

PERRY NUCLEAR POWER PLANT

NUMARC/NESP-007

PLANT-SPECIFIC EAL GUIDELINES

Based on

Emergency Action Level Bases Document
for Conversion to NUMARC/NESP-007 Methodology

Draft Revision 0

Prepared By:	<u>Joseph D. Anderson</u> Emergency Planning Unit	<u>1-20-96</u> Date
Reviewed By:	<u>[Signature]</u> Perry Operations Section	<u>1-31-96</u> Date
Submitted:	<u>[Signature]</u> Manager, Regulatory Affairs Section	<u>2/1/96</u> Date

PNPP Plant-Specific EAL Guidelines

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PNPP Plant-Specific EAL Guidelines

1.0 PURPOSE

This document provides those individuals responsible for the review and maintenance of the Perry Nuclear Power Plant (PNPP) Emergency Action Levels (EALs) with a comparison to, and the logic for, the PNPP-specific version of NUMARC/NESP-007. This document provides the plant-specific technical bases along with the plant-specific references which support each PNPP EAL. This document also provides justification for any deviations taken from the generic NUMARC/NESP-007.

The PNPP Plant-Specific EAL Guidelines (PSEG) is a developmental document and is not intended for use or reference by the EAL user. The Emergency Action Level Bases Document, which was derived from this document, provides the user with EAL bases and interpretation guidance.

2.0 DETAILS

The PSEG is presented consistent with that of NUMARC/NESP-007, Section 5.0, "Generic EAL Guidance." The PSEG consists of the following attachments:

- Category A - Abnormal Rad Levels/Radiological Effluent
- Category F - Fission Product Barrier Degradation
- Category H - Hazards and Other Conditions Affecting Plant Safety
- Category S - System Malfunctions

For Categories A, H and S, each generic Initiating Condition (IC) and associated Operating Modes and Example EALs are shown. To indicate the revision or addition of any site-specific wording required to make the generic information applicable to PNPP, the use of strike-out and underline has been employed. For any generic information which has been determined to not be applicable or appropriate, the words have been ~~struck-out~~. Any new wording is indicated by underline. The revised generic guidance is then followed by the site-specific EAL technical bases, references and justification for any deviations taken.

For Category F, each of the fission product barrier thresholds for LOSS or POTENTIAL LOSS as listed in Table 3 of NUMARC/NESP-007, has been assigned a unique designator and are listed in order starting with the Fuel Clad, RCS and then Primary Containment. Again, a system of strike-out and underline has been used to indicate revision or addition of any site-specific wording required to make the generic information applicable to PNPP. Each barrier LOSS or POTENTIAL LOSS threshold is followed by a site-specific basis. Following the barrier thresholds is a listing of site-specific references and justifications for any deviations taken from the generic guidance.

PNPP Plant-Specific EAL Guidelines

Attachment 5 to this document provides a cross-reference between each PNPP Initiating Condition (IC) and its associated NUMARC/NESP-007 IC. This is provided to assist reviewers in identifying the generic guidance from which a particular PNPP IC or EAL is derived.

RECOGNITION CATEGORY A

ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENT

RECOGNITION CATEGORY A**UNUSUAL EVENT**

AU4HU1 Any unplanned release of gaseous ~~or liquid~~ radioactivity to the environment that exceeds two times the ~~radiological Technical Specifications~~ ODCM control limit for 60 minutes or ~~greater~~ longer.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3 or 4)

1. ~~A valid reading on one or more of the following monitors that exceeds the "value shown" (site specific monitors) indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site specific procedure):~~

~~(site specific list)~~

~~Note: ——— If the monitor reading(s) is sustained for longer than 60 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.~~

Reading greater than TWO times the HIGH alarm setpoint on one or more of the following plant gaseous effluent monitor lasting greater than or equal to 60 minutes:

- Unit 1 Vent 1D17-K786
- OGB Vent Pipe 1D17-K836
- TB/HB Vent 1D17-K856
- Unit 2 Vent 2D17-K786

AND

Chemistry sample analysis methods CANNOT confirm within 60 minutes of receipt of the HIGH alarm that effluent levels are less than two times ODCM 3.11.2.1 limits

2. ~~Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates with a release duration of 60 minutes or longer in excess of two times (site specific technical specifications).~~

Routine or as required sample analysis indicates a release rate greater than two times ODCM 3.11.2.1 limits.

AND

The release lasts for equal to or greater than 60 minutes.

RECOGNITION CATEGORY A

- ~~3. Valid reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background for 60 minutes [for sites having telemetered perimeter monitors].~~
- ~~4. Valid indication on automatic real time dose assessment capability greater than (site-specific values) for 60 minutes or longer [for sites having such capability].~~

Basis:

It is not intended that the release be averaged over 60 minutes. Further, the Emergency Coordinator should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release will exceed TWO times the ODCM Control 3.11.2.1 limit for greater than 60 minutes.

If an ongoing release is detected and the starting time for that release is unknown, the Unusual Event should be declared as soon as it has been determined that the release has exceeded two times ODCM Control 3.11.2.1 limit assuming, in the absence of data to the contrary, that the release duration has exceeded 60 minutes.

Monitor indications and alarms are based on the methodology of the Offsite Dose Calculation Manual (ODCM) which demonstrates compliance with 10CFR20 and 10CFR50 Appendix I requirements. Per CHI-0006, the D17 gaseous effluent (noble gas) HIGH alarm setpoints are 70% of the ODCM Control 3.11.2.1 limits for the gaseous release points. A conservative value of two times the HIGH alarm setpoint (150% limit) was therefore used to provide a quick reference to Operators for classification purposes.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event AU1
2. Off-Normal Instruction (ONI) D17, High Radiation Levels Within Plant - Unit 1 (Rev. 5)
3. Offsite Dose Calculation Manual (ODCM), Section B and Appendix C: Control 3/4.11.2.1 (Rev. 5)
4. Chemistry Instruction (CHI) 0006, Radiation Monitoring Alarm Setpoint Determination (Rev. 0)

RECOGNITION CATEGORY A**Deviations/Comments:**

1. NUMARC Example #3 is not included because the Perry Plant does not have a perimeter radiation monitoring system.
2. NUMARC Example #4 is not included because Perry Plant's automated dose assessment software does not provide automatic real time dose assessment capability.
3. Liquid effluent releases listed NUMARC Example #2 are covered under HU2 as a separate initiating condition.

RECOGNITION CATEGORY A**UNUSUAL EVENT**

AU1HU2 Any unplanned release of ~~gaseous or~~ liquid radioactivity to the environment that exceeds two times the ~~radiological Technical Specifications~~ ODCM Control limit for 60 minutes or ~~greater~~ longer.

Operating Mode Applicability: All

Example Emergency Action Levels: (1 or 2 or 3 or 4)

1. ~~A valid reading on one or more of the following monitors that exceeds the "value shown" (site-specific monitors) indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site-specific procedure):~~

(site-specific list)

Note: ~~———— If the monitor reading(s) is sustained for longer than 60 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.~~

Reading greater than 1.2E3 cpm above background for one or more of the following liquid process monitors lasting at equal to or greater than 60 minutes:

- ESW Loop A Process 1D17-K604
- ESW Loop B Process 1D17-K605

AND

Chemistry sample analysis methods CANNOT confirm within 60 minutes of receipt of the HIGH-HIGH alarm that liquid release levels are less than two times the ODCM Control 3.11.1.1 limits.

2. ~~Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates with a release duration of 60 minutes or longer in excess of two times (site-specific technical specifications).~~

Routine or as required sample analysis indicates a release rate greater than two times ODCM 3.11.1.1 limits.

AND

The release lasts for equal to or greater than 60 minutes.

RECOGNITION CATEGORY A

- ~~3. Valid reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background for 60 minutes [for sites having telemetered perimeter monitors].~~
- ~~4. Valid indication on automatic real time dose assessment capability greater than (site-specific values) for 60 minutes or longer [for sites having such capability].~~

Basis:

This IC includes any liquid release for which a radioactive discharge permit was not prepared or a release that exceeds the conditions on the applicable permit (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.).

Releases in excess of TWO times the ODCM Control 3.11.1.1 limits, that continue for 60 minutes or longer, represent an uncontrolled situation and hence a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here. Rather, it is the degradation in plant control implied by the fact that the release was not isolated within 60 minutes.

It is not intended that the release be averaged over 60 minutes. Further, the Emergency Coordinator should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release will exceed TWO times the ODCM Control 3.11.1.1 limit for greater than 60 minutes.

If an ongoing release is detected and the starting time for the release is unknown, the Unusual Event should be declared as soon as it has been determined that the release has exceeded two times ODCM Control 3.11.1.1 limit, assuming in the absence of data to the contrary, that the release duration has exceeded 60 minutes.

Monitor indications, derived under FCR 021925 and based on the ODCM methodology, demonstrate compliance with 10CFR20 requirements.

The ESW monitor response is based on an average 1995 100% power RCS water isotopic inventory, decayed to 1.5 days (most conservative mix).

Per USAR Chapter 11.5.3, monitoring and sampling are limited to the Emergency Service Water (ESW) and Liquid Radwaste (LRW) liquid effluent pathways. For event classification purposes, concern is limited to the ESW Loop A and B process monitors which would provide indication of leakage from Residual Heat Removal (RHR) Systems via the non-regenerative heat exchanger. Discharges from the liquid radwaste systems to ESW are considered controlled releases, requiring sampling and evaluation prior to discharging; therefore, releases from LRW are not considered.

RECOGNITION CATEGORY A**References:**

1. NUMARC/NESP-007 (Rev. 2), Unusual Event AU1
2. Offsite Dose Calculation Manual (ODCM), Section 2 and Appendix C: Control 3/4.11.1.1 (Rev. 5)
3. FCR 021925, "Effluent LRW Monitor Reading Calculations"
4. Updated Safety Analysis Report (USAR), Chapter 11.5.3 and Table 11.5-3

Deviations/Comments:

None

RECOGNITION CATEGORY A**UNUSUAL EVENT**

AU2GU1 Unexpected increase in plant radiation levels ~~or airborne concentration.~~

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~(Site specific) indication of uncontrolled water level decrease in the reactor refueling cavity with all irradiated fuel assemblies remaining covered by water.~~
2. ~~Uncontrolled water level decrease in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.~~
3. ~~(Site specific) radiation reading for irradiated spent fuel in dry storage.~~
4. Valid direct area radiation monitor readings increase by a factor of 1000 over normal* levels.

* ~~Normal levels can be considered as the highest reading in the past twenty four hours excluding the current peak value.~~

Either:

Unit 1 or common area (D21) radiation monitor reading increases by a factor of 100 greater than ALERT alarm setpoint.

OR

Health Physics surveys indicate an increase by a factor of 1000 times normally expected area radiation levels

AND

Increase in area in-plant radiation levels CANNOT be attributed to either:

- the start-up and operation of plant equipment or systems within design parameters.
- the planned movement of radioactive materials.
- the planned movement of shielding (i.e., plugs, lead shot, etc.)

RECOGNITION CATEGORY A

Basis:

The ALERT alarm setpoint on the area radiation monitors (D21) is intended to provide notice to the Control Room of in-plant radiation levels above normally expected conditions, based on the operation of systems or activities conducted in that given area.

For event classification purposes, the Unusual Event threshold has been conservatively established at 100 times the D21 ALERT setpoint. This value provides a desirable gradient between the Unusual Event and Alert classes.

For Health Physics survey purposes, NORMAL levels can be considered as the highest reading in the past 24-hour period, excluding the current peak value.

This IC is not applicable for alarms resulting from the planned movement of radioactive materials or shielding in the plant or expected increases in radiation levels such as the backwashing of the G36, G41 or N23 filters.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event AU2
2. Off-Normal Instruction (ONI) D17, High Radiation Levels Within Plant Unit 1 (Rev. 5)
3. Updated Safety Analysis Report (USAR) Chapter 12.3.4.4

Deviations/Comments:

1. NUMARC EAL Example #1 and #2 are addressed under GU2 as a separate initiating condition.
2. NUMARC Example #3 is NOT applicable at Perry which has no dry storage capability for irradiated fuel.
3. Criteria for establishing the alarm setpoints for in-plant radiation monitors (D21) has been removed from USAR Chapter 12.3.4.4 and are administratively set and revised, as necessary, based on ALARA, licensing requirements, and operational experience gained throughout plant maturation. Alert setpoints are established under the Radiation Protection and ALARA Programs to provide indication to the Control Room Operator of an abnormal or unexpected increase in radiation levels. The mode of operation of specific equipment/systems and activities conducted in a specific area are considered when establishing the ALERT setpoints for the D21 monitors. Based on the intended purpose of the alarm, the D21 ALERT setpoint is used to define normal radiation levels for event classification purposes.

RECOGNITION CATEGORY A

4. NUMARC IC AU2 includes unexpected increases in airborne concentration in addition to plant radiation. Perry EALs do not address airborne concentration, since an increase in airborne concentration is not addressed in the example EALs or the basis for the Unusual Event or Alert. In discussions with NUMARC, the airborne example EAL was deleted in the body but overlooked in the title. (Note the numbering mismatch in the example EAL line).

RECOGNITION CATEGORY A**UNUSUAL EVENT**

AU2GU2 ~~Unexpected increase in plant radiation or airborne concentration.~~ Uncontrolled fuel pool water level decrease with irradiated fuel outside the RPV remaining covered.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~(Site specific) indication of uncontrolled water level decrease in the reactor refueling cavity with all irradiated fuel assemblies remaining covered by water.~~

Uncontrolled decrease in one or more of the following fuel pools:

- Fuel Storage and Preparation Pool
- Fuel Transfer Pool
- Spent Fuel Storage Pool
- Shipping Cask Storage Pool
- Upper Spent Fuel Deep Pit
- Fuel Transfer Canal

AND

Irradiated fuel is stored in affected pool.

2. ~~Uncontrolled water level decrease in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.~~

3. ~~(Site specific) radiation reading for irradiated spent fuel in dry storage.~~

4. ~~Valid direct area radiation monitor readings increases by a factor of 1000 over normal* levels.~~

* ~~Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value.~~

RECOGNITION CATEGORY A**Basis:**

These events tend to have long lead times relative to potential for radiological release outside the site boundary. Thus the impact to public health and safety is very low. Classification as an Unusual Event is warranted as a precursor to a more serious event.

It is NOT intended that an individual be sent to make a visual observation if it can be verified remotely with cameras or Health Physics surveys, if performed.

Unplanned increases in in-plant radiation levels represent a degradation in the control of radioactive material and represent a potential degradation in the level of safety of the plant. This EAL escalates to an ALERT per GA1 and GA2 if the radiation level increase impairs safe operation of the plant.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event AU2
2. Updated Safety Analysis Report (USAR), Sections 9.1.2.2 and 9.1.3.3.2

Deviations/Comments:

1. NUMARC IC AU2 contains "site-specific" radiation readings for irradiated spent fuel in dry storage. NUMARC example EAL 3 is applicable to plants with licenses of dry storage for older irradiated spent fuel. Currently, the Perry Plant does not have license for the dry storage of older irradiated spent fuel.

RECOGNITION CATEGORY A**ALERT**

AA1HA1 Any unplanned release of gaseous ~~or liquid~~ radioactivity to the environment that exceeds 200 times ~~radiological Technical Specifications~~ ODCM Control Limit for 15 minutes or ~~greater~~ longer.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~A valid reading on one or more of the following monitors that exceeds the value shown indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site specific procedure):~~

~~(site specific list)~~

~~Note: ——— If the monitor reading(s) is sustained for longer than 15 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.~~

Reading greater than 200 times the HIGH alarm setpoint OR offscale high on one or more of the following plant gaseous effluent monitors:

- Unit 1 Vent 1D17-K786
- OG Vent pipe 1D19-K836
- TB/HB Vent 1D17-K856
- Unit 2 Vent 2D17-K786

AND

Chemistry sample analysis methods CANNOT confirm within 15 minutes of receipt of the HIGH alarm that effluent levels are less than 200 times ODCM Control 3.11.2.1 limits.

2. ~~Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates in excess of (200 x site specific technical specifications) for 15 minutes or longer.~~

Routine or as required sample analysis indicates a release rate greater than 200 times ODCM Control 3.11.2.1 limits.

AND

The release lasts for equal to or greater than 15 minutes.

RECOGNITION CATEGORY A

3. ~~Valid reading on perimeter radiation monitoring system greater than 10.0 mR/hr sustained for 15 minutes or longer. [for sites having telemetered perimeter monitors]~~

Portable survey instruments indicate radiation levels of equal to or greater than 10 mR/hr at the Site Boundary for greater than 15 minutes.

4. ~~Valid indication on automatic real-time dose assessment capability greater than (200 x site specific technical specifications) for 15 minutes or longer. [for sites having such capability]~~

Basis:

This event escalates from the Unusual Event by escalating the magnitude of the release by a factor of 100. Prorating 500 mrem/yr (ODCM Control 3.11.2.1 limit) for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary rate would be 10 mR/hr. The required release duration was reduced to 15 minutes in recognition of the increased severity.

It is not intended that the release be averaged over 15 minutes. Further, the Emergency Coordinator should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined that the release will exceed 200 times the ODCM Control 3.11.2.1 limit for greater than 15 minutes.

If ongoing release is detected and the starting time for that release is unknown, the Alert should be declared as soon as it has been determined that the release has exceeded two hundred times ODCM Control 3.11.2.1 limit, assuming in the absence of data to the contrary, that the release duration has exceeded 15 minutes.

Monitor indications and alarms are based on the ODCM which demonstrates compliance with 10CFR20. Per CHI-0006, the D17 gaseous effluent (noble gas) HIGH alarm setpoints are 70% of the ODCM Control 3.11.2.1 limits for the gaseous release points. A conservative value of 200 times the HIGH alarm setpoint or offscale high on one or more of the low range monitors was therefore used to provide a quick reference to Operators for classification purposes.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert AA1
2. Offsite Dose Calculation Manual (ODCM), Section 3 Appendix C: Control 3/4.11.1.1 (Rev. 5)
3. Off-Normal Instruction (ONI) D17, High Radiation Levels Within Plant - Unit 1 (Rev. 5)
4. Chemistry Instruction (CHI) 0006, Radiation Alarm Setpoint Determination (Rev. 0)

RECOGNITION CATEGORY A**Deviations/Comments:**

1. NUMARC Example #3 was deleted since the Perry Plant does not have telemetered perimeter radiation monitors. However, if remote field monitoring teams are deployed, and they locate high offsite dose rate readings, an alert will be declared at same level.
2. NUMARC Example #4 was deleted since Perry Plant's automated dose assessment software does not provide automatic real time dose assessment capability.
3. Liquid effluent releases listed under NUMARC Example #2 are covered under HA2 as a separate initiating condition.

