT</b> Intact  | <b>NOT</b> Established            | 0 min.                  |
| ** If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is <b>NOT</b> applicable |                                   |                         |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| CA6     | Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode.<br>MODE: Cold Shutdown, Refueling | CA6         | Hazardous event affecting a <b>SAFETY SYSTEM</b> needed for the current operating mode.<br>OPCON: 4 - Cold Shutdown, 5 - Refueling | None                               |

EAL Comparison Matrix

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification                       |
|---------------|---|------------|--|--|
| 1             | <p>a. The occurrence of <b>ANY</b> of the following hazardous events:</p> <ul style="list-style-type: none"> <li>● Seismic event (earthquake)</li> <li>● Internal or external flooding event</li> <li>● High winds or tornado strike</li> <li>● FIRE</li> <li>● EXPLOSION</li> <li>● (site-specific hazards)</li> <li>● Other events with similar hazard characteristics as determined by the Shift Manager</li> </ul> <p><b>AND</b></p> <p>b. <b>EITHER</b> of the following:</p> <ol style="list-style-type: none"> <li>1. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode.</li> </ol> <p><b>OR</b></p> <ol style="list-style-type: none"> <li>2. The event has caused <b>VISIBLE DAMAGE</b> to a SAFETY SYSTEM component or structure needed for the current operating mode.</li> </ol> | CA6.1      | <p>The occurrence of <b>any</b> Table C-5 hazardous event</p> <p><b>AND EITHER:</b></p> <ul style="list-style-type: none"> <li>● Event damage has caused indications of degraded performance in at least one train of a <b>SAFETY SYSTEM</b> needed for the current operating mode</li> <li>● The event has caused <b>VISIBLE DAMAGE</b> to a <b>SAFETY SYSTEM</b> component or structure needed for the current operating mode</li> </ul> | The hazardous events have been tabularized in Table C-6. |



| <b>Table C-5 Hazardous Events</b>   |
|---|
| <ul style="list-style-type: none"><li>● Seismic event (earthquake)</li><li>● Internal or external <b>FLOODING</b> event</li><li>● High winds or tornado strike</li><li>● <b>FIRE</b></li><li>● <b>EXPLOSION</b></li><li>● Other events with similar hazard characteristics as determined by the Shift Manager</li></ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| CS1     | Loss of (reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) inventory affecting core decay heat removal capability.<br>MODE: Cold Shutdown, Refueling | CS1         | Loss of RPV inventory affecting core decay heat removal capability<br>OPCON: 4 - Cold Shutdown, 5 - Refueling | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | a. CONTAINMENT CLOSURE not established.<br><b>AND</b><br>b. (Reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level less than (site-specific level).                                   | CS1.1      | <b>CONTAINMENT CLOSURE NOT</b> established <b>AND</b> RPV compensated level < -129 in.<br><br><b>OR</b><br><b>CONTAINMENT CLOSURE</b> established <b>AND</b> RPV compensated level < -161 in.                     | Example EALs #1 and #2 have been combined into a single EAL.<br>-129 in. is the low-low-low ECCS actuation setpoint.<br>-161 in. is the RPV water level corresponding to the top of active fuel.  |
| 2             | a. CONTAINMENT CLOSURE established.<br><b>AND</b><br>b. (Reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level less than (site-specific level).                                       |            |   |   |
| 3             | a. (Reactor vessel/RCS [ <i>PWR</i> ] or RPV [ <i>BWR</i> ]) level cannot be monitored for 30 minutes or longer.<br><b>AND</b><br>b. Core uncover is indicated by <b>ANY</b> of the following: | CS1.2      | RPV level <b>CANNOT</b> be monitored for <b>≥ 30 min.</b> (Note 1)<br><b>AND</b><br>Core uncover is indicated by <b>UNPLANNED</b> increase in <b>ANY</b> Table C-1 sump or tank levels of sufficient magnitude to | Site-specific applicable sumps and tanks are listed in Table C-1 to improve the readability of the EAL.<br><br>Although “Observation...” in Table C-1 is neither a sump nor tank, it is included in order to implement the intent of the NEI basis which states: “...operators may determine that an inventory loss is occurring by observing changes...”<br><br>There are no site-specific radiation monitor readings available that |

EAL Comparison Matrix

|             |   |            |  |  |
|-------------|---|------------|--|--|
|             | <ul style="list-style-type: none"> <li>● (Site-specific radiation monitor) reading greater than (site-specific value)</li> <li>● Erratic source range monitor indication [<i>PWR</i>]</li> <li>● UNPLANNED increase in (site-specific sump and/or tank) levels of sufficient magnitude to indicate core uncover</li> <li>● (Other site-specific indications)</li> </ul> |            | <p>indicate core uncover</p>   | <p>would be indicative of core uncover in the Refueling operating condition.</p> <p>Erratic source range monitoring is not included as HCGS is a BWR.</p> <p>No other site-specific indications of core uncover have been identified for HCGS.</p> |
| <p>Note</p> | <p>The Emergency Director should declare the Site Area Emergency promptly upon determining that 30 minutes has been exceeded, or will likely be exceeded</p>  | <p>N/A</p> | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p>   |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| CG1     | Loss of (reactor vessel/RCS [PWR] or RPV [BWR]) inventory affecting fuel clad integrity with containment challenged<br>MODE: Cold Shutdown, Refueling | CG1         | Loss of RPV inventory affecting fuel clad integrity with containment challenged<br>OPCON: 4 - Cold Shutdown, 5 - Refueling | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification   |
|---------------|--|------------|---|--|
| 1             | a. (Reactor vessel/RCS [PWR] or RPV [BWR]) level less than (site-specific level) for 30 minutes or longer.<br><b>AND</b><br>b. <b>ANY</b> indication from the Containment Challenge Table (see below).   | CG1.1      | RPV compensated level < -161 in. for <b>≥ 30 min.</b> (Note 1)<br><b>AND</b><br><b>ANY</b> Containment Challenge indication, Table C-2  | -161 in. is the RPV water level corresponding to the top of active fuel.<br>6% hydrogen concentration in the presence of oxygen (5%) is the minimum necessary to support a hydrogen deflagration.<br>The Max Safe Operating Radiation Level for HCGS is Reactor Bldg. radiation levels > 1000 time normal.   |
| 2             | a. (Reactor vessel/RCS [PWR] or RPV [BWR]) level cannot be monitored for 30 minutes or longer.<br><b>AND</b><br>b. Core uncover is indicated by <b>ANY</b> of the following: <ul style="list-style-type: none"> <li>● (Site-specific radiation monitor) reading greater than (site-specific value)</li> <li>● Erratic source range monitor indication [PWR]</li> <li>● UNPLANNED increase in (site-specific sump and/or</li> </ul> | CG1.2      | RCS level <b>CANNOT</b> be monitored for <b>≥ 30 min.</b> (Note 1)<br><b>AND</b><br>Core uncover is indicated by <b>UNPLANNED</b> increase in <b>ANY</b> Table C-1 sump or tank levels of sufficient magnitude to indicate core uncover<br><b>AND</b><br><b>ANY</b> Containment Challenge indication, Table C-2 | Site-specific applicable sumps and tanks are listed in Table C-1 to improve the readability of the EAL.<br>Although "Observation..." in Table C-1 is neither a sump nor tank, it is included in order to implement the intent of the NEI basis which states: "...operators may determine that an inventory loss is occurring by observing changes..."<br>There are no site-specific radiation monitor readings available that would be indicative of core uncover in the Refueling operating condition.<br>Erratic source range monitoring is not included as HCGS is a BWR.<br>No other site-specific indications of core uncover have been identified for HCGS.<br>6% hydrogen concentration in the presence of oxygen (5%) is the |

EAL Comparison Matrix

|      |  |     |   |  |
|------|--|-----|---|--|
|      | <p>tank) levels of sufficient magnitude to indicate core uncover</p> <ul style="list-style-type: none"> <li>● (Other site-specific indications)</li> </ul> <p><b>AND</b></p> <p>c. <b>ANY</b> indication from the Containment Challenge Table (see below).</p> |     |   | <p>minimum necessary to support a hydrogen deflagration.</p> <p>The Max Safe Operating Radiation Level for HCGS is Reactor Bldg. radiation levels &gt; 1000 time normal.</p>   |
| Note | <p>The Emergency Director should declare the General Emergency promptly upon determining that 30 minutes has been exceeded, or will likely be exceeded.</p> <p>N/A</p>   | N/A | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p> <p>Note 9: If <b>CONTAINMENT CLOSURE</b> is re-established prior to exceeding the 30-min. time limit, declaration of a General Emergency is <b>NOT</b> required.</p> | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> <p>Note 6 implements the asterisked note associated with the Containment Closure requirement.</p> |

| <b>Containment Challenge Table</b>   |
|--|
| <ul style="list-style-type: none"> <li>■ CONTAINMENT CLOSURE not established*</li> <li>■ (Explosive mixture) exists inside containment</li> <li>■ UNPLANNED increase in containment pressure</li> <li>■ Secondary containment radiation monitor reading above (site-specific value) [BWR]</li> </ul> |