RECOGNITION CATEGORY A**ALERT**

- AA1HA2** Any unplanned release of ~~gaseous or~~ liquid radioactivity to the environment that exceeds 200 times the ODCM Control limit radiological Technical Specifications for 15 minutes or greater longer.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. A valid reading on one or more of the following monitors that exceeds the value shown indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site specific procedure):

(site specific list)

Note: _____ If the monitor reading(s) is sustained for longer than 15 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.

Reading greater than 1.2E5 cpm above background for one or more of the following liquid process monitors lasting at least 15 minutes:

- ESW Loop A Process 1D17-K604
- ESW Loop B Process 1D17-K605

AND

Chemistry sample analysis methods CANNOT confirm within 15 minutes of receipt of the HIGH-HIGH alarm, that liquid release levels are less than 200 times ODCM Control 3.11.1.1 limits.

2. ~~Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates in excess of (200 x site specific technical specifications) for 15 minutes or longer.~~

Routine or as required sample analysis indicates a release rate greater than 200 times ODCM Control 3.11.1.1 limits.

AND

The release lasts for equal to or greater than 15 minutes.

RECOGNITION CATEGORY A

- ~~3. Valid reading on perimeter radiation monitoring system greater than 10.0 mR/hr sustained for 15 minutes or longer. [for sites having telemetered perimeter monitors]~~
- ~~4. Valid indication on automatic real time dose assessment capability greater than (200 x site specific technical specifications) for 15 minutes or longer. [for sites having such capability]~~

Basis:

This IC includes any liquid release for which a radioactive discharge permit was not prepared or a release that exceeds the conditions on the applicable permit. (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.).

This event escalates from the Unusual Event by increasing the magnitude of the release by a factor of 100. Prorating the 500 mrem/yr (ODCM Control 3.11.1.1 limits) for both time (8766 hr/yr) and the 200 multiplier, the associated site boundary dose rate would be 10 mR/hr. The required release duration was reduced to 15 minutes in recognition of the increased severity.

It is not intended that the release be averaged over 15 minutes. Further, the Emergency Coordinator should not wait until 15 minutes has elapsed, but should declare the event as soon as it is determined by that the release will exceed 200 times the ODCM Control 3.11.1.1 limit for greater than 15 minutes.

If an ongoing release is detected and the starting time for that release is unknown, the Alert should be declared as soon as it has been determined that the release has exceeded 200 times ODCM Control 3.11.1.1 limit, assuming in the absence of data to the contrary, that the release duration has exceeded 15 minutes.

Monitor indications, derived under FCR 021925 and based on the ODCM, demonstrate compliance with 10CFR20, and were adjusted upwards by a factor of 200. The ESW monitor response is based on an average 1995 100% power RCS water isotopic inventory, decayed to 1.5 days (most conservative mix). Per USAR Chapter 11.5.3, monitoring and sampling are limited to the Emergency Service Water (ESW) and Liquid Radwaste (LRW) liquid effluent pathways. For event classification purposes, concern is limited to the ESW Loop A and B process monitors which would provide indication of leakage from Residual Heat Removal (RHR) Systems via the non-regenerative heat exchanger. Discharges from the liquid radwaste systems to ESW are considered controlled releases, requiring sampling and evaluation prior to discharging, therefore, releases from LRW are not considered.

RECOGNITION CATEGORY A**References:**

1. NUMARC/NESP-007 (Rev. 2), Alert AA1
2. Off-Site Dose Calculation Manual (ODCM), Section 2 and Appendix C: Control 3.11.1.1 (Rev. 5)
3. FCR 021925, "Effluent LRW Monitor Reading Calculations"
4. Updated Safety Analysis Report (USAR), Chapter 11.5.3 and Table 11.5-3

Deviations/Comments:

None

RECOGNITION CATEGORY A**ALERT**

AA2GA1 Major damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~A (site-specific setpoint) alarm on one or more of the following radiation monitors: (site-specific monitors)~~

~~Refuel Floor Area Radiation Monitor
Fuel Handling Building Ventilation Monitor
Fuel Bridge Area Radiation Monitor~~

Either:

Dropping, bumping, or otherwise rough handling of an irradiated fuel bundle.

OR

Irradiated fuel bundle suspended from grapple with a decrease in pool inventory.

AND

HIGH alarm on one or more of the following radiation monitors:

- Spent Fuel Pool area
- Upper Pool area
- Fuel Preparation Pool area
- FHB ventilation (gaseous)
- Containment atmosphere (gaseous)

- ~~2. Report of visual observation of irradiated fuel uncovered.~~
- ~~3. Water level less than (site-specific) feet for the reactor refueling cavity that will result in irradiated fuel uncovering.~~
- ~~4. Water level less than (site-specific) feet for the spent fuel pool and fuel transfer canal that will result in irradiated fuel uncovering.~~

RECOGNITION CATEGORY A

Basis:

Due to the decreased amount of decay heat present, there is time available to take corrective actions and little potential for substantial fuel damage. In addition, (NUREG/CR-4982), "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82", July 1987, indicates that even if corrective actions are not taken, no prompt fatalities are predicted, and that risk of injury is low. NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel," also presents the following discussion:

"In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel onsite, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's protection action guides."

This IC applies to spent fuel requiring water coverage and is concerned with exposures to plant personnel caused by the rough handling/dropping or uncovering of spent fuel.

Permanent area and airborne gas channel radiation monitors in Containment and the Fuel Handling Building (FHB) are utilized as indication for increased radiation levels caused by rough handling or dropping. If the rough handling was done in the Fuel Handling Building, only classify if the FHB alarms are received.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert AA2.
2. Off-Normal Instruction (ONI) D17, High Radiation Levels Within Plant - Unit 1 (Rev. 5)
3. NUREG 0818, Emergency Action Levels for Light Water Reactors
4. NUREG/CR-4982, Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82, July 1987
5. NRC IE Notice No. 90-08, Kr-85 Hazards from Decayed Fuel

RECOGNITION CATEGORY A**Deviations/Comments:**

1. Example EALs #2, #3 and #4 for NUMARC IC AA2 were deleted. Based on the evaluation for spent fuel pool design, discussed in USAR Section†9.1.3.3.2, level cannot be inadvertently lowered below the top of spent fuel in either the FHB or Containment.

No outlet or drains are provided in the fuel pool that might permit the pool to be drained below a safe shielding level. Inlet lines extending below this level are equipped with siphon breakers to prevent inadvertent pool drainage.

Failure to close the gate between the Spent Fuel Pool and Shipping Cask Storage Pool, while draining a cask pool, will only lower water level to the top of the weir wall separating the pools, thereby preventing spent fuel from being uncovered.

2. Increases in area radiation levels resulting from the reduction in shielding due to lower pool water level would be classified under IC GA2 (NUMARC IC AA3).

RECOGNITION CATEGORY A**ALERT**

AA3GA2 ~~Release of radioactive material or~~ increases in radiation levels within Safe Shutdown Buildings ~~the facility~~ that impedes operation of systems required to maintain safe operations OR to establish or maintain COLD SHUTDOWN.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Valid radiation monitor readings greater than 15 mR/hr in areas requiring continuous occupancy to maintain plant safety functions:~~
 - ~~(Site specific) list.~~

Control Room area radiation levels of greater than 15 mR/hr.
2. ~~Valid (site specific) radiation monitor readings greater than (site specific) values in areas requiring infrequent access to maintain plant safety functions:~~
 - ~~(Site specific) list.~~

Note: ~~The Emergency Director should determine the cause of the increase in radiation levels and review other ICs for applicability.~~

Area radiation levels greater than one or more of the PEI-N11 Maximum Safe Operating Conditions for Area Radiation.

RECOGNITION CATEGORY A

Basis:

The only area requiring continuous occupancy is the Control Room. The value of 15 mR/hr is derived from the General Design Criteria (GDC) 19 value of 5 rem in 30 days with an expected occupancy time of 12 hours per day.

EXAMPLE: $\frac{5000 \text{ mR}}{30 \text{ days}} \times \frac{\text{day}}{24 \text{ hrs.}} \times 12 \text{ hrs.} = 13.9 \text{ mR}$ (dose rounded to 15 mR for human factoring consideration.)

Section III.D.3 of NUREG-0737, "Clarification of TMI Action Plan Requirements," provides that the 15 mR/hr value can be averaged over the 30 days. However, the value is used here without averaging since a 30-day duration implies an event potentially more significant than an Alert.

This IC addresses increased radiation levels that impede necessary access to operating stations or other areas containing equipment that must be operated manually in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. The cause and/or magnitude of the increase in radiation levels is not a concern of this IC. Per the PEI Bases Document, the Maximum Safe Operating Conditions values listed under PEI-N11, Containment Leakage Control, provide the highest parameter value at which either: (1) equipment necessary for safe shutdown of the plant will fail, or (2) personnel access necessary for the safe operation of the plant will be precluded. Therefore, the intent of IC GA2 is met by exceeding the Maximum Safe Operating Conditions for Area Radiation.

This IC is not meant to apply to increases in the Containment radiation monitors as these events are addressed in the fission product barrier ICs, nor is it intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.).

References:

1. NUMARC/NESP-007 (Rev. 2), Alert AA3.
2. NUREG-0737, Clarification of TMI Action Plan Requirements
3. Off-Normal Instruction (ONI) D17, High Radiation Levels Within Plant - Unit 1 (Rev. 5)
4. General Design Criteria 19, Control Room
5. Safety Evaluation 92-161, For Onsite Storage of Low Level Waste
6. Updated Safety Analysis Report (USAR), Chapter 9 and Appendix 9A
7. Plant Emergency Instruction (PEI) N11, Containment Leakage Control (Rev. B)
8. Plant Emergency Instruction (PEI) Bases Document (Rev. 2/Update 1)

RECOGNITION CATEGORY A**Deviations/Comments:**

1. The NUMARC bases for IC AA3 lists the Central Alarm Station as being a location requiring continuous occupation in NUMARC example EAL #1. It is not listed in the Perry Plant EALs since all functions can be assumed at the Secondary Alarm Station located in the Control Room.

RECOGNITION CATEGORY A**SITE AREA EMERGENCY**

AS1HS1 Site Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 100 mR TEDE dose ~~Whole Body~~ or 500 mR CDE Child Thyroid doses for the actual or projected duration of the release.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~A valid reading on one or more of the following monitors that exceeds or is expected to exceed the value shown indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site-specific procedure):~~

(Site-specific list)

Note: ~~If the monitor reading(s) is sustained for longer than 15 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.~~

Greater than the listed reading for one or more of the following plant gaseous effluent monitors:

• <u>Unit 1 Vent</u>	<u>1D19-N300</u>	<u>3.8E-1 μCi/cc</u>
• <u>OGB Vent</u>	<u>1D19-N400</u>	<u>2.2E0 μCi/cc</u>
• <u>TB/HB Vent</u>	<u>1D17-K856</u>	<u>1.6E4 cpm</u>
• <u>Unit 2 Vent</u>	<u>2D19-N300</u>	<u>6.0E-1 μCi/cc</u>

AND

Emergency dose calculations CANNOT confirm, within 15 minutes of exceeding limit, that levels at the Site Boundary are less than 100 mR TEDE and 500 mR CDE Child Thyroid dose using actual meteorology.

2. ~~A valid reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 100 mR/hr. [for sites having telemetered perimeter monitors]~~

RECOGNITION CATEGORY A

3. ~~Valid dose assessment capability indicates dose consequences greater than 100 mR whole body or 500 mR child thyroid.~~

Emergency dose calculations, using actual meteorology indicate that one or more of the following are met at the Site Boundary:

- Greater than 100 mR TEDE
- Greater than 500 mR CDE Child Thyroid

4. ~~Field survey results indicate site boundary dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid dose commitment of 500 mR for one hour of inhalation.~~

Field survey results indicate that one or more of the following have been met at the Site Boundary:

- Greater than 100 mR/hr Whole Body
- Greater than 500 mR CDE Child Thyroid

AND

Dose rates are expected to continue for equal to or greater than 1 hour.

Basis:

Committed Dose Equivalent - child thyroid (CDE_{ct}) is conservatively used based on agreement with the State of Ohio. This usage of a child thyroid dose is consistent with the dose assessment methodology described in Section 7.5.10 of the Emergency Plan.

Effluent monitor readings have been established to quantify the magnitude of the release. These threshold readings are based on 500 mR CDE_{ct} as the most limiting dose per EPU/CEI-02 calculations, based on EPI-B7b methodology. In establishing these thresholds, the following inputs were used: (1) one hour release duration, (2) realistic short term (accident) meteorology per USAR Table 2.3-24; and (3) Reg. Guide 1.109 child thyroid dose factors.

Effluent readings shall only be used for the classification of fast breaking events if a dose assessment calculation cannot be completed within 15 minutes but then only until actual dose projections can be made. Effluent meter setpoints (for E-Plan classification) are based on "best guess" accident scenarios. The vent monitors are calibrated to measure Xe 133, plus they provide a rough indication of the actual release. Therefore, dose assessment, since it uses current plant values, will be more accurate and should be used.

RECOGNITION CATEGORY A

The 100 mrem Whole Body Dose in this IC is based on the 10CFR20 annual average population exposure. This value also provides a desirable gradient (one order of magnitude) between the Alert, Site Area Emergency and General Emergency classes. It is calculated that exposures less than this limit are not consistent with the Site Area Emergency class description. The 500 mrem integrated Child Thyroid dose was established in consideration of the 1:5 ratio of the EPA Protection Action Guidelines for Whole Body and Child Thyroid dose. Whole body dose is considered equivalent to Total Effective Dose Equivalent (TEDE) for emergency dose assessment and event classification purposes.

Actual meteorology is specifically identified in the IC since it gives the most accurate dose assessment.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency AS1
2. Emergency Plan Implementing Instructions (EPI) B7b, Manual Offsite Dose Calculations (Rev. 8), Attachment 2
3. Perry Nuclear Power Plant Updated Safety Analysis Report for Unit 1. Table 2.3-24 and Table 11.5-1
4. Emergency Plan for Perry Nuclear Power Plant; Docket Nos. 50-440, 50-441 (Rev. 13), Section 7.5.10
5. EPU/CEI-02 Calculations (dated 12/95), NUMARC EAL Threshold for Initiating Conditions HS1 and HG1
6. 10CFR20, Standards for Protection Against Radiation
7. Regulatory Guide 1.109, Calculation of Annual Dose to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I
8. Guides and Protective Actions for Nuclear Incidents (October 1991)

Deviations/Comments:

1. NUMARC Example #2 was deleted since the Perry Plant does not have telemetered perimeter radiation monitors. However, if remote field monitoring teams are deployed, and they locate high offsite dose rate readings, a site area emergency will be declared at same level.
2. Specifying the use of actual meteorology during the performance of dose assessment calculations was added for consistency with the methodology used in classification of a General Emergency.

RECOGNITION CATEGORY A**GENERAL EMERGENCY**

AG1HG1 Site Boundary dose resulting from an actual or imminent release of gaseous radioactivity exceeds 1000 mR TEDE dose ~~Whole Body~~ OR 5000 mR CDE Child Thyroid dose for the actual or projected duration of the release.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4)

1. ~~A valid reading on one or more of the following monitors that exceeds or is expected to exceed the value shown indicates that the release may have exceeded the above criterion and indicates the need to assess the release with (site specific procedure):~~

(Site specific list)

~~Note: If the monitor reading(s) is sustained for longer than 15 minutes and the required assessments cannot be completed within this period, then the declaration must be made based on the valid reading.~~

Greater than the listed reading for one or more of the following plant gaseous effluent monitors:

• Unit 1 Vent	1D19-N300	3.8E0 $\mu\text{Ci/cc}$
• OGB Vent	1D17-N400	2.2E1 $\mu\text{Ci/cc}$
• TB/HB Vent	1D17-K856	1.6E5 cpm
• Unit 2 Vent	2D19-N300	6.0E0 $\mu\text{Ci/cc}$

AND

Emergency dose calculations CANNOT confirm, within 15 minutes of exceeding limit, that levels at the Site Boundary are less than 1000 mR TEDE and 5000 mR CDE Child Thyroid dose using actual meteorology.

- ~~2. A valid reading sustained for 15 minutes or longer on perimeter radiation monitoring system greater than 1000 mR/hr. [for sites having telemetered perimeter monitors].~~

RECOGNITION CATEGORY A

3. ~~Valid dose assessment capability indicates dose consequences greater than 1000 mR whole body or 5000 mR child thyroid.~~

Emergency dose calculations, using actual meteorology indicate that one or more of the following are met at the Site Boundary:

- Greater than 1000 mR TEDE
- Greater than 5000 mR CDE Child Thyroid

4. ~~Field survey results indicate site boundary dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate child thyroid dose commitment of 5000 mR for one hour of inhalation.~~

Field survey results indicate that one or more of the following have been met at the Site Boundary:

- Greater than 1000 mR/hr Whole Body
- Greater than 5000 mR CDE Child Thyroid

AND

Dose rates are expected to continue for equal to or greater than 1 hour.

Basis:

Committed Dose Equivalent - child thyroid (CDE_{ct}) is conservatively used based on agreement with the State of Ohio. This usage of a child thyroid dose is consistent with the dose assessment methodology described in Section 7.5.10 of the Emergency Plan.

Effluent monitor readings have been established to quantify the magnitude of the release. These threshold readings are based on 5 R CDE_{ct} as the most limiting dose per EPU/CEI-02 calculations, based on EPI-B7b methodology. In establishing these thresholds, the following inputs were used: (1) one hour release duration, (2) realistic short term (accident) meteorology per USAR Table 2.3-24; and (3) Reg. Guide 1.109 child thyroid dose factors.

Effluent readings shall only be used for the classification of fast breaking events if a dose assessment calculation cannot be completed within 15 minutes but then only until actual dose projections can be made. Effluent meter setpoints (for E-Plan classification) are based on "best guess" accident scenarios. The vent monitors are calibrated to measure Xe 133, thus they provide a rough indication of the actual release. Therefore, dose assessment, since it uses current plant values, will be more accurate and should be used.

RECOGNITION CATEGORY A

The 1000 mrem Whole Body Dose or 5000 mrem Child Thyroid Dose integrated dose are based on the EPA protective action guidance which indicates that public protective actions are indicated if the dose exceeds 1 rem Whole Body Dose or 5 rem Child Thyroid Dose. Whole Body dose is considered equivalent to TEDE for emergency dose assessment and event classification purposes.

Actual meteorology is specifically identified in the IC since it gives the most accurate dose assessment.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency AG1
2. Emergency Plan Implementing Instructions (EPI) B7b, Manual Offsite Dose Calculations (Rev. 8), Attachment 2
3. Perry Nuclear Power Plant Updated Safety Analysis Report for Unit 1. Table 2.3-24 and Table 11.5-1
4. Emergency Plan for Perry Nuclear Power Plant; Docket Nos. 50-440, 50-441 (Rev. 13), Section 7.5.10
5. EPU/CEI-02 Calculations (dated 12/95), NUMARC EAL Threshold for Initiating Conditions HS1 and HG1
6. 10CFR20, Standards for Protection Against Radiation
7. Regulatory Guide 1.109, Calculation of Annual Dose to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I
8. Guides and Protective Actions for Nuclear Incidents (October 1991)

Deviations/Comments:

1. NUMARC Example #2 was deleted since the Perry Plant does not have telemetered perimeter radiation monitors. However, if remote field monitoring teams are deployed, and they locate high offsite dose rate readings, a General Emergency will be declared at same level.

RECOGNITION CATEGORY E

FISSION PRODUCT BARRIER DEGRADATION

RECOGNITION CATEGORY F**A. Fuel Clad Barrier Example EALS****1. Primary Reactor Coolant System Activity Level****LOSS**

FC1.1 ~~Coolant~~ Sample activity is equal to or greater than (site-specific) value
300 $\mu\text{Ci/gm}$ dose equivalent iodine-131

Basis:

A **LOSS** of the Fuel Clad barrier is indicated by a coolant activity of 300 $\mu\text{Ci/gm}$ dose equivalent I-131. This amount of activity is well above that expected for iodine spikes and corresponds to approximately 2%-5% fuel clad damage. This amount of clad damage indicates significant clad heating and thus the Fuel Clad barrier is considered lost.

2. Reactor Pressure Vessel ~~Water~~ Level

NOTE: A **LOSS** or **CHALLENGE** (potential **LOSS**) to the Fuel Clad barrier based on RPV water level is applicable only to non-ATWS conditions. Refer to NUMARC EAL IC SG2 for event classification based on the intentional lowering of RPV water level below the top of active fuel (TAF) as a means of power control for ATWS scenarios.

RECOGNITION CATEGORY F**A. Fuel Clad Barrier Example EALS: (Cont.)****LOSS**

FC2.1 ~~Level less than (site-specific) value~~ Entry into PEI-T23, Containment Flooding

Basis:

Per the Perry Plant PEI Bases Document, if any of the criteria below CANNOT be met for non-ATWS conditions, Operators are directed by the applicable PEI to initiate Containment Flooding per PEI-T23 to re-establish adequate core cooling.

- RPV pressure is less than 130 psig **AND** one or more make-up systems are injecting to the RPV. RPV water level is maintained above TAF. [REF.: PEI-B13, RPV Control (non-ATWS) - Level]
- RPV pressure is greater than 130 psig **AND** NO make-up systems are injecting into the RPV. RPV water level is maintained greater than - 42.5". [REF.: PEI-B13, RPV Control (non-ATWS) - Level]
- RPV level CANNOT be determined, **AND** both at least 4 SRVs can be opened **AND** RPV pressure can be maintained at 70 psig greater than Containment pressure for a non-ATWS condition. [REF.: PEI-B13, RPV Flooding]

POTENTIAL LOSS CHALLENGE

FC2.2 RPV Level less than (site-specific) value 0"

Basis:

A **CHALLENGE** to the Fuel Clad barrier has been established as either 0" (TAF) or RPV level cannot be determined.

RECOGNITION CATEGORY F**A. Fuel Clad Barrier Example EALS: (Cont.)**

Per the PEI Bases Document, adequate core cooling can be assured if RPV level is maintained greater than 0". At TAF, an emergency depressurization is required per PEI-B13, RPV Control (Non-ATWS) to allow for the injection of low pressure make-up systems, if not already initiated, to restore and maintain RPV water level.

FC2.3 RPV level cannot be determined**Basis:**

The inability to determine RPV water level has also been established as a conservative threshold for a **CHALLENGE** to the Fuel Clad barrier. If RPV water level CANNOT be determined per PEI-B13, RPV Control (Non-ATWS), the operator is directed to emergency depressurize to ensure core submergence. If RPV level can still NOT be restored, the operator is directed to enter PEI-B13, Containment Flooding, thus creating the sequence described above for a **LOSS**.

Deviations/Comments:

While criteria that "RPV water level CANNOT be determined" is listed as a CHALLENGE to the Fuel Clad barrier, this condition was not listed under RCS LOSS. Per NUMARC/NESP-007, conditions should be based on known RPV water level indications less than TAF. It should be noted however, that per PEI-B13 (RPV Control) if RPV water level cannot be determined, emergency depressurization is required. Thus, the RCS LOSS criteria under REACTOR PRESSURE CONTROL is met.

RECOGNITION CATEGORY E**A. Fuel Clad Barrier Example EALS: (Cont.)****3. Drywell Radiation Level****LOSS**

FC3.1 Drywell radiation monitor reading greater than 4000 (~~site-specific~~) R/hr.

Basis:

A 4,000R/hr reading on 1D19-R100A or 1D19-R100B 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 mCi/gm dose equivalent I-131 into the Drywell atmosphere. FCR16986 indicates that 4,155 R/hr correlates to approximately 2% clad failure. For readability this value was rounded conservatively to 4,000 R/hr.

This value is higher than that specified for RCS barrier LOSS. Thus, this EAL indicates a loss of both Fuel Clad barrier and RCS barrier.

NOTE: It is important to recognize that in the event the radiation monitor is sensitive to shine from the reactor vessel or piping, spurious readings will be present and another indicator of fuel clad damage is necessary.

Deviations/Comments:

LOSS based on Drywell Radiation was derived using the high-range monitor dose rate plots provided under Attachment 1 to Perry SP-810-07. Also, included as Attachment 2 to this document, is the technical bases package for these curves.

RECOGNITION CATEGORY F**A. Fuel Clad Barrier Example EALS: (Cont.)****4. ~~Other Indications~~****~~LOSS~~**

~~FC4.1 (site specific) as applicable~~

~~POTENTIAL LOSS~~

~~FC4.2 (site specific) as applicable~~

5. Emergency ~~Director~~ Coordinator Judgment**LOSS**

FC5.1 Any condition that in the judgment of the Emergency Coordinator
~~Director~~ that indicates loss of the fuel cladding barrier

~~POTENTIAL LOSS CHALLENGE~~

FC5.2 Any condition that in the judgment of the Emergency Coordinator
~~Director~~ that indicates potential loss of the fuel cladding barrier

Basis:

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

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS:****1. ~~RCS Leak-Rate~~ Reactor Coolant System Bypass****LOSS**

RCS1.1 ~~(site specific) indication of main steam line~~ MSL break exceeding one or more MSIV Tech. Spec isolation setpoints
AND
Containment penetration does NOT isolate on a valid closure signal
AND
Immediate Operator actions in the Control Room are NOT successful in isolating affected penetration.

Basis:

A RCS **LOSS** is limited to RCS inventory loss due to a MSL break outside Containment. The magnitude of the break is quantified by requiring that plant conditions result in an automatic MSIV isolation signal per Technical Specification Table 3.3.2-2.

The integrity of other reactor support systems, applicable under PEI-N11, Containment Leakage Control, are evaluated as a RCS barrier **CHALLENGE**.

An **RCS LOSS** due to an RCS bypass scenario is focusing on the unsuccessful isolation of a MSL break. The successful isolation of a MSL break would be classified under Event Categories 'G and H', based on its radiological in-plant and offsite effluent significance.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)**

The failure of the affected MSL to isolate is defined by all of the following criteria:

- Containment penetration does NOT close on a valid isolation signal. This criteria refers to the successful automatic closure of at least one Main Steam Isolation Valve (MSIV) in an affected MSL. Redundant closure of both the inboard and outboard MSIVs is NOT required. Operators should assess whether isolation is successful based on available Control Room indication.
- Immediate Operator actions in the Control Room are NOT successful in isolating the affected MSL. This criteria is limited to actions taken to remotely isolate the penetration from the Control Room panels within the first 5 minutes after the failure to isolate is identified. Actions taken to dispatch personnel in-plant to attempt to manually close a valve to isolate the penetration are NOT considered.

Deviations/Comments:

Classification is NOT required for a MSL break which has successfully isolated. This decision is consistent with the response to Question #4 under BWR fission product barrier per NUMARC/NESP-007 (Rev. 2) "Questions and Answers" (dated June 1993).

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)****POTENTIAL LOSS CHALLENGE**

RCS1.2 ~~RCS leakage greater than 50 gpm inside the drywell~~

Deviations/Comments:

RCS leakage GREATER THAN 50 GPM inside the drywell, indicating a potential loss of the RCS, was deleted. The Perry Plant does not have installed instrumentation that will monitor an unidentified leak of this magnitude. MAAP analysis TRANLEAK, performed under FCR 17163, assumes a transient (reactor scram and vessel isolation) with subsequent High Pressure Spray (HPCS) injection, no Drywell or Containment heat removal, and a RCS leak rate of 56 gpm. Based on this analysis, the isolation setpoint of 1.68 psig Drywell pressure is reached in 4.2 minutes. A Containment isolation would therefore occur at 1.68 psig, isolating both the Drywell floor and equipment drains and eliminating the plants ability to further quantify the leakage. This conclusion is based on the fact that no direct means of quantifying the leak rate is available to the Control Room, as indicated by the following:

- The instantaneous readout instrumentation available to the Control Room Operator peaks out at 10 gpm. Therefore, further assessment of the magnitude of the leak rate would be the duty of the Radwaste Operator based on the rate of increase observed on the Floor Drain Collector Tank, which has a 35,000 gallon capacity with level instrumentation increments of 500 gallons.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)**

- Any leakage in Containment would be collected by either the floor drains and, possibly, the equipment drains. For a 50 gpm leak, approximately 5 minutes would elapse before the drywell Floor Drain Sump Pump starts at approximately 255 gallons and initiates flow to the Floor Drain Collector Tank [Ref.: SDM G50 and G61].

Therefore, a leak rate of approximately 56 gpm would not be detectable in the Radwaste Control Room prior to Containment isolation. Minimum accuracy on the Floor Drain Collector Tank would also make it impossible for the Radwaste Operator to perform an accurate measurement.

RCS1.3

~~Unisolable primary system leakage outside drywell as indicated by area temperature or area radiation alarm.~~
~~One or more of the Maximum Safe Operating conditions per PEI-N11 has been exceeded~~

~~AND~~

~~Containment penetration does NOT isolate on a valid closure signal~~

~~AND~~

~~Immediate operator actions in the Control Room are NOT successful in isolating affected penetration.~~

Basis:

A **CHALLENGE** to the RCS barrier is indicated by an unisolated RCS leakage outside Containment from reactor support systems. MSL breaks are considered under RCS **LOSS**. Entry into PEI-N11, Containment Leakage Control, is listed to qualify affected systems, plant areas and establish severity threshold.

Per the PEI Bases Document, the purpose of PEI-N11 is to protect equipment in the Annulus and surrounding Containment, limit radioactive releases to the Annulus and surrounding Containment integrity or limit radioactivity release from the Annulus and surrounding Containment.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)**

PEI-N11 Maximum Safe Operating Condition values are used to quantify the magnitude of the Reactor Coolant System leak and provide site-specific indications. Per the PEI Bases Document under PEI-N11, these conditions are the highest parameter value at which either: (1) equipment necessary for safe shutdown of the plant will fail; or (2) personnel access necessary for the safe operation of the plant will be precluded.

The failure to isolate the affected system is defined by all of the following criteria:

- Containment penetration does NOT close on a valid isolation signal. This criteria refers to the successful automatic closure of at least one isolation valve in an affected system. Redundant closure of both the inboard and outboard isolation valves, if applicable, is not required. Operators should assess whether isolation is successful based on Control Room indication.
- Immediate Operator actions in the Control Room are NOT successful in isolating the affected penetration: This criteria is limited to actions taken to remotely isolate the penetration from the Control Room panels within the first 5 minutes after the failure to isolate is identified. Actions taken to dispatch personnel in-plant to attempt to manually close a valve/ damper to isolate the penetration are NOT considered.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)****2. Drywell Pressure****LOSS**

RCS2.1 Drywell Pressure greater than (~~site specific~~) 1.68 psig
AND
Indication of RCS leakage inside the Drywell.

Basis:

A Drywell pressure of 1.68 psig is used per PEI-T23, Containment Control (Pressure), to indicate a LOSS of RCS barrier integrity. This threshold addresses a loss of coolant accident (LOCA) due to breaks inside the Drywell and is an easily identifiable reactor scram setpoint.

The qualifier of "indication of RCS leakage inside Drywell" (e.g., an increase in Drywell Floor Sump Fill Rate), is included as an indicator of RCS boundary degradation and eliminates requirement to classify based on a Drywell pressure increase due to a loss of Drywell ventilation/cooling.

Deviations/Comments:

Under a RCS LOSS due to high Drywell pressure, the qualifier "with indication of leakage inside the Drywell" was inserted to the Drywell isolation setpoint of 1.68 psig. The use of the qualifier "indication of RCS leakage inside Drywell," under the DRYWELL PRESSURE category for a RCS LOSS, is consistent with the response to Question #6 under BWR fission product barrier in NUMARC/NESP-007 (Rev. 2) "Questions and Answers" (dated June 1993).

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)****3. Drywell Radiation Monitoring****LOSS**

RCS3.1 Drywell radiation monitor reading greater than ~~(site-specific)~~
135 R/hr.

Basis:

A 135 R/hr reading on 1D19-R100A or 1D19-R100B is used to indicate a **LOSS** of the RCS barrier. The threshold of 138.5 R/hr was determined under FCR 16986 and was conservatively rounded off to 135 R/hr for readability. This value assumes an instantaneous release and dispersal of the reactor coolant noble gas and iodine inventory associated with Technical Specification 3.4.5 limit concentrations into the Drywell atmosphere at shutdown.

A 135 R/hr reading is less than that specified for Fuel Clad barrier loss. Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading increased to that value specified by Fuel Clad barrier, fuel damage would also be indicated.

Deviations/Comments:

RCS LOSS threshold based on DRYWELL RADIATION was derived using the high-range monitor dose rate plots contained in Attachment 2 to Perry SP-810-07. Also included, as Attachment 2 to Perry SP-810-07, is the technical bases package for these curves.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)****4. Reactor Pressure Vessel ~~Water~~ Level****LOSS**RCS4.1 Level less than ~~(site-specific)~~ 0" value**Basis:**

A **LOSS** of RCS barrier integrity has been defined as water level less than 0" (TAF). Per the NUMARC/NESP-007, a RCS **LOSS** is considered the same as a **CHALLENGE** to the Fuel Clad barrier for a known LOCA resulting in RPV water level dropping below TAF. Thus, this condition appropriately escalates the emergency classification to a Site Area Emergency.

5. Reactor Pressure Control ~~Other Indications~~**LOSS**RCS5.1 ~~(site-specific)~~ as applicableEither:SRV stuck openORAn SRV is being cycled to control RPV pressureANDSample activity equal to or greater than 300 μ Ci/gm dose equivalent Iodine-131**Basis:**

A loss of the RCS under this category focuses on the intentional bypassing of the RCS barrier. Specific plant conditions requiring emergency RPV depressurization are given in the individual PEIs and are listed in the PEI Bases Document under PEI-B13, Emergency Depressurization.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)**

RCS 5.2 Emergency Depressurization is required

Basis:

A LOSS of the RCS under this category focuses on the intentional bypassing of the RCS barrier via the SRVs as a means of pressure control. The EAL indicators listed above compromise RCS integrity and creates a direct release path for fission products to the Suppression Pool.

Credit should be given for the actions taken under ONI-B21 to successfully close a stuck open SRV.

POTENTIAL LOSS CHALLENGE

RCS5.3 ~~(site specific)~~ as applicable

6. Emergency Coordinator ~~Director~~ Judgment**LOSS**

RCS6.1 Any condition that in the judgment of the Emergency Coordinator ~~Director~~ that indicates loss of the RCS barrier

Potential Loss Challenge

RCS6.2 Any condition that in the judgment of the Emergency Coordinator ~~Director~~ that indicates potential loss of the RCS barrier.

RECOGNITION CATEGORY F**B. RCS Barrier Example EALS: (Cont.)****Basis:**

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

C. Primary Containment Barrier Example EALs:**1. Drywell Containment Pressure/Containment Hydrogen****LOSS**

PC1.1 ~~Rapid unexplained decrease following initial increase~~

Deviations/Comments:

A Containment **LOSS** based on a rapid unexplained decrease of Containment pressure (i.e., not attributed to Containment Spray or condensation effects) following an initial increase is addressed under the Emergency Coordinator Judgment category. Containment pressure will increase as a result of the mass and energy release into the Drywell from a LOCA. Thus, Containment pressure not increasing under these circumstances might indicate a LOSS of Containment integrity.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****PC1.2 ~~Drywell pressure response not consistent with LOCA conditions~~
Intentional venting of Containment per PEI-T23****Basis:**

A Containment barrier **LOSS** is based on the intentional venting of Containment being required per PEI-T23 to prevent exceeding the Primary Containment Pressure Limit (PCPL). The PCPL ensures that pressure is maintained below the most limiting factor based on the Perry Plant design, which is the pressure capability of Containment. The limiting component for the PCL curve is the Containment Equipment Hatch.

Per the PEI Bases Document under PEI-T23, Containment Control (Pressure), the PCL is a combination of the PCPL and the Maximum Containment Water Level Limit (MCWLL). PEI-T23, Containment Control, directs Operator actions to mitigate increases in Containment pressure to prevent exceeding the PCL.