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

| <b>Table C-2 Containment Challenge Indications</b>   |
|--|
| <ul style="list-style-type: none"><li>• <b>CONTAINMENT CLOSURE <u>NOT</u></b> established (Note 9)</li><li>• Indications of <math>\geq 6\% \text{H}_2</math> and <math>\geq 5\% \text{O}_2</math> in Drywell or Torus</li><li>• <b>UNPLANNED</b> rise in drywell pressure</li><li>• <b><u>ANY</u></b> Reactor Bldg rad level &gt; <b>1000 times</b> normal</li></ul> |

**Category D**

**Permanently Defueled Station Malfunction**

EAL Comparison Matrix

| NEI IC#  | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording | Difference/Deviation Justification   |
|--|--|-------------|-----------------|--|
| PD-AU1<br>PD-AU2<br>PD-SU1<br>PD-HU1<br>PD-HU2<br>PD-HU3<br>PD-AA1<br>PD-AA2<br>PD-HA1<br>PD-HA3 | Recognition Category D<br>Permanently Defueled Station | N/A         | N/A             | NEI Recognition Category PD ICs and EALs are applicable only to permanently defueled stations. HCGS is not a defueled station. |



## **Category E**

### **Independent Spent Fuel Storage Installation**

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification   |
|---------|--|-------------|--|--|
| E-HU1   | Damage to a loaded cask<br>CONFINEMENT BOUNDARY<br>MODE: All | RU4         | Damage to a loaded cask<br><b>CONFINEMENT BOUNDARY</b><br>OPCON: All | Generic IC E-HU1 has been incorporated into category "R" as it is a bases on abnormal dose rates external to the loaded ISFSI casks. |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|---|------------|--|--|
| 1             | Damage to a loaded cask<br>CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading greater than (2 times the site-specific cask specific technical specification allowable radiation level) on the surface of the spent fuel cask. | RU4.1      | Damage to a Multi Purpose Canister (MPC) <b>CONFINEMENT BOUNDARY</b> as indicated by on-contact radiation readings $\geq 600$ <b>mR/hr (gamma + neutron)</b> on the surface of the spent fuel cask, excluding the air vents, <b>OR <math>\geq 60</math> mR/hr (gamma + neutron)</b> on the top of the spent fuel cask. | The specified dose rates represent 2 times the site-specific cask technical specification allowable levels per the ISFSI Technical Specifications. |

**Category F**

**Fission Product Barrier Degradation**

**BWR Fuel Clad Fission Product Barrier Degradation Thresholds**

| NEI FPB#     | NEI Threshold Wording   | HCGS FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification   |
|--------------|---|---------------|--|--|
| FC Loss<br>1 | <b>RCS Activity</b><br>A. (Site-specific indications that reactor coolant activity is greater than 300 µCi/gm dose equivalent I-131). | FB3-L         | Primary coolant activity > <b>300 µCi/gm</b> dose equivalent I-131   | 300 µCi/gm DEI-131 is the site-specific indication for this reactor coolant activity.  |
| FC Loss<br>2 | <b>RPV Water Level</b><br>A. Primary containment flooding required.   | FB1-L         | SAG entry is required  | Revised to read “SAG entry is required.” Requirements for Primary Containment Flooding correspond to entry into the Severe Accident Guidelines (SAGs) and are established in EOP RPV Control, EOP RPV Control - ATWS and EOP RPV Flooding & EOP RPV Flooding. Per the developers guide “The phrase, “Primary containment flooding required,” should be modified to agree with the site-specific EOP phrase indicating exit from all EOPs and entry to the SAGs (e.g., SAG entry is required.)” Implements EP FAQ 2015-004. |
| FC Loss<br>3 | <b>Not Applicable</b><br>Not Applicable   | N/A           | N/A  | N/A  |
| FC Loss<br>4 | <b>Primary Containment Radiation</b><br>A. Primary containment radiation monitor reading greater than (site-specific value).          | RB2-L         | DAPA radiation monitor RI-4825A or RI-4825B reading <b><u>EITHER</u></b> of the following: <ul style="list-style-type: none"> <li>• With drywell sprays, <b>≥ 2,000 R/hr</b></li> <li>• Without drywell sprays, <b>≥ 4,000 R/hr</b></li> </ul> | A 2,000 R/hr reading in the drywell with sprays or 4,000 R/hr reading in the drywell without sprays is used to indicate a loss of the Fuel Clad barrier and a release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. This value assumes an instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of approximately 300 µCi/gm Dose Equivalent I-131 into the drywell atmosphere.                               |
| FC Loss<br>5 | <b>Other Indications</b><br>A. (site-specific as applicable)  | N/A           | N/A  | No other site-specific Fuel Clad Loss indication has been identified for HCGS.   |

EAL Comparison Matrix

| NEI FPB#       | NEI Threshold Wording   | HCGS FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification   |
|----------------|---|---------------|--|--|
| FC Loss<br>6   | <b>Emergency Director Judgment</b><br>A. <b>ANY</b> condition in the opinion of the Emergency Director that indicates Loss of the Fuel Clad Barrier.                                  | FB4-L         | <b>ANY</b> condition in the opinion of the Emergency Coordinator that indicates loss of the fuel clad barrier                      | None   |
| FC P-Loss<br>1 | <b>RCS Activity</b><br>Not Applicable   | N/A           | N/A  | N/A  |
| FC P-Loss<br>2 | <b>RPV Water Level</b><br>A. RPV water level cannot be restored and maintained above (site-specific RPV water level corresponding to the top of active fuel) or cannot be determined. | FB1-P         | RPV level <b>CANNOT</b> be restored and maintained above <b>-161 in.</b><br><br><b>OR</b><br>RPV level <b>CANNOT</b> be determined | -161 in. is the site-specific RPV water level corresponding to the top of active fuel.   |
| FC P-Loss<br>3 | <b>Not Applicable</b><br>Not Applicable   | N/A           | N/A  | N/A  |
| FC P-Loss<br>4 | <b>Primary Containment Radiation</b><br>Not Applicable  | N/A           | N/A  | N/A  |
| FC P-Loss<br>5 | <b>Other Indications</b><br>A. (site-specific as applicable)  | N/A           | N/A  | No other site-specific Fuel Clad Potential Loss indication has been identified for HCGS. |

EAL Comparison Matrix

| NEI<br>FPB#           | NEI Threshold Wording  | HCGS<br>FPB #(s) | HCGS FPB Wording  | Difference/Deviation Justification |
|-----------------------|--|------------------|---|------------------------------------|
| FC<br>P-Loss<br><br>6 | <p><b>Emergency Director Judgment</b></p> <p>A. Any condition in the opinion of the Emergency Director that indicates Potential Loss of the Fuel Clad Barrier.</p> | FB2-P            | <p><b><u>ANY</u></b> condition in the opinion of the Emergency Coordinator that indicates potential loss of the fuel clad barrier</p> | None                               |

**BWR RCS Fission Product Barrier Degradation Thresholds**

| NEI FPB#      | NEI IC Wording   | HCGS FPB #(s) | HCGS FPB Wording  | Difference/Deviation Justification  |
|---------------|--|---------------|---|---|
| RCS Loss<br>1 | <p><b>Primary Containment Pressure</b></p> <p>A. Primary containment pressure greater than (site-specific value) due to RCS leakage.</p>   | RB2-L         | Drywell pressure > <b>1.68 psig</b> due to RCS leakage  | 1.68 psig is the site-specific primary containment pressure corresponding to the drywell high pressure scram and isolation setpoint.  |
| RCS Loss<br>2 | <p><b>RPV Water Level</b></p> <p>A. RPV water level cannot be restored and maintained above (site-specific RPV water level corresponding to the top of active fuel) or cannot be determined.</p>       | RB1-L         | <p>RPV level <b><u>CANNOT</u></b> be restored and maintained above <b>-161 in.</b></p> <p><b><u>OR</u></b></p> <p>RPV level <b><u>CANNOT</u></b> be determined.</p>   | -161 in. is the site-specific RPV water level corresponding to the top of active fuel.  |
| RCS Loss<br>3 | <p><b>RCS Leak Rate</b></p> <p>A. UNISOLABLE break in ANY of the following: (site-specific systems with potential for high-energy line breaks)</p> <p>OR</p> <p>B. Emergency RPV Depressurization.</p> | RB3-L         | <p>A break outside primary containment <b><u>CANNOT</u></b> be isolated from the Control Room in <b><u>ANY</u></b> of the following systems:</p> <ul style="list-style-type: none"> <li>• Main steam line</li> <li>• HPCI steam line</li> <li>• RCIC steam line</li> <li>• RWCU</li> <li>• Feedwater</li> </ul> | <p>Main Steam Line, HPCI steam line, RCIC steam line, RWCU, and Feedwater are the site-specific systems with potential for high energy line breaks.</p> <p>Added "...<b><u>CANNOT</u></b> be isolated from the Control Room..." to be consistent with the generic bases which states:</p> <p><i>"If it is determined that the ruptured line cannot be promptly isolated from the Control Room, the RCS barrier Loss threshold is met"</i></p> |

EAL Comparison Matrix

| NEI FPB#      | NEI IC Wording   | HCGS FPB #(s) | HCGS FPB Wording  | Difference/Deviation Justification  |
|---------------|--|---------------|---|---|
|               |  | RB4-L         | Emergency RPV<br>Depressurization is required   | None  |
| RCS Loss<br>4 | <p><b>Primary Containment Radiation</b></p> <p>A. Primary containment radiation monitor reading greater than (site-specific value).</p>                      | N/A           | N/A   | <p>This RCS Loss has been deleted. Radiation levels indicative of the dispersal of reactor coolant activity at the Technical Specification limit (~0.1% clad damage) are so low that they cannot be read on the DAPA radiation monitors. These monitors are equipped with a source that ensures an onscale reading. The radiation levels equivalent to the NEI 99-01 threshold would be offscale-low or masked by the check source. There are no other radiation monitors that can be used for this purpose.</p> <p>Due to the inability of the DAPA radiation monitors to distinguish between a cloud of released RCS gases and shine from the reactor vessel and adjacent piping/components, this RCS Loss is being omitted as permitted by NEI 99-01. Other indications of RCS leakage are being used. It should be recognized that DAPA exceeding 2000 R/hr would most likely occur due to core uncover as RPV water level decreases below the top of active fuel. This condition will result in appropriate escalation to a SAE in the Fission Product Barrier Table, and hence the use of DAPA is not needed to detect a loss of RCS barrier.</p> |
| RCS Loss<br>5 | <p><b>Other Indications</b></p> <p>A. (site-specific as applicable)</p>  | N/A           | N/A   | No other site-specific RCS Loss indication has been identified for HCGS.  |
| RCS Loss<br>6 | <p><b>Emergency Coordinator Judgment</b></p> <p>A. <b>ANY</b> condition in the opinion of the Emergency Director that indicates Loss of the RCS Barrier.</p> | RB5-L         | <b>ANY</b> condition in the opinion of the Emergency Coordinator that indicates loss of the RCS barrier | None  |



EAL Comparison Matrix

| NEI FPB#        | NEI IC Wording  | HCGS FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification   |
|-----------------|---|---------------|--|--|
| RCS<br>P-Loss 1 | <b>Primary Containment Pressure</b><br>Not Applicable   | N/A           | N/A  | N/A  |
| RCS<br>P-Loss 2 | <b>RPV Water Level</b><br>Not Applicable  | N/A           | N/A  | N/A  |
| RCS<br>P-Loss 3 | <b>RCS Leak Rate</b><br>A. UNISOLABLE primary system leakage that results in exceeding EITHER of the following:<br><br>1. Max Normal Operating Temperature<br><br>OR<br><br>2. Max Normal Operating Area Radiation Level. | RB1-P         | <b>UNISOLABLE</b> primary system leakage that results in exceeding <b>EITHER</b> of the following:<br><br>• <b>ANY</b> EOP 103 Reactor Bldg room temperature Table 1, Column 1<br><br>• <b>ANY</b> EOP 103 Reactor Bldg local rad monitoring alarm | The entry conditions to EOP flowchart 103 for Reactor Bldg room temperature and local rad monitoring alarms are the HCGS Max Normal Operating Temperature and Max Normal Area Radiation. |
| RCS<br>P-Loss 4 | <b>Primary Containment Radiation</b><br>Not Applicable  | N/A           | N/A  | N/A  |
| RCS<br>P-Loss 5 | <b>Other Indications</b><br>A. (site-specific as applicable)  | N/A           | N/A  | No other site-specific RCS Potential Loss indication has been identified for HCGS.   |
| RCS<br>P-Loss 6 | <b>Emergency Director Judgment</b><br>A. <b>ANY</b> condition in the opinion of the Emergency Director that indicates Potential Loss of the RCS Barrier.  | RB2-P         | <b>ANY</b> condition in the opinion of the Emergency Coordinator that indicates potential loss of the RCS barrier  | None   |

**BWR Containment Fission Product Barrier Degradation Thresholds**

| NEI FPB#  | NEI IC Wording   | HCGS FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification |
|-----------|--|---------------|--|------------------------------------|
| PC Loss 1 | <b>Primary Containment Conditions</b><br>A. UNPLANNED rapid drop in primary containment pressure following primary containment pressure rise                 | CB1-L         | <b>UNPLANNED</b> rapid drop in containment pressure following primary containment pressure rise                  | None                               |
|           | OR<br>B. Primary containment pressure response not consistent with LOCA conditions.  | CB2-L         | Primary containment pressure response <b>NOT</b> consistent with LOCA conditions                                 | None                               |
| PC Loss 2 | <b>RPV Water Level</b><br>Not Applicable   | N/A           | N/A  | N/A                                |
| PC Loss 3 | <b>Primary Containment Isolation Failure</b><br>A. UNISOLABLE direct downstream pathway to the environment exists after primary containment isolation signal | CB3-L         | <b>UNISOLABLE</b> direct downstream pathway to the environment exists after primary containment isolation signal | None.                              |
|           | OR<br>B. Intentional primary containment venting per EOPs  | CB4-L         | Intentional primary containment venting per EOPs   | None                               |

EAL Comparison Matrix

| NEI FPB#    | NEI IC Wording  | HCGS FPB #(s) | HCGS FPB Wording  | Difference/Deviation Justification   |
|-------------|---|---------------|---|--|
|             | OR<br>C. UNISOLABLE primary system leakage that results in exceeding EITHER of the following:<br>1. Max Safe Operating Temperature.<br>OR<br>2. Max Safe Operating Area Radiation Level.    | CB5-L         | <b>UNISOLABLE</b> primary system leakage that results in exceeding <b>EITHER</b> of the following:<br><ul style="list-style-type: none"> <li>• <b>ANY</b> EOP 103 Reactor Bldg room temperature Table 1, Column 2</li> <li>• <b>ANY</b> Reactor Bldg rad level &gt; <b>1000 times</b> normal</li> </ul> | The specified EOP flowchart 103 values for Reactor Bldg room temperature and local rad monitoring are the HCGS Max Safe Operating Temperature and Max Safe Area Radiation.   |
| PC Loss 4   | <b>Primary Containment Radiation</b><br>Not Applicable  | N/A           | N/A   | N/A  |
| PC Loss 5   | <b>Other Indications</b><br>A. (site-specific as applicable)  | N/A           | N/A   | No other site-specific Containment Loss indication has been identified for HCGS.   |
| PC Loss 6   | <b>Emergency Director Judgment</b><br><b>ANY</b> condition in the opinion of the Emergency Director that indicates Loss of the Containment Barrier.   | CB6-L         | <b>ANY</b> condition in the opinion of the Emergency Coordinator that indicates loss of the Containment barrier   | None   |
| PC P-Loss 1 | <b>Primary Containment Conditions</b><br>A. Primary containment pressure greater than (site-specific value)<br>OR<br>B. (site-specific explosive mixture) exists inside primary containment | CB2-P         | Drywell pressure > <b>62 psig</b>   | 62 psig is the maximum HCGS containment pressure allowed by design.  |
|             |   | CB3-P         | Indications of $\geq 6\% \text{H}_2$ and $\geq 5\% \text{O}_2$ in Drywell or Torus  | 6% hydrogen concentration in the presence of 5% oxygen is the minimum necessary to support a hydrogen deflagration.<br><br>Drywell and Torus combustible gas concentrations are monitored and controlled per EOPs. |

EAL Comparison Matrix

| NEI FPB#    | NEI IC Wording   | HCGS FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification  |
|-------------|--|---------------|--|---|
|             | OR<br>C. HCTL exceeded.  | CB4-P         | HCTL exceeded (EOP Curve SPT-P)  | Reference to the EOP curve that illustrates the HCTL has been added for clarification.  |
| PC P-Loss 2 | <b>RPV Water Level</b><br>A. Primary containment flooding required.  | CB1-P         | SAG entry is required  | Revised to read "SAG entry is required." Requirements for Primary Containment Flooding correspond to entry into the Severe Accident Guidelines (SAGs) and are established in EOP RPV Control, EOP RPV Control - ATWS and EOP RPV Flooding & EOP RPV Flooding. Per the developers guide "The phrase, "Primary containment flooding required," should be modified to agree with the site-specific EOP phrase indicating exit from all EOPs and entry to the SAGs (e.g., SAG entry is required.)." Implements EP FAQ 2015-004. |
| PC P-Loss 3 | <b>Primary Containment Isolation Failure</b><br>Not Applicable   | N/A           | N/A  | N/A   |
| PC P-Loss 4 | <b>Primary Containment Radiation</b><br>A. Primary containment radiation monitor reading greater than (site-specific value). | CB5-P         | DAPA radiation monitor RI-4825A or RI-4825B reading <b><u>EITHER</u></b> of the following:<br><ul style="list-style-type: none"><li>• With drywell sprays,<br/>    <b>≥ 10,000 R/hr</b></li><li>• Without drywell sprays,<br/>    <b>≥ 20,000 R/hr</b></li></ul> | A 10,000 R/hr reading in the drywell with sprays or 20,000 R/hr reading in the drywell without sprays is used to indicate a potential loss of the containment barrier and a release of reactor coolant, with elevated activity indicative of fuel damage, into the drywell. This value assumes an instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with a concentration of approximately 20% clad failure into the drywell atmosphere.                                  |
| PC P-Loss 5 | <b>Other Indications</b><br>A. (site-specific as applicable)   | N/A           | N/A  | No other site-specific Containment Potential Loss indication has been identified for HCGS.  |