The MCWLL ensures that Containment water level is kept below the level which will result in exceeding the pressure capability of Containment. With Containment water level above PCL, as a result of Containment Flooding efforts, integrity can no longer be assured. Therefore, irrespective of whether adequate core cooling is assured, injection into Containment from systems which can only take suction from outside Containment, must be terminated.

Deviations/Comments:

Under LOSS to the Primary Containment Barrier based on Drywell/Containment pressure, criteria stating "Containment pressure response following a LOCA is not consistent with the LOCA condition" was deleted. This indication is considered too vague for the Emergency Coordinator to analyze and implies that the LOCA response for Containment will flow a pre-analyzed response time. It is unlikely that a LOCA, should it occur, will elapse exactly as previously analyzed, and then continue exactly as mathematical models may predict. Emergency Coordinator judgment is still available under the Table A-1 criteria if Technical Support Center (TSC) engineers do not believe that Containment is performing as designed under LOCA conditions.

RECOGNITION CATEGORY E**C. Primary Containment Barrier Example EALs: (Cont.)****PC1.3 Intentional Venting of Containment per PEI-M51/M56****Basis:**

PEI-M51/M56, Hydrogen Control, provides Operator actions to mitigate the buildup of hydrogen concentrations in Drywell and Containment and prevent the Hydrogen Deflagration Overpressure Limit (HDOL) from being exceeded.

Per the PEI Bases Document under PEI-M51/M56, Hydrogen Control, the HDOL curve assures that the postulated combustion of hydrogen and oxygen will not result in sufficiently high pressure that will cause the structural failure of Containment or adversely affect Drywell integrity.

A barrier **LOSS** shall therefore be implied due to the intentional venting of Containment per PEI-M51/M56 which purposely bypasses the Containment barrier.

Deviations/Comments:

Criteria established for Containment LOSS based on intentional venting per PEI-M51/M56, prior to exceeding the HDOL. Criteria reflects an intentional bypassing of Containment and is consistent with Containment LOSS due to intentional venting per PEI-T23, Containment Control, prior to exceeding PCL.

PC1.4 (site-specific) Containment pressure is greater than 15 psig and increasing**Basis:**

A Containment pressure of 15 psig and increasing was selected since at this point preparations are taken per PEI-T23, Containment Control (Pressure), to vent Containment prior to exceeding the Primary Containment Limit (PCL). This criteria therefore indicates a clear **CHALLENGE** to Containment. Refer to PC1.2 for a Containment **LOSS** based on intentionally venting to prevent exceeding PCL.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****POTENTIAL LOSS CHALLENGE**

PC1.5 ~~Explosive mixture exists~~

Basis:

See PC1.3

Deviations/Comments:

Criteria not provided for a Containment CHALLENGE due to an explosive mixture. Actions per PEI-M51/M56 are intended to preclude conditions which would result in a CHALLENGE to Containment. Ability to maintain the core covered, and therefore prevent the generation of hydrogen, is covered under the REACTOR PRESSURE VESSEL LEVEL category as a Containment CHALLENGE.

PC1.6 In the UNSAFE region on the HCL figure

Basis:

In the UNSAFE region on the Heat Capacity Limit (HCL) figure, due to either:

- (a) Suppression Pool temperature above the Heat Capacity Temperature Limit (HCTL). Per the PEI Basis Document PEI-T23, Containment Control (Suppression Pool Temperature), the HCTL is defined to be the highest Suppression Pool temperature at which initiation of RPV depressurization will not result in exceeding: (1) the suppression chamber design temperature OR (2) the PCL before the rate of energy transfer from the RPV to the Containment is within the capacity of the Containment vent. This temperature is a function of RPV pressure, and the limit is used to prevent failure of the Containment or equipment necessary for the safe shutdown of the plant.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)**

- (b) Suppression Pool level below the Heat Capacity Level Limit (HCLL). Per the PEI bases Document PEI-T23, Containment Control (Suppression Pool Temperature), the HCLL is defined to be the higher of either: (1) two feet above the elevation of horizontal vents (14.25 feet); or (2) the lowest water level at which initiation of RPV depressurization will not result in exceeding the HCTL. The HCLL is used in conjunction with the HCTL to prevent failure of the Containment or failure of equipment necessary for the safe shutdown of the plant, and to prevent loss of the pressure suppression function of the Containment.

2. Containment Isolation Valve Status After Containment Isolation Signal**LOSS**

PC2.1 ~~Failure of both valves in any one line to close and downstream pathway to environment exists~~

Containment penetration does NOT isolate on a valid closure signal

AND

Immediate Operator actions in the Control Room are NOT successful in isolating affected penetration

AND

Pathway to the environment exists via penetration

AND Either:

- One or more of the Maximum Safe Operating Conditions per PEI-N11 has been exceeded

OR

MSL break in the Turbine Building indicated by either:

- elevated TB radiation levels
- MSL pressure less than Tech. Spec. Table 3.3.2-2 isolation setpoint
- TB area temperatures greater than Tech. Spec. Table 3.3.2-2 isolation setpoint

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****Basis:**

A **LOSS** of Containment barrier integrity is defined by either of the following conditions:

- Failure of both isolation valves in any one line to close AND downstream pathway to the environment exists, as indicated by all of the following:
 - (a) Containment penetration does NOT close on a valid isolation signal. This criteria refers to the successful automatic closure of at least one isolation valve in an affected system. Redundant closure of both the inboard and outboard isolation valves, if applicable, is not required.
 - (b) Immediate Operator actions in the Control Room are NOT successful in isolating the affected penetration. This criteria is limited to actions taken to remotely isolate the penetration from the Control Room panels within the first 5 minutes after the failure to isolate is identified. Actions taken to dispatch personnel in-plant to attempt to manually close a valve/damper to isolate the penetration are NOT considered.
 - (c) Pathway to the environment exists via the penetration. The intent of this criteria is NOT to consider a **LOSS** in Containment simply due to the failure of a penetration to isolate when commanded, which is covered under Technical Specifications. The concern is that a pathway exists through a break or system penetration which would in effect bypass Containment creating a pathway to the environment outside the normal process stream or with the normal filtration path NOT intact. For example, a failure of the MSIVs on a given MSL where a pathway exists to the Main Condenser, in which a vacuum is maintained via the SJAEs through Off-gas, is NOT considered a pathway to the environment.

Normal system leakage is NOT considered.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)**

- Unisolable primary system leakage outside Containment, as indicated by:
 - (a) Primary system discharging outside Containment. Criteria refers to a break or failure to isolate which results in a loss of RCS inventory, greater than normal system leakage, outside Containment.

The magnitude of the break is quantified by either of the following criteria being met for a pipe break outside Containment:
 - (b) One or more of the Maximum Safe Operating Conditions listed under PEI-N11 has been exceeded. Per the PEI Bases Document under PEI-N11, these conditions are the highest parameter values at which either: (1) equipment necessary for safe shutdown of the plant will fail; or (2) personnel access necessary for the safe operation of the plant will be precluded.
 - (c) Indication of a MSL break in the Turbine Building. Since a MSL break in the Turbine Building is outside the scope of PEI-N11, the magnitude of the MSL break is based on either a corresponding MSL low pressure and elevated Turbine Building temperatures per Technical Specifications Table 3.3.2-2, or elevated Turbine Building radiation levels.

Deviations/Comments:

Under LOSS to the Primary Containment Barrier based on Containment isolation, credit is taken for: (1) the successful isolation of either the inboard or outboard isolation valve in the affected system, if applicable; and (2) immediate operator action to remotely close an isolation valve from the Control Room within the first 5 minutes after discovering the unsuccessful isolation. Change allows for plant design and prompt action by the Operator in accordance with ONI and PEI procedures.

PC2.2 ~~Intentional venting per EOPs~~ See PC1.2

PC2.3 ~~Unisolable primary system leakage outside drywell as indicated by area temperature or area radiation alarm~~ See PC2.1

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****3. ~~Significant Radioactive Inventory in~~ Containment Radiation****POTENTIAL LOSS CHALLENGE**

PC3.1 Containment radiation monitor reading greater than ~~(site-specific)~~
20,000 R/hr.

Basis:

A 20,000 R/hr reading on 1D19-R200A or 1D19-R200B is used to indicate **CHALLENGE** to the Containment barrier. This level of activity is indicative of approximately 20% clad damage. Per FCR 16986, 20,000 R/hr is based on the containment radiation monitor reading associated with 10% failed fuel from NUS Letter SP-810-07, Attachment 1 (Curve 3), which was doubled to account for 20% fuel failure. It is a value that indicates significant fuel damage well in excess of that associated with the **LOSS** of both Fuel Clad and RCS barriers.

A radioactive release requiring offsite protective actions is not possible unless a major fuel cladding failure allows radioactive material to be released from the core into the reactor coolant. This amount of activity in Containment, if released, would have severe consequences justifying a **CHALLENGE** to Containment. As such a General Emergency declaration is warranted.

Deviations/Comments:

Attachment 2 to NUS Letter SP-810-07 contains the technical bases for Attachment 1 curves.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****4. Reactor Pressure Vessel ~~Water~~ Level****POTENTIAL LOSS CHALLENGE**

PC4.1 ~~Reactor vessel water level less than (site specific) value and the maximum core uncover time limit is in the unsafe region.~~
Entry into PEI-T23, Containment Flooding

Basis:

A **LOSS** to the Containment barrier is defined as the inability to provide adequate core cooling to an extent requiring Primary Containment Flooding. This logic is consistent with the Containment **LOSS** criteria under Containment Hydrogen and Containment Pressure categories due to the intentional venting of Containment per PEI-T23, Containment Flooding, to restore adequate core cooling via submersion.

Deviations/Comments:

Entry into PEI-T23, Containment Flooding,” is used as an indicator of inadequate core cooling and is consistent with Fuel Clad **LOSS** criteria. The entry into PEI-T23 is considered a **LOSS**, and NOT a **CHALLENGE** (potential loss) per NUMARC/NESP-007 Table 3. This decision is based on the intentional venting of the Containment as directed by PEI-T23 to support Containment Flooding. The intentional venting of Containment is used as a **LOSS** criteria under both **CONTAINMENT HYDROGEN** and **CONTAINMENT PRESSURE** categories; therefore, initiation of Containment Flooding is consistent with other Perry Plant Table A-1 criteria and NUMARC/NESP-007 Containment **LOSS** indicators.

NUMARC/NESP-007 Table 3 criteria allowing for the restoration of RPV water level within a specified time duration was deleted. As previously stated, the flooding of Containment to restore adequate core cooling results in an intentional venting and thus bypassing of the Containment barrier.

RECOGNITION CATEGORY F**C. Primary Containment Barrier Example EALs: (Cont.)****5. ~~Other Indications~~****~~LOSS~~**

~~PC5.1 (site specific) as applicable~~

~~POTENTIAL LOSS~~

~~PC5.2 (site specific) as applicable~~

6. Emergency Coordinator ~~Director~~ Judgment**LOSS**

RCS6.1 Any condition that in the judgment of the Emergency ~~Director~~
Coordinator that indicates loss of the containment barrier

~~POTENTIAL LOSS CHALLENGE~~

RCS6.2 Any condition that in the judgment of the Emergency ~~Director~~
Coordinator that indicates potential loss of the containment barrier

Basis:

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

A Containment **LOSS** based on a rapid unexplained decrease of Containment pressure (i.e., not attributed to Containment Spray or condensation effects) following an initial increase is addressed under the Emergency Coordinator Judgment category. Containment pressure will increase as a result of the mass and energy release into the Drywell from a LOCA. Thus, Containment pressure not increasing under these circumstances might indicate a **LOSS** of Containment integrity.

RECOGNITION CATEGORY F**References:**

1. NUMARC/NESP-007 (Rev. 2) Table 3
2. Plant Emergency Instruction (PEI) B13, RPV Control (Non-ATWS), Rev. A
3. Plant Emergency Instruction (PEI) B13, Emergency Depressurize, Rev.†B
4. Plant Emergency Instruction (PEI) B13, RPV Flooding, Rev. A
5. Plant Emergency Instruction (PEI) M51/56, Hydrogen Control, Rev.A
6. Plant Emergency Instruction (PEI) N11, Containment Leakage Control, Rev. B
7. Plant Emergency Instruction (PEI) T23, Containment Flooding, Rev. A
8. Plant Emergency Instruction (PEI) T23, Containment Control, Rev. A
9. Plant Emergency Instruction (PEI) Bases Document, (Rev. 2 / Update 1)
10. Off-Normal Instruction (ONI) N11, Pipe Break Outside Containment, (Rev. 6)
11. Technical Specifications, Perry Nuclear Power Plant, Unit 1, Section 2.1 and Table 3.3.2-2
12. FCR 16986, Calculating Radiation Monitor Readings
13. NUS Letter [PERRY] SP-810-07, Drywell Radiation Plots and Technical Bases, dated 5/10/83
14. NUMARC/NESP-007 (Rev. 2) "Question and Answers", dated June 1993
15. FCR 17163, Table 1 - MAAP Run Results for TRANLEAK
16. System Design Manual (SDM) G50, Liquid Radioactive Waste Systems (Rev. 3)
17. System Design Manual (SDM) G61, Liquid Radwaste Sumps Systems (Rev. 3)
18. System Design Manual (SDM) G50, Floor Drain Collector System (Rev. 4)
19. Off-Normal Instruction (ONI) B21-1, SRV Inadvertent Opening/Stuck Open, Rev. 3/TCN-3

Generic Deviations/Comments:

1. The term "CHALLENGE" used in place of "POTENTIAL LOSS"
2. For a General Emergency declaration under Perry IC AG1 (NUMARC Table 3), the LOSS of a fission product barrier is indicative that a challenge (potential loss) to that barrier has already occurred. Therefore, the LOSS of these three barriers for a General Emergency infers that at least two barriers are lost and a CHALLENGE to the third has occurred.
3. NUMARC IC FA1 is covered under Perry ICs AA1 and AA2 which address a LOSS or CHALLENGE to either the Fuel Clad barrier or RCS barrier separately.

RECOGNITION CATEGORY H

**HAZARDS AND OTHER CONDITIONS
AFFECTING PLANT SAFETY**

RECOGNITION CATEGORY H**UNUSUAL EVENT**

~~HU1~~LU1 Natural OR destructive phenomena affecting the Protected Area boundary

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4 or 5 or 6 or 7)

1. ~~(Site-specific) method indicates felt earthquake.~~

Control Room receives report from plant personnel who felt an earthquake

AND Either:

- WHITE event indicator light on local Seismic Monitoring Panel 0H51-P021.
- AMBER light(s) on Seismic Monitoring Panel 0H13-P969

2. ~~Report by plant personnel of tornado striking within protected area.~~

Report by plant personnel confirming either of the following within the Protected Area boundary:

- tornado strike
- plane or train crash

3. ~~Assessment by the control room that an event has occurred.~~

4. ~~Vehicle crash into plant structures or systems within protected area boundary. See EAL #2~~

5. Report by plant personnel confirming the occurrence of an explosion within a Safe Shutdown Building. See IC FU2

RECOGNITION CATEGORY H

6. ~~Report of turbine failure resulting in casing penetration or damage to turbine or generator seals.~~

Indications in the Control Room of a Main Turbine Trip or failure
AND Either:

- Turbine casing penetration
- Catastrophic damage to generator seals.

7. ~~(Site specific) occurrences.~~

High sustained winds greater than 70 mph for equal to or greater than 15 minutes.

Basis:

The method of detection associated with an earthquake of this intensity is based on the condition for a "felt earthquake" as defined in the EPRI-sponsored "Guidelines for Nuclear Power Plant Response to an Earthquake". These methods include the activation of seismic monitoring instrumentation along with confirmation from plant personnel who have physically felt the ground motion and recognize the event as an earthquake. ONI-D51 provides indication of a measurable earthquake.

The EVENT white indicator light is received by 0.005 g which is the lowest detectable earthquake for which Perry monitors. The amber light is received at 2/3 Operational Basis Earthquake (OBE) or 0.05 g and is listed as a backup to the EVENT indicator to ensure declaration. Section 3.7 "Seismic Design" of the USAR describes the Methodology for measuring the OBE earthquake.

An earthquake of this magnitude may be sufficient to cause some minor damage to plant structures or equipment within the Protected Area. Damage is considered to be minor since it does not affect physical or structural integrity. The event is not expected to affect the capabilities of plant safety functions. Due to the unpredictable nature of earthquakes, this may be a precursor to a more serious event and, therefore, represents a potential degradation in the level of safety of the plant.

A tornado touching down within the Protected Area is an observed event with the potential to cause damage to structures containing systems or functions necessary for the safe shutdown of the plant. As such, the occurrence of a tornado strike represents a potential degradation in the level of safety of the plant. If structural damage is confirmed, this event would be escalated to Alert LA1.

RECOGNITION CATEGORY H

If it is determined that the occurrence of the tornado strike has either affected or caused the loss of shutdown cooling functions, then the consequences of the event are assessed under event category B, "Loss of Shutdown/Cooldown Functions" or Event Category A, "Fission Product Barrier Degradation". The event may then be escalated via these categories if appropriate.

IC LU1 is also intended to address reported crashes such as plane or helicopter crashes or crashes by trains which may occur within the Protected Area. As such, the crash represents a potential degradation of the level of safety of the plant. Damage to plant structures and equipment is considered to be minor, with no impact on their physical or structural integrity.

Personal vehicle crashes are not included since they do not have the potential to impact safe shutdown equipment with sufficient force. Two vehicles involved in an accident in the Protected Area does not require classification.

If the crash is confirmed to affect a safe shutdown area, the event may be escalated to Alert, LA1. Consideration should also be given to any potential security aspect of the crash under Event Category N, "Security Events" for impact with the security boundary or if an individual was attempting to do damage.

High sustained winds in excess of 70 mph is a natural and potentially destructive phenomena that may accompany certain events such as a tornado or hurricane. These sustained high winds may also be produced by unstable weather conditions. However this event occurs, it may be a precursor to a more serious event and, therefore, represents a potential degradation in the level of safety of the plant.