EAL Comparison Matrix

| NEI<br>FPB#       | NEI IC Wording  | HCGS<br>FPB #(s) | HCGS FPB Wording   | Difference/Deviation Justification |
|-------------------|---|------------------|--|------------------------------------|
| PC<br>P-Loss<br>6 | <p><b>Emergency Director Judgment</b></p> <p>A. <b>ANY</b> condition in the opinion of the Emergency Director that indicates Potential Loss of the Containment Barrier.</p> | CB6-P            | <p><b>ANY</b> condition in the opinion of the Emergency Coordinator that indicates potential loss of the Containment barrier</p> | None                               |

## **Category H**

### **Hazards and Other Conditions Affecting Plant Safety**

EAL Comparison Matrix

| NEI IC# | NEI IC Wording                                      | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| HU1     | Confirmed SECURITY CONDITION or threat<br>MODE: All | HU1         | Confirmed <b>SECURITY CONDITION</b> or threat.<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|--|------------|--|--|
| 1             | A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the (site-specific security shift supervision). | HU1.1      | <p>A <b>SECURITY CONDITION</b> that does <b>NOT</b> involve a <b>HOSTILE ACTION</b> as reported by the Security Shift Manager or designee (Note 6)</p> <p><b>OR</b></p> <p>Notification of a credible security threat directed at the site – (determined by security in accordance with SY-AA-101-132, “Threat Assessment”) (Note 6)</p> <p><b>OR</b></p> <p>A <b>VALIDATED</b> notification from the NRC providing information of an aircraft threat (Note 6)</p> | <p>Example EALs #1, 2 and 3 have been combined into a single EAL for ease of presentation and use.</p> <p>The “Security Shift Supervision” is the Security Operations Supervisor or designee.</p> <p>Added: (determined by security in accordance with SY-AA-101-132, “Threat Assessment”)” for clarification. Threats are evaluated by security per Threat Assessment, SY-AA-101-132.</p> |
| 2             | Notification of a credible security threat directed at the site.   |            |  |  |
| 3             | A validated notification from the NRC providing information of an aircraft threat.   |            |  |  |
| N/A           | N/A  | N/A        | Note 6: Shift Manager (SM) should implement the Prompt Actions of the Security Emergency Guideline Attachment located in NC.EP-EP.ZZ-0102, EC Response, prior to   | Added Note 6 to provide guidance to implement immediate security based response actions prior to declaring the security based emergency and to obtain critical information of the nature of the security event.  |

EAL Comparison Matrix

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  | <p>classification of a security emergency.</p> <p>Key Information to obtain from Security Supervision upon SM notification of a security event:</p> <ul style="list-style-type: none"><li>• Determination if the security event is a <b>HOSTILE ACTION</b> or <b>SECURITY CONDITION</b></li><li>• If a <b>HOSTILE ACTION</b>, is location the <b>OCA</b> or <b>PA</b>?</li></ul> |  |
|--|--|--|--|--|



EAL Comparison Matrix

| NEI IC# | NEI IC Wording                                     | HCGS IC#(s) | HCGS IC Wording                                     | Difference/Deviation Justification |
|---------|--|-------------|---|------------------------------------|
| HU2     | Seismic event greater than OBE levels<br>MODE: All | HU2         | Seismic event greater than OBE levels<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Seismic event greater than Operating Basis Earthquake (OBE) as indicated by:<br><br>(site-specific indication that a seismic event met or exceeded OBE limits) | HU2.1      | Actuation of the OBE Seismic Switch (> <b>0.1 g</b> ) as indicated by <b><u>EITHER</u></b> : <ul style="list-style-type: none"> <li>• Annunciator C6-C4 (SEISMIC MON PNL C673) activated</li> <li>• Amber alarm light on the Seismic Switch Power Supply Drawer Panel 10C673</li> </ul> | The amber Seismic Switch Event Alarm on the Seismic Switch Power Supply (SP-1) will illuminate at an acceleration equal to or exceeding 0.1 g (OBE). This also annunciates the seismic activity alarm C6-C4 (SEISMIC MON PNL C673). |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording                | HCGS IC#(s) | HCGS IC Wording               | Difference/Deviation Justification |
|---------|-------------------------------|-------------|-------------------------------|------------------------------------|
| HU3     | Hazardous event.<br>MODE: All | HU3         | Hazardous event<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | A tornado strike within the PROTECTED AREA.  | HU3.1      | A tornado strike within the <b>PROTECTED AREA</b>   | None  |
| 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. | HU3.2      | Internal room or area <b>FLOODING</b> of a magnitude sufficient to require manual or automatic electrical isolation of a <b>SAFETY SYSTEM</b> component needed for the current operating mode | None  |
| 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).         | HU3.3      | Movement of personnel within the <b>PROTECTED AREA</b> is <b>IMPEDED</b> due to an offsite event involving hazardous materials (e.g., an offsite chemical spill or toxic gas release)         | None  |
| 4             | A hazardous event that results in on-site conditions sufficient to prohibit the plant staff from accessing the site via personal vehicles.                                       | 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)  | Added reference to Note 7.  |
| 5             | (Site-specific list of natural or technological hazard events)   | N/A        | N/A   | No other site-specific hazard has been identified for HCGS.   |
| Note          | EAL #3 does not apply to routine traffic impediments such as fog,  | N/A        | Note 7: This EAL does <b>NOT</b> apply to routine traffic   | This note, designated Note #7, is intended to apply to generic example EAL #4, not #3 as specified in the generic guidance. |

EAL Comparison Matrix

|  |  |  |   |  |
|--|--|--|---|--|
|  | snow, ice, or vehicle breakdowns or accidents. |  | impediments such as fog, snow, ice, or vehicle breakdowns or accidents. |  |
|--|--|--|---|--|

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| HU4     | FIRE potentially degrading the level of safety of the plant.<br>MODE: All | HU4         | <b>FIRE</b> potentially degrading the level of safety of the plant<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification                     |
|---------------|---|------------|---|--|
| 1             | <p>a. A FIRE is NOT extinguished within 15-minutes of <b>ANY</b> of the following FIRE detection indications:</p> <ul style="list-style-type: none"> <li>● Report from the field (i.e., visual observation)</li> <li>● Receipt of multiple (more than 1) fire alarms or indications</li> <li>● Field verification of a single fire alarm</li> </ul> <p><b>AND</b></p> <p>b. The FIRE is located within <b>ANY</b> of the following plant rooms or areas:<br/>(site-specific list of plant rooms or areas)</p> | HU4.1      | <p>A FIRE is <b><u>NOT</u></b> extinguished within <b>15 min.</b> of <b>ANY</b> of the following FIRE detection indications (Note 1):</p> <ul style="list-style-type: none"> <li>● Report from the field (i.e., visual observation)</li> <li>● Receipt of multiple (more than 1) fire alarms or indications</li> <li>● Field verification of a single fire alarm</li> </ul> <p><b><u>AND</u></b></p> <p>The <b>FIRE</b> is located within <b>ANY</b> Table H-1 area</p> | Table H-1 provides a list of site-specific fire areas. |
| 2             | <p>a. Receipt of a single fire alarm (i.e., no other indications of a FIRE).</p> <p><b>AND</b></p> <p>b. The FIRE is located within</p>   | HU4.2      | <p>Receipt of a single fire alarm (i.e., <b><u>NO</u></b> other indications of a FIRE)</p> <p><b><u>AND</u></b></p> <p>The fire alarm is indicating a</p>   | Table H-1 provides a list of site-specific fire areas. |

EAL Comparison Matrix

|      |   |       |  |  |
|------|---|-------|--|--|
|      | <p><b>ANY</b> of the following plant rooms or areas:<br/>(site-specific list of plant rooms or areas)</p> <p><b>AND</b></p> <p>c. The existence of a FIRE is not verified within 30-minutes of alarm receipt.</p> |       | <p><b>FIRE</b> within <b>ANY</b> Table H-1 area</p> <p><b>AND</b></p> <p>The existence of a <b>FIRE</b> is <b>NOT</b> verified within <b>30 min.</b> of alarm receipt (Note 1)</p> |  |
| 3    | <p>A FIRE within the plant <i>or ISFSI</i> [for plants with an ISFSI outside the plant Protected Area] PROTECTED AREA not extinguished within 60-minutes of the initial report, alarm or indication.</p>          | HU4.3 | <p>A <b>FIRE</b> within the <b>PROTECTED AREA NOT</b> extinguished within <b>60 min.</b> of the initial report, alarm or indication (Note 1)</p>                                   | HCGS has an ISFSI located inside the plant Protected Area.   |
| 4    | <p>A FIRE within the plant <i>or ISFSI</i> [for plants with an ISFSI outside the plant Protected Area] PROTECTED AREA that requires firefighting support by an offsite fire response agency to extinguish.</p>    | HU4.4 | <p>A <b>FIRE</b> within the <b>PROTECTED AREA</b> that requires firefighting support by an offsite fire response agency to extinguish</p>  | HCGS has an ISFSI located inside the plant Protected Area.   |
| Note | <p><b>Note:</b> The Emergency Director should declare the Unusual Event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.</p>                                     | N/A   | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p>                     | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p> |

| <b>Table H-1 Fire Areas</b>  |
|--|
| <ul style="list-style-type: none"><li>• Reactor Building</li><li>• Control/Auxiliary Building</li><li>• Service Water Intake Structure</li><li>• Service/Radwaste Building</li></ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| HU7     | Other conditions exist which in the judgment of the Emergency Director warrant declaration of a (NO)UE<br>MODE: All | HU7         | Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a <b>UNUSUAL EVENT</b><br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification |
|---------------|---|------------|--|------------------------------------|
| 1             | Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs. | 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. <b>NO</b> releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of <b>SAFETY SYSTEMS</b> occurs. | None                               |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| HA1     | HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.<br>MODE: All | HA1         | <b>HOSTILE ACTION</b> within the <b>OWNER CONTROLLED AREA</b> or airborne attack threat within 30 minutes<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the (site-specific security shift supervision). | HA1.1      | A <b>HOSTILE ACTION</b> is occurring or has occurred within the <b>OWNER CONTROLLED AREA</b> as reported by HCGS Security Shift Manager or designee (Note 6)<br><br><b>OR</b><br>A validated notification from NRC of an aircraft attack threat within <b>30 min.</b> of the site (Note 6) | Example EALs #1 and #2 have been combined into a single EAL for ease of use.  |
| 2             | A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.   |            |  |   |
| N/A           | N/A   | N/A        | Note 6: Shift Manager (SM) should implement the Prompt Actions of the Security Emergency Guideline Attachment located in NC.EP-EP.ZZ-0102, EC Response, prior to classification of a security emergency.<br><br>Key Information to obtain from Security                                    | Added Note 6 to provide guidance to implement immediate security based response actions prior to declaring the security based emergency and to obtain critical information of the nature of the security event. |



EAL Comparison Matrix

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  | <p>Supervision upon SM notification of a security event:</p> <ul style="list-style-type: none"><li>• Determination if the security event is a <b>HOSTILE ACTION</b> or <b>SECURITY CONDITION</b></li></ul> <p>If a <b>HOSTILE ACTION</b>, is location the <b>OCA</b> or <b>PA</b>?</p> |  |
|--|--|--|--|--|

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|--|-------------|---|------------------------------------|
| HA5     | Gaseous release impeding access to equipment necessary for normal plant operations, cooldown or shutdown.<br>MODE: All | HA5         | Gaseous release <b>IMPEDING</b> access to equipment necessary for normal plant operations, cooldown or shutdown<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification   |
|---------------|--|------------|---|--|
| 1             | a. Release of a toxic, corrosive, asphyxiant or flammable gas into any of the following plant rooms or areas:<br><br>(site-specific list of plant rooms or areas with entry-related mode applicability identified)<br><br><b>AND</b><br>b. Entry into the room or area is prohibited or impeded. | HA5.1      | Release of a toxic, corrosive, asphyxiant or flammable gas into <b>ANY</b> Table H-2 room or area<br><br><b>AND</b><br>Entry into the room or area is prohibited or <b>IMPEDED</b> (Note 5) | The site-specific list of plant rooms or areas with entry-related mode applicability are tabularized in Table H-2. |
| Note          | <b>Note:</b> 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.  | N/A        | Note 5: If the equipment in the listed room or area was already inoperable or out-of-service before the event occurred, then <b>NO</b> emergency classification is warranted.               | None   |

| <b>Table H-2 Safe Operation &amp; Shutdown Rooms/Areas</b> |                                   |                            |
|--|-----------------------------------|----------------------------|
| <b>Bldg. – Ele.</b>  | <b>Rooms/Areas</b>                | <b>OPCON Applicability</b> |
| RB 54'   | 4113/4109<br>(RHR A/B Pump Rooms) | 3, 4, 5                    |
| RB 77'   | 4201<br>(10B242 MCC)              | 3, 4, 5                    |
| RB 102'  | 4307<br>(B SACS Pump Room)        | 3, 4, 5                    |
| RB 102'  | 4328/4322<br>(North/South HCU)    | 3, 4, 5                    |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| HA6     | Control Room evacuation resulting in transfer of plant control to alternate locations.<br>MODE: All | HA6         | Control Room evacuation resulting in transfer of plant control to alternate locations<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification |
|---------------|--|------------|---|------------------------------------|
| 1             | An event has resulted in plant control being transferred from the Control Room to (site-specific remote shutdown panels and local control stations). | HA6.1      | An event has resulted in plant control being transferred from the Control Room to the Remote Shutdown Panel (RSP) | None                               |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| HA7     | Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.<br>MODE: All | HA7         | Other conditions exist that in the judgment of the Emergency Coordinator warrant declaration of an Alert<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification |
|---------------|--|------------|---|------------------------------------|
| 1             | Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. | 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 <b>HOSTILE ACTION</b> . Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels. | None                               |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| HS1     | HOSTILE ACTION within the PROTECTED AREA<br>MODE: All | HS1         | <b>HOSTILE ACTION</b> within the <b>PROTECTED AREA</b><br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|--|------------|--|---|
| 1             | A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site-specific security shift supervision). | HS1.1      | A <b>HOSTILE ACTION</b> is occurring or has occurred within the <b>PROTECTED AREA</b> as reported by HCGS Security Shift Manager Supervisor or designee (Note 6)   | None  |
| N/A           | N/A  | N/A        | Note 6: Shift Manager (SM) should implement the Prompt Actions of the Security Emergency Guideline Attachment located in NC.EP-EP.ZZ-0102, EC Response, prior to classification of a security emergency.<br><br>Key Information to obtain from Security Supervision upon SM notification of a security event:<br><br><ul style="list-style-type: none"> <li>• Determination if the security event is a <b>HOSTILE ACTION</b> or <b>SECURITY CONDITION</b></li> <li>• If a <b>HOSTILE ACTION</b>, is location the <b>OCA</b> or <b>PA</b>?</li> </ul> | Added Note 6 to provide guidance to implement immediate security based response actions prior to declaring the security based emergency and to obtain critical information of the nature of the security event. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification   |
|---------|--|-------------|---|--|
| HS6     | Inability to control a key safety function from outside the Control Room.<br>MODE: All | HS6         | Inability to control a key safety function from outside the Control Room<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown, 4 - Cold Shutdown, 5 - Refueling | Deleted defueled mode applicability. Control of the cited safety functions are not critical for a defueled reactor as there is no energy source in the RPV or RCS.<br><br><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b> |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|---|------------|---|---|
| 1             | a. An event has resulted in plant control being transferred from the Control Room to (site-specific remote shutdown panels and local control stations).<br><br><b>AND</b><br>b. Control of <b>ANY</b> of the following key safety functions is not reestablished within (site-specific number of minutes). <ul style="list-style-type: none"> <li>● Reactivity control</li> <li>● Core cooling [<i>PWR</i>] / RPV water level [<i>BWR</i>]</li> <li>● RCS heat removal</li> </ul> | HS6.1      | An event has resulted in plant control being transferred from the Control Room to the Remote Shutdown Panel (RSP)<br><br><u><b>AND</b></u><br>Control of <b>ANY</b> of the following key safety functions is <b>NOT</b> re-established within <b>15 min.</b> (Note 1): <ul style="list-style-type: none"> <li>● Reactivity (OPCONs 1 and 2 <b>only</b>)</li> <li>● RPV water level</li> <li>● RCS heat removal</li> </ul> | The OPCON applicability for the reactivity control safety function has been limited to OPCONs 1 and 2. In OPCONs 3, 4 and 5 adequate shutdown margin exists under all conditions.<br><br><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| HS7     | Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency.<br>MODE: All | HS7         | Other conditions existing that in the judgment of the Emergency Coordinator warrant declaration of a Site Area Emergency<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification |
|---------------|---|------------|--|------------------------------------|
| 1             | Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts, (1) toward site personnel or equipment that could lead to the likely failure of or, (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary. | 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 <b>HOSTILE ACTION</b> 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 <b>NOT</b> expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the <b>SITE BOUNDARY</b> . | None                               |



EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording | Difference/Deviation Justification  |
|---------|---|-------------|-----------------|---|
| HG1     | <p>HOSTILE ACTION resulting in loss of physical control of the facility.</p> <p>MODE: All</p> | N/A         | N/A             | <p>IC HG1 and associated example EAL are not implemented in the HCGS scheme.</p> <p>There are several other ICs that are redundant with this IC, and are better suited to ensure timely and effective emergency declarations. In addition, the development of new spent fuel pool level EALs, as a result of NRC Order EA-12-051, clarified the intended emergency classification level for spent fuel pool level events.</p> <p><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b></p> |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording | Difference/Deviation Justification  |
|---------------|---|------------|------------------|---|
| 1             | <p>a. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (site-specific security shift supervision).</p> <p><b>AND</b></p> <p>b. <b>EITHER</b> of the following has occurred:</p> <ol style="list-style-type: none"> <li>1. <b>ANY</b> of the following safety functions cannot be controlled or maintained. <ul style="list-style-type: none"> <li>● Reactivity control</li> <li>● Core cooling [PWR]/RPV water level [BWR]</li> <li>● RCS heat removal</li> </ul> </li> </ol> | N/A        | N/A              | <p>IC HG1 and associated example EAL are not implemented in the HCGS scheme.</p> <p>There are several other ICs that are redundant with this IC, and are better suited to ensure timely and effective emergency declarations. In addition, the development of new spent fuel pool level EALs, as a result of NRC Order EA-12-051, clarified the intended emergency classification level for spent fuel pool level events. This deviation is justified because:</p> <ol style="list-style-type: none"> <li>1. Hostile Action in the Protected Area is bounded by ICs HS1 and HS7. Hostile Action resulting in a loss of physical control is bound by EAL HG7, as well as any event that may lead to radiological releases to the public in excess of Environmental Protection Agency (EPA) Protective Action Guides (PAGs). <ol style="list-style-type: none"> <li>a. If, for whatever reason, the Control Room must be evacuated, and control of safety functions (e.g., reactivity control, RPV water level, and RCS heat</li> </ol> </li> </ol> |