Turbine failure of sufficient magnitude to cause observable damage to the turbine casing or seals increases the potential for leakage of combustible fluids and gases (hydrogen cooling) to the Turbine Building. The damage must be readily observable and should not require equipment disassembly to locate.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HU1
2. Guidelines for Nuclear Power Plant Response to an Earthquake, EPRI
3. Updated Safety Analysis Report (USAR), Chapters 3.3.1, 3.3.2 and 3.7
4. Off-Normal Instruction (ONI) D51, Earthquake (Rev. 4)

RECOGNITION CATEGORY H**Deviations/Comments:**

1. The explosion EAL was moved to Event Category F, "FIRE", to be consistent with the Fire Alert FA1, and to avoid Emergency Coordinator confusion.
2. NUMARC Example EAL #3 "Assessment by the Control Room that an event has occurred" is not included in the Perry EALs. This EAL is redundant with and is included in Perry EAL OU1, "Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Unusual Event.'

RECOGNITION CATEGORY H**UNUSUAL EVENT**

HU2FU1 Fire within a Safe Shutdown Building ~~protected area boundary~~ NOT extinguished within 15 minutes ~~of detection~~.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~Fire in buildings or areas contiguous to any of the following (site specific) areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:~~

~~• (Site specific) list~~

Fire within any Safe Shutdown Building

AND

Fire CANNOT be extinguished within 15 minutes of either of the following:

- Verification of alarm.
- Notification received in the Control Room from plant personnel that a fire exists.

Basis:

A fire is as defined in PAP-1911, "Fire Emergency."

This IC and its associated EAL address fires that are of sufficient magnitude that they may be potentially significant precursors to damage to safety systems. This excludes items such as fires within administrative buildings or other structures not contiguous with a Safe Shutdown Building, and other fires of no safety consequence or threat to a Safe Shutdown Building.

Verification in this context means those actions taken in the Secondary Alarm Station (SAS) to determine that the alarm is not spurious. Verification includes the receipt of multiple/independent alarms or confirmation of a single detector by visual inspection of the affected area by a first responder.

RECOGNITION CATEGORY H

If an inspection of the area is completed within 15 minutes with no evidence of a fire, i.e., spurious alarm, no declaration need be made. The 15 minute time frame has been established to exclude small fires that can be controlled by Fire Brigade resources and have no impact on the performance of required safe shutdown systems or components.

Notification includes all verbal means of learning of a fire.

For the purposes of this IC, Safe Shutdown Buildings/areas are considered to be the following locations:

- Control Complex (all elevations)
- Auxiliary Building (all elevations)
- Intermediate Building (all elevations)
- Fuel Handling Building (all elevations)
- Reactor Building (all elevations)
- Emergency Service Water Pump House (all elevations)
- Electrical Duct Chase Leading to ESW Building
- Diesel Generator Building (all areas except the Unit 2 Division 1, 2, and 3 Rooms)
- Steam Tunnel (all elevations)
- Diesel Generator Fuel Oil Storage Area
- Condensate Storage Tank
- Intake/Discharge Structure

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HU2
2. Updated Safety Analysis Report (USAR), Chapter 9 and Appendix 9A
3. Fire Protection Evaluation Report (Rev. 4), Sections 3 and 4, Table 3-1
4. Appendix R - Evaluation, Safe Shutdown Capability Report (Rev. 5) Section 4
5. Plant Administrative Procedure (PAP) 1911, Fire Emergency (Rev. 4)

Deviations/Comments:

1. Rather than list the rooms and areas where safe shutdown equipment are located, the entire building will be included and will envelope all areas "contiguous" with these rooms. The walls of these buildings are all 3 hour fire rated barriers. Any fire outside to these buildings will not be classified.

RECOGNITION CATEGORY H**UNUSUAL EVENT**

HU3MU1 Release of toxic OR flammable gases affecting the Protected Area boundary deemed detrimental to safe operation of the plant.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Report or detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect normal operation of the plant.~~

Toxic or explosive gas concentrations detected within the Protected Area

AND

Normal operation of the plant is impeded due to access restrictions.

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

Control Room informed by local, county, or State officials to evacuate non-essential personnel due to an offsite gas release.

Basis:

This IC and its associated EALs are based on gas releases within the Protected Area boundary in concentrations that may affect the health of plant personnel or the safe operation of the plant. This includes gas releases that originate both onsite as well as offsite, and threaten onsite areas.

A toxic gas is considered to be any gas that is dangerous to life or limb by reason of inhalation or skin contact. A combustible gas, if maintained at a concentration lower than the Lower Explosive Limit (LEL) will not explode due to ignition.

RECOGNITION CATEGORY H

A toxic or flammable gas release is considered to be impeding normal operations due to access restrictions if it is of sufficient magnitude that access to areas normally accessed to plant operator rounds is restricted. It also includes releases where access to these areas is possible only through the use of protective equipment such, as respirators since this limits the operators visibility and mobility thereby affecting "normal" plant operations. It should not be considered to include "confined spaces" that do not require normal access and must be ventilated prior to entry or situations where the Fire Brigade is using respiratory equipment to protect themselves from the gases released from a fire unless the gases are of such quantity that they also affect personnel not involved in the fire fighting effort.

An offsite event (such as a tanker truck accident releasing toxic gases) may place the Protected Area within the evacuation area.

Site assessment, response, and reportability actions shall be in accordance with PAP-0806.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HU3
2. Plant Administrative Procedure (PAP) 0806, Oil/Chemical Release Contingency Plan (Rev. 2)

Deviations/Comments:

1. The wording of NUMARC IC, "Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant", was changed to more closely reflect the intent of the NUMARC basis while maintaining consistency of philosophy between Unusual Events LU1, HU1, MU1. The NUMARC basis for this Initiating Condition "... is based on releases ...within the site boundary ...". However, it is believed that the site boundary referred to here is a generic term and is not intended to reflect the entire site Owner Controlled Area. Unusual Events EU1 and EU2, which also evaluate potential hazards, limit their scope to the Protected Area. The NUMARC basis also indicates that one aspect of this event is the effect it has on normal operation of the plant. Releases that do not affect the Protected Area would not impact normal operation of the plant.

RECOGNITION CATEGORY H**UNUSUAL EVENT**

HU4NU1 Confirmed security event which indicates a potential degradation in the level of safety of the plant.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Bomb device discovered within plant protected area and outside the plant vital area.~~

Any security event resulting in the declaration of a SECURITY ALERT in accordance with the PNPP Physical Security Plan.

2. ~~Other security events as determined from (site specific) Safeguards Contingency Plan.~~

Basis:

Events which are believed by the Emergency Coordinator to indicate a potential degradation of the level of safety of the plant should be declared an Unusual Event. Potential degradation of the level of safety of the plant is indicated primarily, but not exclusively, by exceeding plant Technical Specification LCOs. Precursors of more serious events (e.g., degrading trends) are also included because precursors represent a potential degradation in the level of safety of the plant.

Security events, which represent a potential degradation of the level of safety of the plant, are addressed by the PNPP Physical Security Plan and would result in the declaration of a Security Alert. Therefore, these items are not specifically reiterated here.

An increase in the security posture to a Security Emergency will escalate this event to Alert NA1. Security events which do not represent at least a potential degradation in the level of safety of the plant are reported under 10CFR73.71 or in some cases 10CFR50.72.

RECOGNITION CATEGORY H**References:**

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HU3
2. PNPP Physical Security Plan (Rev. 21)

Deviations/Comments:

1. NUMARC EAL Statement, "Bomb device discovered within plant Protected Area and outside the plant Vital Area", was not included as a separate statement in the Perry IC. It is implicit in the EAL as written.

RECOGNITION CATEGORY H**UNUSUAL EVENT**

HU5OU1 Other conditions existing, which in the judgment of the Emergency ~~Director~~ Coordinator, warrant declaration of an Unusual Event.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation of the level of safety of the plant.~~

Events are in process or have occurred which indicate a potential degradation of the level of safety of the plant.

Basis:

Events which are believed by the Emergency Coordinator to indicate a potential degradation of the level of safety of the plant should be declared an Unusual Event. For those cases where the degradation in the level of safety of the plant is tied to equipment or system malfunctions, the decision that the component is degraded should be based upon its functionality and not its operability.

A system, subsystem, train, component or device, though degraded in equipment condition or configuration, is functional if it is capable of maintaining respective system parameters within acceptable design limits.

Releases of radioactive material requiring offsite response or monitoring are not expected to occur at the Unusual Event level unless further degradation of safety systems occur. However, if one does occur, it will be classified under IC GU1.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HU5

RECOGNITION CATEGORY H

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**ALERT**

~~HA1~~LA1 Natural OR destructive phenomena affecting the Safe Shutdown Buildings plant vital area.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2 or 3 or 4 or 5 or 6 or 7)

1. ~~(Site-specific) method indicates seismic event greater than Operating Basis Earthquake (OBE).~~

Control Room receives report from plant personnel who felt an earthquake.

AND Either:

- YELLOW seismic switch indicator light on local Seismic Monitoring Panel 0H51-P021.
- RED light on Seismic Monitoring Panel 0H13-P969.

2. ~~Tornado or high winds striking plant vital areas: Tornado or high winds greater than (site-specific) mph strike within the protected area boundary.~~

Report by plant personnel confirming either of the following striking a Safe Shutdown Building:

- tornado
- aircraft, barge or train crash

OR

High sustained winds with a velocity greater than 90 mph for equal to or less than 15 minutes.

RECOGNITION CATEGORY H

3. ~~Report of any visible structural damage on any of the following plant structures:~~

- ~~• Reactor building~~
- ~~• Intake building~~
- ~~• Ultimate heat sink~~
- ~~• Refueling water storage tank~~
- ~~• Diesel generator building~~
- ~~• Turbine building~~
- ~~• Condensate storage tank~~
- ~~• Control room,~~
- ~~• Other (site specific) structures~~

4. ~~(Site specific) indications in the control room.~~

5. ~~Vehicle crash affecting plant vital areas.~~

See EAL #2

6. ~~Turbine failure generated missiles result in any visible structural damage to or penetration of any of the following plant areas: (site specific) list.~~

Report by plant personnel confirming a turbine failure which results in penetration of the turbine casing.

AND

Missiles generated from the turbine failure result in damage to Safe Shutdown equipment.

7. ~~(Site specific) occurrences.~~

Greater than PEI-N11 Maximum Safe Operating Value for Area Water Level (internal flooding)

Basis:

Each of these EALs is intended to address events that may have resulted in Safe Shutdown Buildings being subjected to forces beyond design limits, and thus damage may be assumed to have occurred to safe shutdown systems. The initial "report" should not be interpreted as mandating a lengthy damage assessment prior to classification. No attempt is made in these EALs to assess the actual magnitude of the damage.

RECOGNITION CATEGORY H

The declaration of an Alert and the activation of the TSC will provide the Emergency Coordinator with the resources needed to perform these damage assessments subsequent to the classification.

Escalation to a higher emergency class, if appropriate, will be based on the specific system malfunctions, fission product barrier degradation, abnormal radiological releases, or Emergency Coordinator judgment ICs.

Safe Shutdown Equipment refers to equipment identified in the USAR Appendix 9A. This is the minimum list of equipment required to achieve and maintain COLD SHUTDOWN (including all auxiliary equipment such as AC/DC power, cooling water and instrumentation). A detailed list is provided in the "Appendix R Evaluation - Safe Shutdown Capability Report."

Safe Shutdown Equipment list: (Division 1 and 2 only)

- Reactor Protection System
- Control Rod Drive Hydraulics
- Automatic Depressurization System/SRV
- Reactor Core Isolation Cooling
- Low Pressure Core Spray
- Low Pressure Coolant Injection - A/B/C
- Suppression Pool Cooling
- Shutdown Cooling
- Safety-Related Instrument Air
- Emergency Service Water
- Emergency Service Water Screen Wash
- Emergency Service Water Pump House Ventilation
- ECCS Pump Room Cooling System
- Diesel Generator Building Ventilation
- Stand-by Diesel Generator (DG)
- DG Fuel Oil Storage/Transfer
- Electrical Power Distribution
- Emergency Closed Cooling Pump Area Cooling
- Emergency Closed Cooling
- Control Complex Chilled Water
- MCC, Switchgear and Miscellaneous Electrical Equipment Areas HVAC System
- Battery Room Exhaust
- Control Room HVAC and Emergency Recirculation System

RECOGNITION CATEGORY H

For the purposes of this IC, Safe Shutdown Buildings/Areas are considered to be the following locations:

- Control Complex (all elevations)
- Auxiliary Building (all elevations)
- Intermediate Building (all elevations)
- Fuel Handling Building (all elevations)
- Reactor Building (all elevations)
- Emergency Service Water Pump House (all elevations)
- Electrical Duct Chase Leading to ESW Building (includes 2 manways per division)
- Diesel Generator Building (all areas except the Unit 2 Division 1, 2, and 3 DG Rooms)
- Steam Tunnel (all elevations)
- Diesel Generator Fuel Oil Storage Area
- Condensate Storage Tank
- Intake/Discharge Structure

An earthquake that exceeds the Operating Basis Earthquake level (0.075 g) is beyond the design basis limits for the plant as specified in USAR Section 3.7, Seismic Design. A seismic event of this magnitude can cause damage to safety related systems and functions. ONI-D51 provides indication of a measurable earthquake.

Detection of this event includes activation of seismic monitoring instrumentation along with confirmation from plant personnel who have physically felt the associated ground motion. An evaluation along with a thorough inspection of plant areas and systems will be used to determine the extent of plant damage and will provide the necessary information to determine if escalation to a higher emergency classification is required.

Maximum Safe Operating Values for "Area Water Level," as defined in PEI-N11, are used to quantify the magnitude and significance of plant internal flooding. These "area water level" values are all based on equipment qualifications, and are identifiable either by installed instrumentation or water level reference wall-markings in affected plant areas.

RECOGNITION CATEGORY H**References:**

1. NUMARC/NESP-007 (Rev. 2), Alert HA1
2. Off-Normal Instruction (ONI) D51, Earthquake (Rev. 4)
3. Plant Emergency Instruction (PEI) N11, Containment Leakage Control, (Rev. B)
4. Updated Safety Analysis Report (USAR), Chapters 3.3.1, 3.3.2 and 3.7
5. Fire Protection Evaluation Report (Rev. 4), Section 3 and Table 3-1
6. Appendix R - Evaluation, Safe Shutdown Capability Report (Rev. 5), Sections 2 and 4

Deviations/Comments:

1. NUMARC IC Statement, "Natural and Destructive Phenomena Plant Vital Areas," was changed to "Natural and Destructive Phenomena Affecting Safe Shutdown Buildings." At the Perry Nuclear Power Plant, Safe Shutdown Buildings include buildings containing safe shutdown equipment (Appendix R).
2. NUMARC EAL Statement: "(Site-specific) indications in the Control Room", is not included in the Perry EALs.

The NUMARC Basis for this EAL states: "EAL 4 should specify the instrumentation or indications including judgment which are to be used to assess occurrence." This is not substantially different from NUMARC Alert HA6, "Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of an Alert", and is already addressed by Perry IC OA1, "Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Alert."

3. Elevated ground water level is not considered a credible scenario to subject plant vital areas to forces beyond design limits. By design the Underdrain System (P72) consists of separate mechanical pumping and gravity drain subsystems. Both subsystems are designed to prevent the buildup of hydrostatic pressure under building foundations from exceeding a condition equivalent to a static water surface elevation of 590'0. Based on the system design basis, discussed in USAR Section 2.4.13.5.2, a credible scenario does not exist for ground water to exceed the design limit of 618'0.

RECOGNITION CATEGORY H**ALERT**

HA2FA1 Fire OR explosion affecting the operability of plant safety systems required to establish or maintain safe shutdown.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~The following conditions exist:~~
 - a. ~~Fire or explosion in any of the following (site-specific) areas:~~
~~• (Site-specific) list~~
 - AND**
 - b. ~~Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment within the specified area.~~

Either of the following has been confirmed:

- Fire in a Safe Shutdown Building.
- Explosion in a Safe Shutdown Building.

AND Either:

- Plant personnel at the scene report visible damage to safe shutdown equipment or components.

OR

- Affected safe shutdown system indicates degraded performance.

AND

Affected safe shutdown system or component is required to be operable per Technical Specifications for the present plant operating mode.

Basis:

A fire is as defined in PAP-1911, "Fire Emergency."

An explosion is considered a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials.

RECOGNITION CATEGORY H

Only those explosions of sufficient force to damage permanent structures or equipment required for safe shutdown within Safe Shutdown Buildings should be considered. The same philosophy is being applied to fires that affect safe shutdown areas. Degraded systems performance or visual observation of damage that could degrade system performance is used as the indicator that the safe shutdown system was actually affected.

The inclusion of a "report of visible damage" should not be interpreted as mandating a lengthy damage assessment prior to classification. NO attempt is made in this EAL to assess the actual magnitude of damage beyond the immediate area. The occurrence of the explosion or fire with reports of evidence of damage (e.g., deformation, scorching) is sufficient for declaration.

For the purposes of this IC, Safe Shutdown Buildings/areas are considered to be the following locations:

- Control Complex (all elevations)
- Auxiliary Building (all elevations)
- Intermediate Building (all elevations)
- Fuel Handling Building (all elevations)
- Reactor Building (all elevations)
- Emergency Service Water Pump House (all elevations)
- Electrical Duct Chase Leading to ESW Building (includes 2 manways per division)
- Diesel Generator Building (all areas except the Unit 2 Division 1, 2, and 3 DG Rooms)
- Steam Tunnel (all elevations)
- Diesel Generator Fuel Oil Storage Area
- Condensate Storage Tank
- Intake/Discharge Structure

Safe Shutdown System/Equipment refers to equipment identified in the Safe Shutdown Capability Report. This is the minimum list of equipment required to achieve and maintain COLD SHUTDOWN (including all auxiliary equipment such as AC/DC power, cooling water and instrumentation). A detailed list is provided in the "Appendix R Evaluation - Safe Shutdown Capability Report."

RECOGNITION CATEGORY H**ALERT**

HA3MA1 Release of toxic OR flammable gases within a ~~facility structure~~ Safe Shutdown Building which jeopardizes operation of systems required to maintain safe operations or to establish or maintain COLD SHUTDOWN.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Report or detection of toxic gases within a facility structure in concentrations that will be life threatening to plant personnel.~~

Entry of toxic or flammable gases into Safe Shutdown Buildings or Areas.
AND any of the following:

- Toxic gas in concentrations considered life-threatening
- Flammable gas estimated or determined to be in explosive concentrations
- Plant personnel NOT able to perform actions necessary to establish and maintain Mode 4 while utilizing appropriate protective equipment.

2. ~~Report or detection of flammable gases within a facility structure in concentrations that will affect the safe operation of the plant.~~

Basis:

This IC and its associated EALs are based on gases that have entered a Safe Shutdown Building and are affecting safe operation of the plant. The intent of MA1 is NOT to include contiguous buildings or structures (i.e., warehouse).

This IC addresses increased toxic or flammable gas levels that impede necessary access to operating stations or other areas containing equipment that must be operated manually in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant. The cause of the increase in toxic or flammable gas levels is NOT a concern of this IC.

RECOGNITION CATEGORY H

Access to the area must be required, but impeded in order to classify. For example, a toxic or flammable gas reading in the Intermediate Building IB 599' level pipe chase to radwaste meets the entry condition, but no declaration is made since access to this area is not needed to safely operate or shutdown the plant.

For the purposes of this IC, Safe Shutdown Buildings/Areas are considered to be the following locations:

- Control Complex (all elevations)
- Auxiliary Building (all elevations)
- Intermediate Building (all elevations)
- Fuel Handling Building (all elevations)
- Reactor Building (all elevations)
- Emergency Service Water Pump House (all elevations)
- Electrical Duct Chase Leading to ESW Building (includes 2 manways per division)
- Diesel Generator Building (all areas except the Unit 2 Division 1, 2, and 3 DG Rooms)
- Steam Tunnel (all elevations)
- Diesel Generator Fuel Oil Storage Area
- Condensate Storage Tank
- Intake/Discharge Structure

Site assessment, response, and reportability actions shall be in accordance with PAP-0806.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert HA3
2. Plant Administrative Procedure (PAP) 0806, Oil/Chemical Release Contingency Plan
3. Appendix R - Evaluation, Safe Shutdown Capability Report (Rev. 5), Section 4
4. Fire Protection Evaluation Report (Rev. 4), Section 3 and Table 3-1

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**ALERT**

HA4NA1 Security event in a the plant Protected Area.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Intrusion into plant protected area by a hostile force.~~

Any security event resulting in a declaration of a SECURITY EMERGENCY in accordance with the PNPP Physical Security Plan.

2. ~~Other security events as determined from (site specific) Safeguards Contingency Plan.~~

Basis:

Security events which represent a threat to plant safety are addressed by the PNPP Physical Security Plan. The events that the Security Plan classifies as a Security Emergency are more significant than those classified as a Security Alert. This increase in the level of concern is analogous to the upgrading from the Unusual Event's "...degradation of the level of safety..." to the Alert's "...substantial degradation of the level of safety..."

Intrusion into a Vital Area by a hostile force as defined in Site Area Emergency NS1 will escalate this event to Site Area Emergency.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert HA4
2. PNPP Physical Security Plan (Rev. 21)

Deviations/Comments:

1. NUMARC EAL Statement, "Intrusion into plant Protected Area by a hostile force," was not included as a separate statement in the Perry IC. It is implicit in the EAL as written.

RECOGNITION CATEGORY H**ALERT**

HA5IA1 Control Room evacuation has been initiated.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Entry into ONI-C61 (~~site-specific~~) ~~procedure for control room evacuation.~~

Basis:

The Alert condition addresses events which involve a substantial degradation of the level of safety of the plant. Frequently, a distinguishing characteristic of a "substantial degradation" is the need for increased monitoring of, or assistance in monitoring, and direction through the Technical Support Center and/or Operations Support Center is necessary. Therefore, an Alert should be declared when the Control Room must be evacuated.

An inability to establish plant control from outside the Control Room will escalate this event to a Site Area Emergency per IS1.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert HA5
2. Off-Normal Instruction (ONI) C61, Evacuation of the Control Room (Rev. 2)

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**ALERT**

HA6OA1 Other conditions existing, which in the judgment of the Emergency Coordinator ~~Director~~, warrant declaration of an Alert.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~Other conditions existing which in the judgment of the Emergency Director indicate that plant safety systems may be degraded and that increased monitoring of plant functions is warranted.~~

Events are in progress or have occurred which indicate an actual or potential degradation of systems needed for the protection of the public and which warrant increased monitoring of plant functions.

Basis:

This IC is intended to address unanticipated conditions not addressed explicitly elsewhere but that warranted declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the Alert emergency class. This includes a determination by the Emergency Coordinator that additional assistance similar to that provided by the TSC and OSC staffs, including a transfer of the Emergency Coordinator responsibilities to the TSC, is necessary for the event to be effectively mitigated. Transfer of Emergency Coordinator duties for classification, offsite notifications and PAR decisions, is used as an initiator since an event significant enough to warrant transfer of command and control is a substantial reduction in the level of safety of the plant.

Activation of the TSC outside of the Emergency Plan in support of the Control Room staff is allowed by EPI-A1 Section 5.5, Non-Emergency Plan Activation of Emergency Response Facilities in Support of the Control Room Staff.

Releases that are expected to be limited to a small fraction of the EPA Protective Action Guideline exposure levels are addressed under IC HA1.

RECOGNITION CATEGORY H

References:

1. NUMARC/NESP-007 (Rev. 2), Alert HA6

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**SITE AREA EMERGENCY**

HS1NS1 Security event in a plant vital area.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. Intrusion into a plant Vital Area by a hostile force.
2. ~~Other security events as determined from (site specific) Safeguards Contingency Plan.~~

Basis:

This class of security event represents an escalated threat to plant safety above that contained in Alert NA1 in that a hostile force has progressed from the Protected Area to the Vital Area. The Vital Area is within the Protected Area and is controlled by key card readers. These areas contain vital equipment which includes any equipment, system, device, or material, the failure, destruction, or release of which could directly or indirectly endanger the public health and safety by exposure to radiation. Equipment or systems which would be required to function to protect health and safety following such, failure, destruction, or release are also considered vital.

A confirmed explosive device within a vital area is a direct threat to vital equipment designed to protect the public. If there is conclusive evidence that a vital area has been entered by a hostile force, even though he is no longer present, the intrusion had been made and a Site Area Emergency is therefore warranted.

For the purposes of this initiating condition, a civil disturbance which penetrates the Protected Area boundary as well as an individual or group of individuals with known or suspected malicious intent can be considered a hostile force. However, this hostile force must occupy or gain control of a vital area to meet the criteria for declaration of a Site Area Emergency.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency HS1
2. PNPP Physical Security Plan (Rev. 21)

RECOGNITION CATEGORY H**Deviations/Comments:**

1. NUMARC EAL Statement, "Other security events as determined from (site-specific) Safeguards Contingency Plan", was not included. All security events in the PNPP Physical Security Plan are listed as either Security Alerts or Security Emergencies and are already covered by ICs NU1 and NA1.

RECOGNITION CATEGORY H**SITE AREA EMERGENCY**

HS2IS1 Control Room evacuation has been initiated, and plant control CANNOT be established within 15 minutes.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~The following conditions exist:~~
 - a. ~~Control room evacuation has been initiated.~~
 - AND**
 - b. ~~Control of the plant cannot be established per (site specific) procedure within (site specific) minutes.~~

Entry into ONI-C61.

AND

Within 15 minutes of entry into ONI-C61, Operator(s) located at the remote shutdown controls CANNOT maintain RPV water level greater than 0".

Basis:

This IC and its associated EAL address a condition where evacuation of the Control Room is necessary but expeditious transfer of safety systems has not occurred. Fission product barrier damage may not yet be indicated.

The intent of IS1 is to ensure that prompt Operator action is taken upon evacuating the Control Room to ensure that RPV water level is maintained above TAF, thus preventing possible clad damage. Loss of RPV inventory below 0" is classified as a Site Area Emergency under NUMARC IC SS5 (Perry AS1).

A maximum 15 minute time frame for the transfer of "required" systems was established by NUMARC/NESP-007.

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Radiation levels/Radiological Effluent, or Emergency Coordinator Judgment Initiating Conditions.

RECOGNITION CATEGORY H**References:**

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency HS2
2. Off-Normal Instruction (ONI) C61, Evacuation of the Control Room (REV. 2)
3. Integrated Operating Instruction (IOI) 11, Shutdown from Outside Control Room (Rev. 5)
4. Perry IPE MAAP Output Summary Report of Station Blackout with No Injection (MAAP 10_00_70)

Deviations/Comments:

1. Engineering Calculation CEI-03, MAAP Run 10_00_70 models Station Blackout (SBO) with no injection from time 0. Based on the assumption that the resulting reactor scram is successful, 0.539 hours would elapse prior to core uncover and 0.862 hours until peak fuel temperature of 2200 F is exceeded. Both of these elapsed times exceed the 15 minute threshold identified in NUMARC/NESP-007.

The SBO analysis performed under MAAP Run 10_00_70 conservatively assumes that no injection would be available to the RPV from the time of Control Room evacuation until ECCS control is re-established at the Remote Shutdown Areas.

RECOGNITION CATEGORY H**SITE AREA EMERGENCY**

HS3OS1 Other conditions existing, which in the judgment of the Emergency Coordinator ~~Director~~, warrant declaration of Site Area Emergency.

Operating Mode Applicability: All

Example Emergency Action Level:

1. Other conditions exist which ~~in the judgment of the Emergency Director~~ indicate actual or likely major failures of plant functions needed for protection of the public.

Basis:

This IC is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the emergency class description for a Site Area Emergency.

Radioactive releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels except within the site boundary. Radioactive releases to the general public area addressed under IC HS1 and HG1.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency HS3

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**GENERAL EMERGENCY**

HG1NG1 Security event resulting in loss of ability to reach and maintain COLD SHUTDOWN.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. Loss of physical control of the Control Room due to a hostile force or act ~~security event~~.
2. Loss of physical control of the Division 1 and 2 Remote Shutdown Rooms ~~capability~~ due to a hostile force or act ~~security event~~.

Basis:

NG1 encompasses conditions under which a hostile force has taken physical control of areas required to reach and maintain cold shutdown.

For event classification purposes, a civil disturbance which penetrates the Protected Area boundary, or an individual or group of individuals with known or suspected malicious intent is considered a hostile force. This hostile force must occupy or gain control of either the Control Room or Division 1 and 2 Remote Shutdown Room to meet the criteria for the declaration of a General Emergency.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event HG1
2. Integrated Operating Instruction (IOI) 11, Shutdown from Outside Control Room (Rev. 5)
3. PNPP Physical Security Plan (Rev. 21)

Deviations/Comments:

1. None

RECOGNITION CATEGORY H**GENERAL EMERGENCY**

HG2OG1 Other conditions existing, which in the judgment of the Emergency Coordinator ~~Director~~, warrant declaration of General Emergency.

Operating Mode Applicability: All

Example Emergency Action Level: (1 or 2)

1. ~~Other conditions existing which in the judgment of the Emergency Director indicate: (1) actual or imminent substantial core degradation with potential for loss of containment, or (2) potential for uncontrolled radio nuclide releases. These releases can reasonably be expected to exceed EPA PAG plume exposure levels outside the site boundary.~~

ANY of the following:

- Other conditions exist which indicate an actual or imminent substantial core degradation with the potential loss of Containment integrity
- Potential for an uncontrolled radionuclide release which can reasonably be expected to be greater than 1R TEDE at the Site Boundary
- Potential for an uncontrolled radionuclide release which can reasonably be expected to be greater than 5 R CDE Child Thyroid at the Site Boundary

Basis:

This IC is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the General Emergency class.

Radioactive releases may exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. Radioactive releases to the general public are addressed under IC HS1 and HG1.

RECOGNITION CATEGORY H

References:

1. NUMARC/NESP-007 (Rev. 2), General Emergency HG2

Deviations/Comments:

1. None

RECOGNITION CATEGORY H

(INTENTIONALLY BLANK)

RECOGNITION CATEGORY S

SYSTEM MALFUNCTION

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU1DU1 Loss of all offsite power to Division 1 and 2 EH essential busses for greater than 15 minutes.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~The following conditions exist:~~
 - a. ~~Loss of power to (site specific) transformers for greater than 15 minutes.~~
 - AND**
 - b. ~~At least (site specific) emergency generators are supplying power to emergency buses.~~

ONI-R10 entered for a Loss of Off-site Power (LOOP).

AND any of the following:

Either of the following power sources CANNOT be made available within 15 minutes for energizing Bus EH11:

- Normal Preferred
- Alternate Preferred

OR

Either of the following power sources CANNOT be made available within 15 minutes for energizing Bus EH12:

- Normal Preferred
- Alternate Preferred

Basis:

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a loss of off-site power (LOOP) as defined by ONI-R10.

RECOGNITION CATEGORY S

Technical Specification 3.8.1.1 for Modes 1, 2 and 3 requires two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system. The Normal Preferred power source from the Perry Plant Transmission yard for both busses EH11 and EH12 is from the Unit 1 Start-up Transformer, supplied through Interbus Transformer LH-1-A to bus TH1. The Alternate Preferred power source to either EH11 or EH12 is from the Unit 2 Start-up Transformer, supplied through Interbus Transformer LH-2-A to bus TH21.

Per ONI-R10, a loss of offsite power (LOOP) is defined as "...a loss of offsite power has occurred and at least one of the Division 1 and 2 Diesel Generators has supplied its respective bus". IC DU1 addresses the ability to re-energize either bus EH11 or EH12 from the Normal Preferred or Alternate Preferred power source within 15 minutes.

Fifteen minutes was selected as a threshold to exclude transient or momentary offsite power losses. However, classification should be made as soon as it is known that the availability of offsite power will not be re-established within 15 minutes. The intent of DU1 is the availability of either the normal preferred or alternate preferred sources to energize their respective bus(es), and NOT the physical connection of either of these power supplies to the bus.

Credit is not taken in this EAL for the Division 3 Diesel Generator because it only supplies power to the High Pressure Core Spray (HPCS) pump and associated loads, not for any long term decay heat removal systems. In particular, Suppression Pool cooling mechanisms would be essential subsequent to a station blackout.

Failure of either bus EH11 or EH12 to be supplied from its respective diesel generator is evaluated for escalation to an Alert under IC DA1 for Modes 1,2 and 3.

Failure of both busses EH11 and EH12 to be supplied from their respective diesel generators (Station Black Out) is evaluated for escalation to an Alert under IC DA2 for Modes 4 and 5 and to a Site Area Emergency under IC DS1 for Modes 1, 2 and 3.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU1
2. Technical Specifications, Perry Nuclear Power Plant, Unit 1
3. Off-Normal Instruction (ONI) R10, Loss of AC Power, Rev. 4 -TCN-3
4. System Design Manual (SDM) R10, Plant Electrical AC System (Rev. 8)
5. Updated Safety Analysis Report (USAR), Chapters 15.2.6 and 8.2.1

RECOGNITION CATEGORY S**Deviations/Comments:**

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 (essential) EH busses." This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).
2. Entry into ONI-R10 for a loss of off-site power used, in lieu of listing specific transformers per EAL statement 1A. ONI-R10 provides criteria and justification for loss of AC power causalities.
3. EAL statement 1B was not listed since it is a "positive" statement and is not needed for classification of the unusual event. Failure of a diesel to start is covered in higher event classifications (DA1).

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU2CU1 Inability to reach required shutdown within Technical Specification Limits.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. Plant is not brought to required operating mode within ~~(site-specific)~~ the Technical Specification ~~LCO~~ action statement time following entry into an LCO.

Basis:

Limiting Conditions of Operation (LCOs) require the plant to be brought to a shutdown condition when the Technical Specification required configuration cannot be restored. The plant is within its safety envelope when being shutdown within the allowable action statement time in the Technical Specification. An immediate Unusual Event is required when the plant is not brought to the required operating conditions within the allowable action statement time. Declaration of the Unusual Event is based on the time at which the LCO-specified action statement time period elapses due to failure in equipment needed to meet the action statement or it becomes obvious that the action statement will not be met.

Declaration should not be made because of an administrative oversight that results in an LCO action statement being exceeded and a controlled shutdown started. (i.e., unaware that the plant was in an active LCO.) Declaration should be made because of equipment failures that prevent the performance of an ordered shutdown or failure to meet the shutdown action statement from the time discovered and an active LCO entered. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement period elapses and is not related to how long a condition may have existed.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU2
2. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Sections 3.0.3 and 3.0.4

RECOGNITION CATEGORY S

Deviations/Comments:

1. None

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU3JU1 ~~Unplanned loss of most or all safety system annunciation~~ annunciators or indication in the Control Room for greater than 15 minutes.

Operating Mode Applicability: Power Operation, Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:**1. ~~The following conditions exist:~~**

a. ~~Loss of most or all (site specific) annunciators associated with safety systems for greater than 15 minutes.~~

AND

b. ~~Compensatory non-alarming indications are available.~~

AND

c. ~~In the opinion of the Shift Supervisor, the loss of the annunciators or indicators requires increased surveillance to safely operate the unit(s).~~

AND

d. ~~Annunciator or indicator loss does not result from planned action.~~

Either:

• Unplanned loss of most Control Room annunciators for greater than 15 minutes.

OR

• Unplanned loss of most Control Room indication for greater than 15 minutes.

AND

In the Shift Supervisor's opinion, increased surveillance is warranted to safely operate the plant.

RECOGNITION CATEGORY S

Basis:

This IC and its associated EAL recognize the difficulty associated with monitoring plant conditions without the use of a major portion of the annunciation or indication equipment.

Quantification of "most" is left to the Shift Supervisor. It is not intended that plant personnel perform a detailed count of the instrumentation lost, but rather make a judgment call with approximately 75% being the threshold. It is estimated that if approximately 75% of the annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected.

Control Room panels with annunciators and indications include:

- All Unit 1 Control Room Panels in the Operations Areas,
- Unit 1 D17, D19, D21 Readout Modules
- Unit 2 Plant Vent on panel 2H13-P804 (1D17), and 2H13-P884 (2D19)
- Unit 2 Start-Up Transformer on panel 2H13-P870, and
- Unit 2 Safety-related batteries on panel 2H13-P877.

Indications are available at other locations including Control Room back panels; however, using them to safely operate the plant would require increased surveillance.

Plant design provides redundant safety system indication powered from separate uninterruptable power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10CFR50.72. If the shutdown is not in compliance with the Technical Specification action statement, the Unusual Event is based on CU1, "Inability to Reach Required Shutdown Within Technical Specification Limits."

The Control Room readouts from radiation monitoring systems are included to ensure that potential releases or degraded core conditions can be monitored. Both the meter and chart recorder (if appropriate) would be unavailable if the readout modules are out of service such that the process cannot be monitored.