|  |  |  |  |  |
|--|--|--|--|--|
|  | <p style="text-align: center;"><b>OR</b></p> <p>2. Damage to spent fuel has occurred or is IMMINENT.</p> |  |  | <p>removal) cannot be reestablished, then IC HS6 would apply, as well as IC HS7 if desired by the EAL decision-maker.</p> <p>b. Also, as stated above, any event (including Hostile Action) that could reasonably be expected to have a release exceeding EPA PAGs would be bound by IC HG7.</p> <p>c. From a Hostile Action perspective, ICs HS1, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.</p> <p>d. From a loss of physical control perspective, ICs HS6, HS7 and HG7 are appropriate, and therefore, make this part of HG1 redundant and unnecessary.</p> <p>2. Any event which causes a loss of spent fuel pool level will be bounded by ICs AA2, AS2 and AG2, regardless of whether it was based upon a Hostile Action or not, thus making this part of HG1 redundant and unnecessary.</p> <p>a. An event that leads to a radiological release will be bounded by ICs AU1, AA1, AS1 and AG1. Events that lead to radiological releases in excess of EPA PAGs will be bounded by EALs AG1 and HG7, thus making this part of HG1 redundant and unnecessary.</p> <p>ICs AA2, AS2, AG2, AS1, AG1, HS1, HS6, HS7 and HG7 have been implemented consistent with NEI 99-01 Revision 6 and thus HG1 is adequately bounded as described above.</p> <p><b>This is an acceptable deviation from the generic NEI 99-01 Revision 6 guidance.</b></p> |
|--|--|--|--|--|

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| HG7     | Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency<br>MODE: All | HG7         | Other conditions exist which in the judgment of the Emergency Coordinator warrant declaration of a General Emergency<br>OPCON: All | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification |
|---------------|--|------------|---|------------------------------------|
| 1             | Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMEDIATE 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. | 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 <b>IMMEDIATE</b> substantial core degradation or melting with potential for loss of containment integrity or <b>HOSTILE ACTION</b> 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. | None                               |

**Category S**

**System Malfunction**

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification                                    |
|---------|---|-------------|---|---|
| SU1     | Loss of all offsite AC power capability to emergency buses for 15 minutes or longer.<br><br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SU1         | Loss of <b>ALL</b> offsite AC power capability to vital buses for 15 minutes or longer<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | “vital buses” is the HCGS-specific terminology for “emergency buses”. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Loss of <b>ALL</b> offsite AC power capability to (site-specific emergency buses) for 15 minutes or longer.                                      | SU1.1      | Loss of <b>ALL</b> offsite AC power capability to 4.16 KV vital buses for <b>≥ 15 min.</b> (Note 1)   | Vital 4.16 KV buses are the site-specific emergency buses.  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| SU2     | UNPLANNED loss of Control Room indications for 15 minutes or longer.<br><br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SU3         | <b>UNPLANNED</b> loss of Control Room indications for 15 minutes or longer.<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|---|------------|---|---|
| 1             | An UNPLANNED event results in the inability to monitor one or more of the following parameters from within the Control Room for 15 minutes or longer. | SU3.1      | An <b>UNPLANNED</b> event results in the inability to monitor one or more Table S-1 parameters from within the Control Room for <b>≥ 15 min.</b> (Note 1) | The site-specific Safety System Parameter list is tabulated in Table S-1.   |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.      | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.   | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| <i>[BWR parameter list]</i>  | <i>[PWR parameter list]</i>                                |
|------------------------------|--|
| Reactor Power                | Reactor Power  |
| RPV Water Level              | RCS Level  |
| RPV Pressure                 | RCS Pressure   |
| Primary Containment Pressure | In-Core/Core Exit Temperature                              |
| Suppression Pool Level       | Levels in at least (site-specific number) steam generators |
| Suppression Pool Temperature | Steam Generator Auxiliary or Emergency Feed Water Flow     |

| <b>Table S-1 Safety System Parameters</b>  |
|--|
| <ul style="list-style-type: none"> <li>• Reactor power</li> <li>• RPV water level</li> <li>• RPV pressure</li> <li>• Primary containment pressure</li> <li>• Torus water level</li> <li>• Torus temperature</li> </ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|--|-------------|--|------------------------------------|
| SU3     | Reactor coolant activity greater than Technical Specification allowable limits.<br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SU4         | Reactor coolant activity greater than Technical Specification allowable limits<br>OPCON:<br>1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | (Site-specific radiation monitor) reading greater than (site-specific value).   | SU4.1      | Offgas Pretreatment Radiation Monitor (9RX621/9RX622) High alarm | An Offgas Pretreatment Radiation Monitor High alarm is indicative of a degradation of the fuel clad, and is a precursor of a more serious problem. The alarm is set at 2.2E+04 mR/hr, which ensures that the alarm will actuate prior to exceeding the Technical Specification Offgas System Noble Gas Effluent Limit of 3.3E5 µCi/sec.   |
| 2             | Sample analysis indicates that a reactor coolant activity value is greater than an allowable limit specified in Technical Specifications. | SU4.2      | Coolant activity > <b>4 µCi/gm dose equivalent I-131</b>         | A reactor coolant sample analysis with specific activity in excess of the Technical Specification limit of 4 µCi/gm Dose Equivalent Iodine-131 (DEI-131) is indicative of a degradation of the fuel clad. This activity level is chosen instead of the 0.2 µCi/gm DEI-131 Technical Specification limit (under which operation is allowed to continue for up to 48 hours) to accommodate short duration Iodine spikes following changes in thermal power. |



EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|--|-------------|---|------------------------------------|
| SU4     | RCS leakage for 15 minutes or longer.<br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SU5         | RCS leakage for 15 minutes or longer<br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification   |
|---------------|--|------------|---|--|
| 1             | RCS unidentified or pressure boundary leakage greater than (site-specific value) for 15 minutes or longer.                                       | SU5.1      | RCS unidentified or pressure boundary leakage > <b>10 gpm</b> for <b>≥ 15 min.</b><br><b>OR</b>   | Example EALs #1, 2 and 3 have been combined into a single EAL for usability. |
| 2             | RCS identified leakage greater than (site-specific value) for 15 minutes or longer.  |            | RCS identified leakage > <b>25 gpm</b> for <b>≥ 15 min.</b><br><b>OR</b>  |  |
| 3             | Leakage from the RCS to a location outside containment greater than 25 gpm for 15 minutes or longer.   |            | Leakage from the RCS to a location outside primary containment > <b>25 gpm</b> for <b>≥ 15 min.</b><br>(Note 1)   |  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. |  |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification   |
|---------|--|-------------|---|--|
| SU5     | Automatic or manual (trip [PWR] / scram [BWR]) fails to shutdown the reactor.<br><br>MODE: Power Operation | SU6         | Automatic or manual scram fails to shut down the reactor<br><br>OPCON: 1 - Power Operation, 2 - Startup | Included 2 - Startup OPCON applicability because the mode switch is not taken to RUN position until after 4% reactor power is reached in the Startup OPCON (mode). |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | a. An automatic (trip [PWR] / scram [BWR]) did not shutdown the reactor.<br><br><b>AND</b><br>b. A subsequent manual action taken at the reactor control consoles is successful in shutting down the reactor.   | SU6.1      | An automatic or manual scram did <b>NOT</b> shut down the reactor as indicated by reactor power > <b>4%</b> after <b>ANY</b> RPS setpoint is exceeded or manual scram action was initiated<br><br><b>AND</b><br>A subsequent automatic scram or manual scram action taken at the reactor control console (mode switch, manual scram pushbuttons, manual ARI actuation) is successful in shutting down the reactor as indicated by reactor power ≤ <b>4%</b> (Note 8) | Combined Example EALs #1 and #2 for simplification.<br><br>As specified in the generic developers guidance “Developers may include site-specific EOP criteria indicative of a successful reactor shutdown in an EAL statement, the Basis or both (e.g., a reactor power level).” Reactor power ≤ 4% (APRM downscale) is the site-specific indication of a successful reactor scram.<br><br>Added the words "... as indicated by reactor power > 4% after <b>any</b> RPS setpoint is exceeded or manual scram action was initiated" to clarify that it is a failure of the automatic scram when a valid scram signal has been exceeded or failure of any manual scram action was initiated.<br><br>Mode Switch, Manual PBs, and initiation of ARI are the manual actions taken to shut down the reactor. |
| 2             | a. A manual trip ([PWR] / scram [BWR]) did not shutdown the reactor.<br><br><b>AND</b><br>b. <b>EITHER</b> of the following:<br>1. A subsequent manual action taken at the reactor control consoles is successful in shutting down the reactor.<br><br><b>OR</b><br>2. A subsequent automatic (trip [PWR] / scram [BWR]) is successful in |            |  |   |