Compensatory indications include the Process Computer System and Emergency Response Information System (ERIS). It may include other permanently or temporarily installed monitoring systems if they allow the plant Operators to compensate for the failed indications.

RECOGNITION CATEGORY S

The D19 Accident Radiation Monitoring System may be started to monitor the 4 plant release points. If functional, this would qualify as a compensatory indicator for the respective D17 Radiation Monitor(s). Similarly, if no transient is in progress that would auto initiate the D19 monitor, the D17 system may fulfill the function of a compensatory indicator for the respective D19 monitors.

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

No IC is indicated during COLD SHUTDOWN and REFUELING due to the limited number of safety systems required for operation.

This event will be escalated to Alert JA1 if a transient is in progress during the loss of the annunciation/ indication or the compensatory indications become unavailable.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU3
2. Off-Normal Instruction (ONI) R61, Loss of Control Room Annunciators (Rev. 0)

Deviations/Comments:

1. None

RECOGNITION CATEGORY S**UNUSUAL EVENT****SU4AU1** Fuel clad degradation.

Operating Mode Applicability: All Power Operation, Hot Standby (Startup in BWRs), Hot Shutdown, Cold Shutdown

Example Emergency Action Level:

1. ~~(Site specific) radiation monitor readings indicating fuel clad degradation greater than Technical Specification allowable limits.~~

High Off-Gas pretreatment air activity greater than the ODCM Control 3.11.2.7 limit.

2. ~~(Site specific) coolant sample activity value indicating fuel clad degradation greater than Technical Specification allowable limits.~~

Reactor Coolant System sample indicates activity greater than Technical Specification 3.4.5 limits.

Basis:

IC AU1 is considered to be a potential degradation in the level of safety of the plant and a potential precursor of more serious problems.

The Off-Gas Pretreatment process radiation monitor reflects the steam jet air ejector effluent and would be one of the first indicators of degrading fuel conditions in Modes 1, 2 or 3. Therefore, elevated offgas radiation activity represents a potential degradation in the level of safety of the plant and a potential precursor of more serious problems.

Coolant activity in excess of allowable Technical Specifications 3.4.5 limits also reflects a degraded or degrading core condition and a potential precursor of more serious problems. This condition is elevated to an Alert should coolant activity exceed 300 microcuries/gram dose equivalent I-131, a value which represents approximately 2% clad damage. (Refer to Attachment 2, "Recognition Category F", for technical bases discussion.)

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU4
2. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.4.5
3. Offsite Dose Calculation Manual (ODCM), Appendix C - Control 3/4.11.2.7 (Rev. 5)

Deviations/Comments:

1. The applicable operating condition was changed to Modes 1, 2, 3, 4 (Power Operation Startup, Hot Shutdown, Cold Shutdown) for consistency with the Perry Plant Tech. Specs. NUMARC/NESP-007 defines the EAL threshold for an Unusual Event as operation beyond the safety envelope for the plant as defined by Technical Specifications and ODCM Controls including LCOs.
2. Radiological Effluent Technical Specifications (RETS) have been removed from the PNPP Technical Specifications as part of Amendment 72 to the Operating License and relocated to the ODCM Appendix C Revision 5.

RECOGNITION CATEGORY S**Deviations/Comments:**

1. NUMARC Example EAL 1A identifies pressure boundary leakage. There is no Perry EAL listed for pressure boundary leakage specifically since it is a subset of unidentified leakage. Perry Tech. Specs. requires a shutdown if any pressure boundary leakage is found.
2. NUMARC Example EAL 1B lists a limit of 25 gpm for identified leakage. Perry's EAL uses a limit of 5 gpm. The limit is 5 gpm greater than the Tech. Spec. LCO, and as such allows for a shutdown to commence per the action statement of Tech. Spec. 3.4.3.2 without declaring an Emergency Plan event unless the leakage is significantly greater and has the potential to degrade. This will also permit actions to isolate coolant boundary systems in order to identify the source of leakage via designed isolation valves.

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU6KU1 ~~Unplanned~~ loss of all onsite OR in-plant ~~offsite~~ communications capabilities.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~Either of the following conditions exist:~~
 - a. ~~Loss of all (site specific list) onsite communications capability affecting the ability to perform routine operations.~~
 - OR**
 - b. ~~Loss of all (site specific list) offsite communications capability.~~

Loss of all five Plant Public Address System channels.
AND
Loss of all of the following Plant Radio System channels:

 - Channel 1
 - Channel 2
 - Channel 3

Basis:

This IC and its associated EALs recognize a loss of onsite communications capability that defeats the plant staff's ability to perform routine tasks necessary for plant operations.

Use of Plant Radio System channels 4 and 5 is restricted to Site Protection activities. Therefore, credit for Channels 4 and 5 is NOT taken in support of plant operations.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU6
2. Plant Administrative Procedure (PAP) 0202, Communications (Rev. 2)

RECOGNITION CATEGORY S

Deviations/Comments:

1. Loss of offsite communications capability is covered under KU2.

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU6KU2 ~~Unplanned loss of all onsite or~~ Significant degradation of offsite communications capabilities.

Operating Mode Applicability: All

Example Emergency Action Level:

1. ~~Either of the following conditions exist:~~
 - a. ~~Loss of all (site specific list) onsite communications capability, affecting the ability to perform routine operations.~~
 - OR**
 - b. ~~Loss of all (site specific list) offsite communications capability.~~

Loss of the State and County Notification Circuit (5-way) reported to the Control Room.
AND

Loss of offsite long distance calling capability on three or more of the following systems circuits for greater than 15 minutes:

- Control Room private (259-) lines
- Private Branch Exchange, Service Building ("5000") Switch
- Private Branch Exchange, Warehouse Building ("6000") Switch
- Company Off-Premise Exchange

Basis:

This IC and its associated EALs recognize a loss of offsite communications capability that significantly degrades the plant operations staff's ability to communicate with offsite authorities. The loss of offsite communications capability is more comprehensive than that addressed by 10CFR50.72.

An offsite system circuit refers to one of the four offsite "5-Way" contacts: the State of Ohio, and the counties of Ashtabula, Geauga, and Lake. Testing to determine "5-Way" operability or to initiate circuit restoration actions are governed under PSI-0007.

RECOGNITION CATEGORY S

All direct (259-) off-site calling capability from the Control Room via private lines refers to:

- Autodialer at the US console.
- Private (259-) line on the superphones.
- Private (259-) line at the SAS console.

Refer to PSI-0007 for communications failure scenarios and a listing of circuit power supplies.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU6
2. Preparedness Support Instruction (PSI) 0007, Reporting Emergency Plan-Related Communications Equipment Problems (Rev. 2)
3. Plant Administrative Procedure (PAP) 0202, Communications (Rev. 2)

Deviations/Comments:

1. Although the NUMARC IC calls for the Loss of ALL off-site communication, Perry will declare an Unusual Event when all but 1 off-site communication link is lost. Perry elects to declare early so that a method is available to make the required State, and County and NRC notification.

RECOGNITION CATEGORY S**UNUSUAL EVENT**

SU7EU1 ~~Unplanned loss of required~~ Degradation of Division 1 and 2 essential DC power ~~during cold shutdown or refueling mode~~ for greater than 15 minutes.

Operating Mode Applicability: Cold Shutdown, Refueling

Example Emergency Action Level:

1. ~~Either (both) of the following conditions exist:~~
 - a. ~~Unplanned loss of vital DC power to required DC busses based on (site specific) bus voltage indications.~~
 - AND**
 - b. ~~Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.~~

Voltage on both of the following busses is less than 105 VDC for greater than 15 minutes:

- ED-1-A
- ED-1-B

Basis:

This IC and its EAL recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during COLD SHUTDOWN or REFUELING. This EAL is intended to be anticipatory in that the Operators may not have the necessary indication and control of equipment needed to respond to the loss.

Credit is NOT taken in this EAL for the Division 3 DC bus because this power source does not affect any decay heat removal systems.

One hundred five (105) volts DC is the minimum design voltage of the 125 VDC, 60 cell Division I and II batteries. Thus 105 volts DC has been selected as the threshold for a loss DC power.

The same set of conditions as described in this EAL would be classified as Site Area Emergency ES2 if they occurred during Modes 1, 2, or 3.

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SU7
2. Updated Safety Analysis Report (USAR), Chapter 8.3.2
3. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.2.1
4. FCR #021930, "Emergency Action Levels, EAL DC Voltage, R42"

Deviations/Comments:

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 essential DC Busses," and a time frame. This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).
2. NUMARC IC SU7 states that the site-specific bus voltage should incorporate a margin of at least 15 minutes of operation before onset of the inability to operate DC loads. However, consistent with the bases of NUMARC IC SS3, the EAL is intended to address a LOSS of DC power. The LOSS occurs when DC voltage drops below the design voltage of 105 VDC. Identification of a voltage greater than the minimum design which would provide a 15 minute margin under all load conditions adds an overly conservative limitation for event classification.

RECOGNITION CATEGORY S**ALERT**

SA1DA2 Loss of all offsite power and ~~loss of all onsite AC power to essential Division 1 and 2 EH busses during cold shutdown or refueling mode for greater than 15 minutes.~~

Operating Mode Applicability: Cold Shutdown, Refueling, Defueled

Example Emergency Action Level:

1. All of the following ~~conditions exist:~~
 - a. ~~Loss of power to (site specific) transformers.~~
 - AND**
 - b. ~~Failure of (site specific) emergency generators to supply power to emergency busses~~
 - AND**
 - c. ~~Failure to restore power to at least one **[**SA1-3**]** emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.~~

Both busses EH11 and EH12 CANNOT be energized from any source within 15 minutes.

Basis:

IC DA2 deals with loss of the minimum required offsite circuits and failure of the diesel generators to restore power to the emergency busses resulting in a loss of AC power to all plant safety systems requiring AC power including: RHR, ECCS, Containment cooling systems, spent fuel heat removal systems, and Suppression Pool cooling systems.

IC DA2, is only applicable to Modes 4 and 5, and is concerned with a total loss of AC power to both busses EH11 and EH12. Credit is NOT taken for Bus EH13 which only supplies power to the HPCS pump and associated loads, but does NOT provide power to any decay heat removal systems that would be critical in a Station Blackout (SBO) scenario.

RECOGNITION CATEGORY S

Fifteen (15) minutes is allowed prior to classification to restore a single source of redundant AC power source to either EH11 and EH12. Fifteen minutes was selected as a conservative lower threshold that retains the anticipatory nature of the EALs while excluding transient or momentary power losses. However, classification should be made as soon as it is known that power to either EH11 or EH12 will NOT be able to be restored within 15 minutes.

No escalation path exists to a Site Area Emergency for Modes 4 and 5 in Event Category 'D'. Criteria established in IC DA2 would be considered a Site Area Emergency in Modes 1, 2 and 3.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert SA1
2. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.1
3. Off-Normal Instruction (ONI) R10, Loss of AC Power (Rev. 4)
4. Updated Safety Analysis Report (USAR), Chapter 15.2.6

Deviations/Comments:

1. The title of the IC has been changed by adding the qualifier, "Division 1 and 2 EH (essential) Buses," and a time frame. This meets the intent of the example EAL listed in NUMARC while being more description for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).
2. NUMARC IC SA1 requires you to check that offsite power distribution and on-site power distribution are available. These conditions are combined into one EAL. If the essential (EH) bus is de energized, it means that both off-site and on-site power sources were unable to connect to the divisional bus.

RECOGNITION CATEGORY S**ALERT**

SA2CA1 Failure of ~~Reactor Protection system instrumentation to complete or initiate or~~
complete an automatic Reactor Scram once a ~~Reactor Protection System RPS~~
function is required ~~setpoint has been exceeded and manual scram was successful.~~

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs)

Example Emergency Action Level:

1. ~~(Site-specific) indication(s) exist that indicate that Reactor Protection system setpoint was exceeded and automatic scram did not occur, and a successful manual scram occurred.~~

Following automatic actuations of either of the following, "shutdown under all conditions without boron" has NOT been obtained:

- RPS
- RRCS

Basis:

CA1 is applicable if either Mode 1 or 2 existed when the transient started and NOT the mode which exists at the time of classification.

This condition indicates a failure of the automatic protection system to fully scram the reactor. It is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient or an inadequate number of control rods inserted. Redundant Reactivity Control System (RRCS) is included since it is an automatic system designed to back up the Reactor Protection System (RPS) for low level/high pressure situations.

RECOGNITION CATEGORY S

The RPS/RRCS failure could be due to 1) electronics such that all control rods did not receive the scram signal; or 2) hydraulics such that all control rods did not full insert to complete the scram. Thus plant safety has been compromised, and design limits of the fuel may have been exceeded. "Shutdown under all conditions without boron" is defined by the PEI Bases Document under PEI-B13, RPV Control (ATWS) - ENTRY, as either 1) all control rods are determined to be full-in, except one control rod may be at any position; or 2) as determined by a Reactor Engineer.

This EAL may be terminated if manual Operator actions achieve shutdown conditions or when a Reactor Engineer determines that the reactor is shut down. Failure of the manual scram in Mode 1 would escalate this event to Site Area Emergency CS1.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert SA2
2. Plant Emergency Instruction (PEI) Bases Document (Rev. 2 / Update 1)
3. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Table 2.2.1-1

Deviations/Comments:

1. No credit is taken for operator intervention (manual scram) since fuel damage may have occurred prior to intervention.
2. The initiating condition was modified to allow either the Reactor Protection System (RPS) or Redundant Reactivity Control System (RRCS) to initiate the automatic reactor scram. Since the initiation setpoints of the two systems are close together, it will require a post-scram evaluation to determine which system actually inserted the control rods. Automatic protection is provided in both cases.

RECOGNITION CATEGORY S**ALERT****SA3BA1** Inability to maintain plant in COLD SHUTDOWN.**Operating Mode Applicability:** Cold Shutdown, Refueling**Example Emergency Action Level:**

1. ~~The following conditions exist:~~
 - a. ~~Loss of (site specific) Technical Specification required functions to maintain cold shutdown.~~
 - AND**
 - b. ~~Temperature increase that either:~~
 - ~~Exceeds cold shutdown temperature limit Technical Specification~~
 - OR**
 - ~~Results in uncontrolled temperature rise approaching cold shutdown temperature limit technical specification.~~

Inability to maintain RCS temperature less than 200°F.

Basis:

This IC and its EAL address a complete loss of functions required for core cooling during REFUELING and COLD SHUTDOWN modes. The IC remains applicable for situations in which an uncontrolled increase in RCS temperature greater than 200°F results in a change to Mode 3.

The criteria, "inability to maintain a reactor temperature of less than 200°F," is met as soon as it becomes known that sufficient cooling CANNOT be restored to maintain temperature below 200°F regardless of the current temperature. An Alert is declared in the event RCS temperature exceeds 200°F unless the required systems are functionally available to restore the temperature below 200°F. The intent of IC BA1 is not to classify based on a momentary unplanned excursion above 200 °F when heat removal capability is available.

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2) Alert SA3
2. Off-Normal Instruction (ONI) E12-2, Loss of Decay Heat Removal (Rev. 4)
3. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Table 1.2

Deviations/Comments:

1. The Perry Technical Specifications do not specify required functions to maintain cold shutdown. A reactor coolant temperature increase that approaches or exceeds the cold shutdown technical specification limit in an uncontrolled manner warrants declaration of an Alert irrespective of the availability of technical specification required functions to maintain cold shutdown. The concern of this EAL is the loss of ability to maintain the plant in cold shutdown which is defined by reactor coolant temperature and not the operability of equipment which supports removal of heat from the reactor. The anticipatory criteria is provided in the use of the term "Inability to maintain." NUMARC/NESP-007 "Questions and Answers" published in June 1993 defines the term 'function' as : "The action which a system, subsystem or component is designed to perform." The evaluation of both current and future system performance (function) is inherent in this definition of "inability to maintain."

RECOGNITION CATEGORY S**ALERT**

SA4JA1 ~~Unplanned~~ loss of most or all safety system annunciation ~~annunciators~~ or indication in the Control Room with either: (1) a significant transient in progress, OR (2) compensatory non-alarming indicators are NOT ~~un~~available.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown, ~~Cold Shutdown~~

Example Emergency Action Level:

1. ~~The following conditions exist:~~

a. ~~Loss of most or all (site specific) annunciators associated with safety systems for greater than 15 minutes.~~

AND

b. ~~In the opinion of the Shift Supervisor, the loss of the annunciators or indicators requires increased surveillance to safely operate the unit(s)~~

AND

c. ~~Annunciator or indicator loss does not result form planned action~~

AND

d. ~~Either of the following:~~

- ~~• A significant plant transient is in progress~~

OR

- ~~• Compensatory non-alarming indications are available.~~

Either:

- Unplanned loss of most Control Room annunciators for greater than 15 minutes.
- Unplanned loss of most Control Room indicators for greater than 15 minutes.

AND

In the Shift Supervisor's opinion, increased surveillance is warranted to safely operate the plant.

AND Either:

- A significant plant transient is in progress.
- Compensatory indications i.e., ERIS and process computer, are NOT available.

RECOGNITION CATEGORY S

Basis:

This IC and its associated EAL recognize the difficulty associated with monitoring plant conditions without the use of a major portion of the annunciation or indication equipment. It represents an increase in severity above that described in Unusual Event JU1 in that either compensatory indications are not available or a significant transient is in progress.

Quantification of "most" is left to the Shift Supervisor. It is not intended that plant personnel perform a detailed count of the instrumentation lost, but rather make a judgment call with approximately 75% being the threshold. It is estimated that if approximately 75% of the annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected.

Control Room panels with annunciators and indications include:

- All Unit 1 Control Room Panels in the Operations Areas,
- Unit 1 D17, D19, D21 Readout Modules
- Unit 2 Plant Vent on panel 2H13-P804 (1D17), and 2H13-P884 (2D19)
- Unit 2 Start-Up Transformer on panel 2H13-P870, and
- Unit 2 Safety-related batteries on panel 2H13-P877.

Indications are available at other locations including Control Room back panels; however, using them to safely operate the plant would require increased surveillance.

Plant design provides redundant safety system indication powered from separate uninterruptable power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status. This will be addressed by the specific Technical Specification. The initiation of a Technical Specification imposed plant shutdown related to the instrument loss will be reported via 10CFR50.72. If the shutdown is not in compliance with the Technical Specification action statement, the Unusual Event is based on CU1, Inability to Reach Required Shutdown Within Technical Specification Limits."