EAL Comparison Matrix

|       |  |     |   |      |
|-------|--|-----|---|------|
|       | shutting down the reactor.   |     |   |      |
| Notes | <b>Note:</b> A manual 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. | N/A | Note 8: A manual action is <b><u>ANY</u></b> operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does <b><u>NOT</u></b> include manually driving in control rods or implementation of boron injection strategies. | None |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| SU6     | Loss of all onsite or offsite communications capabilities.<br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SU7         | Loss of <b>all</b> onsite or offsite communications capabilities.<br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|---|------------|---|---|
| 1             | Loss of <b>ALL</b> of the following onsite communication methods:<br>(site-specific list of communications methods) | SU7.1      | Loss of <b>all</b> Table S-3 onsite communication methods<br><br><b>OR</b><br>Loss of <b>all</b> Table S-3 offsite communication methods<br><br><b>OR</b><br>Loss of <b>all</b> Table S-3 NRC communication methods | Example EALs #1, 2 and 3 have been combined into a single EAL for simplification of presentation.<br><br>Table S-3 provides a site-specific list of onsite, offsite (ORO) and NRC communications methods. |
| 2             | Loss of <b>ALL</b> of the following ORO communications methods:<br>(site-specific list of communications methods)   |            |   |   |
| 3             | Loss of <b>ALL</b> of the following NRC communications methods:<br>(site-specific list of communications methods)   |            |   |   |

| <b>Table S-3 Communication Methods</b>    |               |                |            |
|---|---------------|----------------|------------|
| <b>System</b>                             | <b>Onsite</b> | <b>Offsite</b> | <b>NRC</b> |
| Direct Inward Dial System (DID)           | X             | X              | X          |
| Station Page System (Gaitronics)          | X             |                |            |
| Station Radio System                      | X             |                |            |
| Nuclear Emergency Telephone System (NETS) |               | X              | X          |
| Centrex Phone System (ESSX)               |               | X              | X          |
| NRC (ENS)                                 |               |                | X          |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording | Difference/Deviation Justification  |
|---------|---|-------------|-----------------|---|
| SU7     | <p>Failure to isolate containment or loss of containment pressure control. [PWR]</p> <p>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown</p> | N/A         | N/A             | This IC and its associated example EALs are applicable to PWRs only and therefore not included. |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording | Difference/Deviation Justification  |
|---------------|---|------------|------------------|---|
| 1             | <p>a. Failure of containment to isolate when required by an actuation signal.</p> <p><b>AND</b></p> <p>b. <b>ALL</b> required penetrations are not closed within 15 minutes of the actuation signal.</p>            | N/A        | N/A              | This IC and its associated example EALs are applicable to PWRs only and therefore not included. |
| 2             | <p>a. Containment pressure greater than (site-specific pressure).</p> <p><b>AND</b></p> <p>b. Less than one full train of (site-specific system or equipment) is operating per design for 15 minutes or longer.</p> |            |                  |   |
| N/A           | N/A   | N/A        | N/A              | This IC and its associated example EALs are applicable to PWRs only and therefore not included. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                                    |
|---------|---|-------------|--|---|
| SA1     | Loss of all but one AC power source to emergency buses for 15 minutes or longer.<br><br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SA1         | Loss of <b>ALL</b> but one AC power source to vital buses for 15 minutes or longer.<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | “vital buses” is the HCGS-specific terminology for “emergency buses”. |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | a. AC power capability to (site-specific emergency buses) is reduced to a single power source for 15 minutes or longer.<br><br><b>AND</b><br>b. Any additional single power source failure will result in a loss of all AC power to SAFETY SYSTEMS. | SA1.1      | AC power capability to 4.16 KV vital buses reduced to a single power source for <b>≥ 15 min.</b> (Note 1)<br><br><b>AND</b><br><b>ANY</b> additional single power source failure will result in loss of <b>ALL</b> AC power to <b>SAFETY SYSTEMS</b> | Vital 4.16 KV buses are the site-specific emergency buses.  |
| Note          | The Emergency Director should declare the Alert promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.  | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.  | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| SA2     | <p>UNPLANNED loss of Control Room indications for 15 minutes or longer with a significant transient in progress.</p> <p>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown</p> | SA3         | <p><b>UNPLANNED</b> loss of Control Room indications for 15 minutes or longer with a significant transient in progress.</p> <p>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown</p> | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|---|------------|--|--|
| 1             | <p>An UNPLANNED event results in the inability to monitor one or more of the following parameters from within the Control Room for 15 minutes or longer.</p> <p><b>AND</b></p> <p><b>ANY</b> of the following transient events in progress.</p> <ul style="list-style-type: none"> <li>● Automatic or manual runback greater than 25% thermal reactor power</li> <li>● Electrical load rejection greater than 25% full electrical load</li> <li>● Reactor scram [BWR] / trip [PWR]</li> </ul> | SA3.1      | <p>An <b>UNPLANNED</b> event results in the inability to monitor one or more Table S-1 parameters from within the Control Room for <b>≥ 15 min.</b> (Note 1)</p> <p><b>AND</b></p> <p><b>ANY</b> significant transient is in progress, Table S-2</p> | <p>The site-specific Safety System Parameter list is in Table S-1.</p> <p>The significant transient list has been tabularized in Table S-2 for ease of use.</p> <p>A threshold value of 22% for electrical load rejection is consistent with Main Steam bypass capability.</p> |



EAL Comparison Matrix

|      |  |     |   |   |
|------|--|-----|---|---|
|      | <ul style="list-style-type: none"> <li>● ECCS (SI) actuation</li> <li>● Thermal power oscillations greater than 10% [BWR]</li> </ul>             |     |   |   |
| Note | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| <i>[BWR parameter list]</i>  | <i>[PWR parameter list]</i>                                |
|------------------------------|--|
| Reactor Power                | Reactor Power  |
| RPV Water Level              | RCS Level  |
| RPV Pressure                 | RCS Pressure   |
| Primary Containment Pressure | In-Core/Core Exit Temperature                              |
| Suppression Pool Level       | Levels in at least (site-specific number) steam generators |
| Suppression Pool Temperature | Steam Generator Auxiliary or Emergency Feed Water Flow     |

| <b>Table S-1      Safety System Parameters</b>   |
|--|
| <ul style="list-style-type: none"> <li>• Reactor power</li> <li>• RPV water level</li> <li>• RPV pressure</li> <li>• Primary containment pressure</li> <li>• Torus water level</li> <li>• Torus temperature</li> </ul> |

| <b>Table S-2      Significant Transients</b>   |
|--|
| <ul style="list-style-type: none"> <li>• Reactor scram</li> <li>• Thermal power reduction &gt; 25%</li> <li>• Electrical load rejection &gt; 22%</li> <li>• ECCS injection</li> <li>• Thermal power oscillations &gt; 10%</li> </ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification   |
|---------|---|-------------|--|--|
| SA5     | Automatic or manual (trip [PWR] / scram [BWR]) fails to shutdown the reactor, and subsequent manual actions taken at the reactor control consoles are not successful in shutting down the reactor.<br>MODE: Power Operation | SA6         | Automatic or manual scram fails to shut down the reactor and subsequent manual actions taken at the reactor control consoles are <b>NOT</b> successful in shutting down the reactor<br><br>OPCON: 1 - Power Operation, 2 - Startup | Included 2 - Startup OPCON applicability because the mode switch is not taken to RUN position until after 4% reactor power is reached in the Startup OPCON (mode). |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|--|------------|--|---|
| 1             | a. An automatic or manual (trip [PWR] / scram [BWR]) did not shutdown the reactor.<br><br><b>AND</b><br>b. Manual actions taken at the reactor control consoles are not successful in shutting down the reactor.                       | SA6.1      | An automatic or manual scram fails to shut down the reactor as indicated by reactor power > 4%<br><br><b>AND</b><br>Manual scram actions taken at the reactor control console (Mode Switch, Manual PBs, manual ARI) are <b>NOT</b> successful in shutting down the reactor as indicated by reactor power > 4% (Note 8) | Added the words "... as indicated by reactor power > 4% after <b>any</b> manual trip action was initiated" to clarify that it is a failure of any manual trip when an actual manual trip signal has been inserted.<br><br>Mode Switch, Manual PBs, and initiation of ARI are the manual actions taken to shut down the reactor. |
| Notes         | <b>Note:</b> A manual 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 | N/A        | Note 8: A manual action is <b>any</b> operator action, or set of actions, which causes the control rods to be rapidly inserted into the core, and does <b>NOT</b> include manually driving in control rods or  | None  |

EAL Comparison Matrix

|  |             |  |  |  |
|--|-------------|--|--|--|
|  | strategies. |  | implementation of boron injection strategies |  |
|--|-------------|--|--|--|

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification |
|---------|---|-------------|---|------------------------------------|
| SA9     | Hazardous event affecting a SAFETY SYSTEM needed for the current operating mode.<br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SA8.1       | Hazardous event affecting a <b>SAFETY SYSTEM</b> needed for the current operating mode<br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

EAL Comparison Matrix

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification                  |
|---------------|---|------------|--|---|
| 1             | <p>a. The occurrence of <b>ANY</b> of the following hazardous events:</p> <ul style="list-style-type: none"> <li>● Seismic event (earthquake)</li> <li>● Internal or external flooding event</li> <li>● High winds or tornado strike</li> <li>● FIRE</li> <li>● EXPLOSION</li> <li>● (site-specific hazards)</li> <li>● Other events with similar hazard characteristics as determined by the Shift Manager</li> </ul> <p><b>AND</b></p> <p>b. <b>EITHER</b> of the following:</p> <ol style="list-style-type: none"> <li>1. Event damage has caused indications of degraded performance in at least one train of a SAFETY SYSTEM needed for the current operating mode.</li> </ol> <p><b>OR</b></p> <ol style="list-style-type: none"> <li>2. The event has caused <b>VISIBLE DAMAGE</b> to a SAFETY SYSTEM component or structure needed for the current operating mode.</li> </ol> | SA8.1      | <p>The occurrence of <b>any</b> Table S-4 hazardous event</p> <p><b>AND EITHER:</b></p> <ul style="list-style-type: none"> <li>● Event damage has caused indications of degraded performance in at least one train of a <b>SAFETY SYSTEM</b> needed for the current operating mode</li> <li>● The event has caused <b>VISIBLE DAMAGE</b> to a <b>SAFETY SYSTEM</b> component or structure needed for the current operating mode</li> </ul> | The hazardous events have been listed in Table S-4. |

| <b>Table S-4 Hazardous Events</b>   |
|---|
| <ul style="list-style-type: none"><li>● Seismic event (earthquake)</li><li>● Internal or external <b>FLOODING</b> event</li><li>● High winds or tornado strike</li><li>● <b>FIRE</b></li><li>● <b>EXPLOSION</b></li><li>● Other events with similar hazard characteristics as determined by the Shift Manager</li></ul> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                                    |
|---------|---|-------------|--|---|
| SS1     | Loss of all offsite and all onsite AC power to emergency buses for 15 minutes or longer.<br><br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SS1         | Loss of <b><u>ALL</u></b> offsite and <b><u>ALL</u></b> onsite AC power to vital buses for 15 minutes or longer<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | “Vital buses” is the HCGS-specific terminology for “emergency buses”. |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Loss of <b><u>ALL</u></b> offsite and <b><u>ALL</u></b> onsite AC power to (site-specific emergency buses) for 15 minutes or longer.             | SS1.1      | Loss of <b><u>ALL</u></b> offsite and <b><u>ALL</u></b> onsite AC power to 4.16 KV Vital Buses for <b>≥ 15 min.</b> (Note 1)                            | Vital 4.16 KV buses are the site-specific emergency buses.  |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |



EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification   |
|---------|---|-------------|--|--|
| SS5     | Inability to shutdown the reactor causing a challenge to (core cooling [PWR] / RPV water level [BWR]) or RCS heat removal.<br>MODE: Power Operation | SS6         | Inability to shut down the reactor causing a challenge to RPV water level or RCS heat removal<br>OPCON: 1 - Power Operation, 2 - Startup | Included 2 - Startup OPCON applicability because the mode switch is not taken to RUN position until after 4% reactor power is reached in the Startup OPCON (mode). |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification   |
|---------------|---|------------|--|--|
| 1             | <p>a. An automatic or manual (trip [PWR] / scram [BWR]) did not shutdown the reactor.<br/><b>AND</b></p> <p>b. All manual actions to shutdown the reactor have been unsuccessful.<br/><b>AND</b></p> <p>c. <b>EITHER</b> of the following conditions exist:</p> <ul style="list-style-type: none"> <li>• (Site-specific indication of an inability to adequately remove heat from the core)</li> <li>• (Site-specific indication of an inability to adequately remove heat from the RCS)</li> </ul> | SS6.1      | <p>An automatic or manual scram fails to shut down the reactor as indicated by reactor power &gt; 4%</p> <p><b>AND</b></p> <p><b>ALL</b> actions to shut down the reactor are <b>NOT</b> successful as indicated by reactor power &gt; 4%</p> <p><b>AND EITHER:</b></p> <ul style="list-style-type: none"> <li>• RPV level <b>CANNOT</b> be restored and maintained &gt; -185 in</li> <li>• HCTL exceeded (EOP Curve SPT-P)</li> </ul> | <p>Deleted the term “manual actions” from the second condition. For generic IC SS5, all actions to shut down the reactor can be credited, including emergency boration which is not considered a “manual” scram action.</p> <p>Indication of an inability to adequately remove heat from the core occurs when RPV water level cannot be restored and maintained above -185 in., which is the EOP RPV water level indicative of a loss of adequate core cooling (Minimum Steam Cooling RPV Water Level).</p> <p>Indication of an inability to adequately remove heat from the RCS occurs when parameters cannot be maintained within the safe region of the HCTL curve.</p> |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording  | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification |
|---------|---|-------------|--|------------------------------------|
| SS8     | Loss of all Vital DC power for 15 minutes or longer.<br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SS2         | Loss of <b>ALL</b> vital DC power for 15 minutes or longer.<br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | None                               |

| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL # | HCGS EAL Wording  | Difference/Deviation Justification  |
|---------------|--|------------|---|---|
| 1             | Indicated voltage is less than (site-specific bus voltage value) on <b>ALL</b> (site-specific Vital DC busses) for 15 minutes or longer.         | SS2.1      | <b>&lt; 108 V</b> DC bus voltage indication on <b>ALL</b> Vital 125 V DC Buses for <b>≥ 15 min.</b> (Note 1)  | 108 VDC is the site-specific minimum vital 125V DC bus voltage.   |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded. | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded. | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |

EAL Comparison Matrix

| NEI IC#       | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording   | Difference/Deviation Justification  |
|---------------|--|-------------|---|---|
| SG1           | <p>Prolonged loss of all offsite and all onsite AC power to emergency buses.</p> <p>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown</p>  | SG1         | <p>Prolonged loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to vital buses</p> <p>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown</p>  | <p>“Vital buses” is the HCGS-specific terminology for “emergency buses”.</p>  |
| NEI Ex. EAL # | NEI Example EAL Wording  | HCGS EAL #  | HCGS EAL Wording  | Difference/Deviation Justification  |
| 1             | <p>a. Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to (site-specific emergency buses).</p> <p><b>AND</b></p> <p>b. <b>EITHER</b> of the following:</p> <ul style="list-style-type: none"> <li>• Restoration of at least one AC emergency bus in less than (site-specific hours) is not likely.</li> <li>• (Site-specific indication of an inability to adequately remove heat from the core)</li> </ul> | SG1.1       | <p>Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to 4.16 KV vital buses</p> <p><b>AND EITHER:</b></p> <ul style="list-style-type: none"> <li>• Restoration of at least one vital 4.16 KV bus in <b>&lt; 4 hrs</b> is <b>NOT</b> likely (Note 1)</li> <li>• RPV level <b>CANNOT</b> be restored and maintained <b>&gt; -185 in.</b></li> </ul> | <p>Vital 4.16 KV buses are the site-specific emergency buses.</p> <p>4 hours is the site-specific SBO coping analysis time.</p> <p>Indication of an inability to adequately remove heat from the core occurs when RPV water level cannot be restored and maintained above -185 in., which is the EOP RPV water level indicative of a loss of adequate core cooling (Minimum Steam Cooling RPV Water Level).</p> |
| Note          | <p>The Emergency Director should declare the General Emergency promptly upon determining that (site-specific hours) has been exceeded, or will likely be exceeded.</p>   | N/A         | <p>Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.</p>  | <p>The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording.</p>  |

EAL Comparison Matrix

| NEI IC# | NEI IC Wording   | HCGS IC#(s) | HCGS IC Wording  | Difference/Deviation Justification                              |
|---------|--|-------------|--|---|
| SG8     | Loss of all AC and Vital DC power sources for 15 minutes or longer.<br><br>MODE: Power Operation, Startup, Hot Standby, Hot Shutdown | SG2         | Loss of <b>ALL</b> vital AC and vital DC power sources for 15 minutes or longer<br><br>OPCON: 1 - Power Operation, 2 - Startup, 3 - Hot Shutdown | “vital AC” is the HCGS-specific terminology for “emergency AC”. |

| NEI Ex. EAL # | NEI Example EAL Wording   | HCGS EAL # | HCGS EAL Wording   | Difference/Deviation Justification  |
|---------------|---|------------|--|---|
| 1             | a. Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to (site-specific emergency buses) for 15 minutes or longer.<br><br><b>AND</b><br>b. Indicated voltage is less than (site-specific bus voltage value) on ALL (site-specific Vital DC busses) for 15 minutes or longer. | SG2.1      | Loss of <b>ALL</b> offsite and <b>ALL</b> onsite AC power to 4.16 KV vital buses for <b>≥ 15 min.</b><br><br><b>AND</b><br><b>&lt; 108 V</b> DC bus voltage indication on <b>ALL</b> vital 125 V DC buses for <b>≥ 15 min.</b><br>(Note 1) | Vital 4.16 KV buses are the site-specific emergency buses.<br>108 VDC is the site-specific minimum vital 125V DC bus voltage.                         |
| Note          | The Emergency Director should declare the Unusual Event promptly upon determining that 15 minutes has been exceeded, or will likely be exceeded.  | N/A        | Note 1: The Emergency Coordinator should declare the event promptly upon determining that the time limit has been exceeded, or will likely be exceeded.  | The classification timeliness note has been standardized across the HCGS EAL scheme by referencing the "time limit" specified within the EAL wording. |