The Control Room readouts from radiation monitoring systems are included to ensure that potential releases or degraded core conditions can be monitored. Both the meter and chart recorder (if appropriate) would be unavailable if the readout modules are out of service such that the process CANNOT be monitored.

Compensatory indications include the Process Computer System and Emergency Response Information System (ERIS). It may include other permanently or temporarily installed monitoring systems if they allow the plant Operators to compensate for the failed indications.

RECOGNITION CATEGORY S

The D19 Accident Radiation Monitoring System may be started to monitor the 4 plant release points. If functional, this would qualify as a compensatory indicator for the respective D17 Radiation Monitor(s). Similarly, if no transient is in progress that would auto-initiate the D19 monitor, the D17 system may fulfill the function of a compensatory indicator for the respective D19 monitors.

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

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

No IC is indicated during COLD SHUTDOWN and REFUELING due to the limited number of safety systems required for operation.

References:

1. NUMARC/NESP-007 (Rev. 2), Unusual Event SA4
2. Off-Normal Instruction (ONI) R61, Loss of Control Room Annunciators (Rev. 0)

Deviations/Comments:

1. None

RECOGNITION CATEGORY S**ALERT**

SA5DA1 ~~AC~~ power capability to ~~essential~~ Division 1 and 2 EH busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~The following conditions exist (a and b):~~
 - a. ~~Loss of power to (site specific) transformers for greater than 15 minutes.~~
 - AND**
 - b. ~~Onsite power capability has been degraded to one (train of) emergency bus(es) powered from a single onsite power source due to the loss of:~~
~~(site specific list)~~

Essential AC power reduced to only one of the following power sources for greater than 15 minutes:

- Normal Preferred
- Alternate Preferred
- Division 1 Diesel Generator
- Division 2 Diesel Generator

AND

Loss of the single remaining power source will result in a loss of AC power to both busses EH11 and EH12

Basis:

This IC and its associated EAL provide an escalation from IC DU1, "Loss of all offsite power to Division 1 and 2 EH Buses for greater than 15 minutes." The condition indicated by this EAL is the degradation of the offsite and onsite power system such that any additional single failure would result in a Station Blackout (SBO).

RECOGNITION CATEGORY S

IC DA1 is only applicable to Modes 1, 2 and 3 and is concerned with the degradation of offsite and onsite AC power such that the loss of any single source would result in a SBO, as defined in ONI-R10. Credit is NOT taken for bus EH13 which only supplies power to the HPCS pump and associated loads, but does NOT provide power to any decay heat removal systems that would be critical in a SBO scenario.

Fifteen (15) minutes is allowed prior to classification to either:

- Restore redundant AC power source to EH11 or EH12
- Provide separate independent sources of AC power to EH11 and EH12

The loss of the normal preferred and alternate preferred sources with the respective diesel generators powering both EH11 and EH12 is classified as an Alert under DU1.

Escalation to a Site Area Emergency is evaluated under IC DS1, for Operating Modes 1, 2 and 3, based on a total loss of AC power to both busses EH11 and EH12.

A total loss of AC power to busses EH11 and EH12 while in Modes 4 and 5 is classified as an Alert under IC DA2. No escalation path exists to a Site Area Emergency for Modes 4 and 5.

References:

1. NUMARC/NESP-007 (Rev. 2), Alert SA5
2. Off-Normal Instruction (ONI-R10), Loss of AC Power (Rev. 4)
3. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.1
4. Updated Safety Analysis Report (USAR), Chapter 15.2.6

Deviations/Comments:

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 EH (essential) Busses," and a time frame. This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

SS4DS1 Loss of all offsite ~~power and loss of all~~ AND onsite AC power to essential Division 1 and 2 EH Busses for greater than 15 minutes.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~Loss of all offsite and onsite AC power as indicated by:~~
 - a. ~~Loss of power to (site specific) transformers.~~
 - AND**
 - b. ~~Failure of (site specific) emergency generators to supply power to emergency busses.~~
 - AND**
 - c. ~~Failure to restore power to at least one emergency bus within (site specific) minutes from the time of loss of both offsite and onsite AC power.~~

Both busses EH11 and EH12 CANNOT be energized from any source within 15 minutes.

Basis:

IC DS1 deals with a loss of all AC power compromising plant safety systems requiring electric power, including: RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink.

IC DS1, is only applicable to Modes 1, 2 and 3 and is concerned with a total loss of AC power to both busses EH11 and EH12. Credit is NOT taken for bus EH13 which only supplies power to the HPCS pump and associated loads, but does NOT provide power to any decay heat removal systems that would be critical in a Station Blackout (SBO) scenario.

Fifteen (15) minutes is allowed prior to classification to restore a single AC power source to EH11 or EH12. Fifteen minutes was selected as a conservative lower threshold that retains the anticipatory nature of the EALs while excluding transient or momentary losses. However, classification should be made as soon as it is known that power to either EH11 or EH12 will NOT be able to be restored within 15 minutes.

RECOGNITION CATEGORY S

Escalation to a General Emergency is evaluated under IC DG1, for Modes 1, 2 and 3, based on a continued degradation of core cooling capability.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency SS1
2. PNPP Engineering Calculation CEI-03, MAAP Run 10_00_70, Station Blackout (no injection)
3. Off-Normal Instruction (ONI) R10, Loss of AC Power, (Rev. 4)
4. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.1
5. Updated Safety Analysis Report (USAR), Chapter 15.2.6

Deviations/Comments:

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 EH (essential Busses," and a time frame. This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).
2. NUMARC IC SS1 requires you to check that offsite power distribution and onsite power distribution are available. These conditions are combined into one EAL. If the essential (EH) bus is de energized, it means that both offsite and onsite power sources were unable to connect to the divisional bus.
3. Under Engineering Calculation CEI-03, MAAP Run 10_00_70 models Station Blackout with no injection from time 0. Based on the assumption that a successful scram was initiated at the onset of a Station Blackout, 0.539 hours would elapse prior to core uncover and 0.862 hours until a peak fuel temperature of 2200 degrees F is exceeded. Both these elapsed times exceed the 15 minute threshold identified in NUMARC IC SS1.

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

SS2CS1 Failure of Reactor Protection system instrumentation to complete or initiate or ~~complete~~ an automatic Reactor Scram once a ~~Reactor Protection System setpoint~~ has been exceeded RPS function is required and manual scram was NOT successful.

Operating Mode Applicability: Power Op.

Example Emergency Action Level:

1. ~~(Site specific) indications exist that automatic and manual scram were not successful.~~

Following automatic actuations of either of the following, "shutdown under all conditions without boron" has NOT been obtained:

- RPS
- RRCS

AND Either:

- Manual operator actions taken at 1H13-P680 were NOT successful in lowering Reactor power to less than 4%.
- Reactor power CANNOT be determined.

Basis:

CS1 is applicable if Mode 1 existed when the transient started and NOT the mode which exists at the time of classification. Refer to CA1 for Mode 2 applicability.

This condition indicates a failure of both the automatic protection system and manual efforts at Control Room panel 1H13-P680 to scram the reactor.

RECOGNITION CATEGORY S

Four percent reactor power was selected to identify a successful manual scram. This power level is consistent with the decision process used in PEI-B13, RPV Control (ATWS) - ENTRY. Power levels above the average power range monitor (APRM) downscale trip setpoint of 4% may challenge the ability to limit Containment heatup and may require actions to deliberately lower RPV water level per PEI-B13 (ATWS) to reduce reactor power. This threshold should NOT be confused with the definition of "shutdown under all conditions without boron," defined in the PEI Bases Document under PEI-B13, RPV Control (ATWS) - ENTRY, as: 1) all control rods are determined to be full-in, except one control rod may be at any position; or 2) as determined by a Reactor Engineer.

A manual scram is any set of actions by the Reactor Operator(s) at 1H13-P680 which results in a scram signal. These actions include placing the Reactor Mode Switch in the SHUTDOWN position, arming and depressing the RPS Manual Scram push buttons, and arming and depressing the RRCS Manual ARI push buttons. Injection of boron is NOT considered in reducing reactor power below 4%.

If Reactor power is unknown and the reactor is NOT "shutdown under all conditions without boron", then it CANNOT be verified that power is less than 4%.

A concurrent challenge to the ability to cool the core would escalate this event to General Emergency CG1.

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency SS2
2. Plant Emergency Instruction (PEI) B13, RPV Control, (ATWS), Rev. A
3. Plant Emergency Instruction (PEI) Bases Document (Rev. 2 / Update 1)
4. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Table 2.2.1-1

Deviations/Comments:

1. The initiating condition was modified to allow either the Reactor Protection System (RPS) or Redundant Reactivity Control System (RRCS) to initiate the automatic reactor scram. Since the initiation setpoints of the two systems are close together, it will require a post-scram evaluation to determine which system actually inserted the control rods. Automatic protection is provided in both cases.

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

SS3ES1 ~~Loss of all vital DC power.~~ Degradation of Division 1 and 2 essential DC power for greater than 15 minutes.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~Loss of all vital DC power based on [(site specific) bus voltage indications for greater than 15 minutes.~~

Voltage on both of the following busses is less than 105 VDC for greater than 15 minutes:

- ED-1-A
- ED-1-B

Basis:

This IC and its EAL recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during POWER OPERATIONS, START-UP, and HOT SHUTDOWN conditions. It is intended to be anticipatory in that the operating crew may not have the necessary indication and control of equipment needed to respond to the loss. This EAL represents a more serious condition than that described in Unusual Event EU1 in that the initial temperatures, pressures, and available decay heat may be substantially higher than in Unusual Event EU1, resulting in significantly less time available before failure of systems needed to protect the public.

Loss of all DC power compromises the ability to monitor and control plant safety functions. Prolonged loss of all DC power may result in core uncover and loss of Containment integrity when there is significant decay heat and residual heat in the Reactor.

Credit is NOT taken in this EAL for the Division 3 DC bus because this power source does NOT affect any decay heat removal systems.

One hundred five (105) volts DC is the minimum design voltage of the 125 VDC, 60 cell Division I and II batteries. Thus 105 volts DC has been selected as the threshold for a loss DC power.

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency SS3
2. Updated Safety Analysis Report (USAR), Chapter 8.3.2
3. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.2.1
4. FCR #021930, "Emergency Action Levels, EAL DC Voltage, R42"

Deviations/Comments:

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 essential DC busses," and a time frame. This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

SS4BS1 Complete loss of function needed to achieve ~~or maintain hot~~ COLD SHUTDOWN.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~Complete loss of any (site specific) function required for hot shutdown.~~

RHR Loops A and B are NOT capable of lowering RPV temperature.

AND

Suppression Pool temperature is above the HCL.

Basis:

This IC and its associated EALs address the loss of systems needed to reach COLD SHUTDOWN from Modes 1, 2, or 3.

The normal method for rejecting heat in Modes 1, 2, and 3 is via the Main Condenser. If the Main Condenser is not available, heat may be rejected directly to the Suppression Pool via the SRVs.

The Suppression Pool will act as a limited heat sink until the ability to remove heat to the ultimate heat sink is restored. If Suppression Pool temperature is greater than the HCL, it is assumed that the Main Condenser is unavailable AND heat capacity of the pool is severely degraded due to Suppression Pool low level or high temperature. Per PEI Bases Document under PEI-T-23, Containment Control (Suppression Pool Temperature), so long as the plant is maintained below the HCL, the Suppression Pool temperature will not exceed the design limit of 185°F following RPV depressurization.

Losing both divisions of the Shutdown Cooling and Suppression Pool Cooling modes of RHR inhibits the ability to reduce reactor coolant temperatures to less than 200°F. Loss of RHR Shutdown Cooling means all RHR modes as defined in SOI-E12 or ONI-E12-2.

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency SS4
2. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Table 1.2
3. Plant Emergency Instruction (PEI) Bases Document (Rev. 2 / Update 1)
4. Off-Normal Instruction (ONI) E12-2, Loss of Decay Heat Removal (Rev. 4)
5. System Operating Instruction (SOI) E12, Residual Heat Removal System (Rev. 8)

Deviations/Comments:

1. NUMARC IC statement, "Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown," was changed to BS1, "Complete Loss of Functions Needed to Achieve Cold Shutdown." For a BWR, entering Hot Shutdown merely requires placing the reactor mode switch in shutdown. The NUMARC basis discusses both reactivity control and decay heat removal. Perry Plant EAL BS1 only addresses total loss of decay heat removal, since loss of reactivity control is covered under ATWS initiating conditions. An EAL was, therefore, generated that reflects the NUMARC basis yet is consistent with a Site Area Emergency declaration.

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

~~SS5~~AS1 Loss of RPV water level that has or will uncover fuel ~~in the RPV.~~

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown, Cold Shutdown, Refueling

Example Emergency Action Level:

1. ~~Loss of RPV water level as indicated by:~~
 - a. ~~Loss of all decay heat removal cooling as determined by (site specific) procedure.~~
 - AND**
 - b. ~~(Site specific) indicators that the core is or will be uncovered.~~

RPV water level CANNOT be maintained greater than 0".
AND
Reactor is "shutdown under full conditions without boron."

Basis:

This IC and its associated EAL address: (1) a loss of the Reactor Coolant System, defined here as the inability to maintain level above the top of active fuel; and (2) a challenge to the fuel clad when the core becomes uncovered. This could ultimately result in a release to the environment.

AS1 is applicable only to non-ATWS situations in which RPV level was NOT intentionally lowered per PEI-B13 (ATWS) as a means of power control. Refer to NUMARC IC SG2 (Perry CG1) for ATWS scenario.

The fission product barrier loss and challenge thresholds defined in the Fission Product Barrier Matrix only apply under Modes 1, 2 or 3. This separate IC, established outside the Fission Product Barrier Matrix, is based on application during Modes 4 and 5 in addition to Modes 1, 2 and 3. Refer to the Fission Product Barrier Matrix for possible event escalation to a General Emergency in Modes 1, 2 or 3 based upon this condition in combination with a loss or challenge to the Containment barrier.

RECOGNITION CATEGORY S**References:**

1. NUMARC NESP-007 (Rev. 2), Site Area Emergency SS5
2. Technical Specifications, Perry Nuclear Power Plant, Unit 1, Sections 3.4.9.1 and 3.4.9.2
3. Plant Emergency Instruction (PEI), RPV Control (Non-ATWS Rev. 2)

Deviations/Comments:

1. NUMARC EAL Statement: "Loss of all decay heat removal cooling as determined by (site-specific) procedure.

This EAL statement was not included in the Perry IC. A review of the NUMARC basis indicated that the concern addressed by this EAL statement was not the loss of cooling capability but rather the potential for loss of water inventory that can occur through a RHR system which might result in a loss of cooling capability. An inability to keep the core covered is, in itself, a loss of decay heat removal cooling capability. The statement, therefore, appears to be at least partially redundant with the remainder of the IC and does not significantly add to the IC.

An inability to maintain the plant in a cold shutdown condition is not a significant issue for BWRs. Under these conditions, Technical Specifications and plant procedures merely require that preparations be made to enter Operating Condition 3 and that it then be entered.

2. The Perry Plant EAL as written is comprehensive enough to include a loss of RCS inventory during shutdown conditions from any source rather than being limited to inventory losses through only the RHR system.
3. Mode applicability has been expanded to include Modes 1, 2 and 3 to ensure consistency with the Fission Product Barrier Matrix and the criteria for declaration of a Site Area Emergency in Modes 1,2 and 3 based on RPV level less than 0".
4. Top of Active Fuel (TAF) is equivalent to 0" RPV water level.

RECOGNITION CATEGORY S**SITE AREA EMERGENCY**

SS6JS1 Inability to monitor a significant transient in progress.

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~All of the following conditions exist:~~
 - a. ~~Loss of (site specific) annunciators associated with safety systems.~~
AND
 - b. ~~Compensatory non-alarming indications are unavailable.~~
AND
 - c. ~~Indications needed to monitor (site specific) safety functions are unavailable.~~
AND
 - d. ~~Transient in progress.~~

Either:

- Loss of Control Room annunciators.
- Loss of Control Room indication.

AND

Compensatory indicators, i.e., ERIS and process computer, are NOT available.

AND

A significant transient is in progress.

AND

Sufficient indication is NOT available to directly monitor plant critical safety parameters for PEIs entered due to the transient.

Basis:

This IC and its associated EAL recognize the inability of the Control Room staff to monitor plant response to a transient. A Site Area Emergency is considered to exist if the Control Room staff CANNOT monitor the critical safety functions needed for protection of the public as indicated by an inability to monitor the PEI entry condition indications.

This IC and its associated EAL recognize the difficulty associated with monitoring plant conditions without the use of a major portion of the annunciation or indication equipment.

RECOGNITION CATEGORY S

Quantification of "most" is left to the Shift Supervisor. It is not intended that plant personnel perform a detailed count of the instrumentation lost, but rather make a judgment call with approximately 75% being the threshold. It is estimated that if approximately 75% of the annunciators or indicators are lost, there is an increased risk that a degraded plant condition could go undetected.

Control Room panels with annunciators and indications include:

- All Unit 1 Control Room Panels in the Operations Areas,
- Unit 1 D17, D19, D21 Readout Modules
- Unit 2 Plant Vent on panel 2H13-P804 (1D17), and 2H13-P884 (2D19)
- Unit 2 Start-Up Transformer on panel 2H13-P870, and
- Unit 2 Safety-related batteries on panel 2H13-P877.

Indications are available at other locations including Control Room back panels. However, using them to safely operate the plant would require increased surveillance.

Critical safety functions are those plant parameters and functions that allow the plant operators to verify they have a coolable core geometry, that core cooling is maintained, and that Containment is intact. The Perry Plant USAR, Chapter 15A.2.2.b states that the safety functions include:

1. The accommodation of abnormal transients and postulated design basis accidents,
2. The maintenance of Containment integrity,
3. The assurance of Emergency Core Cooling, and
4. The continuance of Reactor Coolant Pressure Boundary integrity.

If a significant transient is in progress, entry into one or more PEIs would be required for RPV or Containment control. These PEIs specify the parameters that must be monitored and controlled.

Compensatory indications include the Process Computer System and Emergency Response Information System (ERIS). It may include other permanently or temporarily installed monitoring systems if they allow the plant Operators to compensate for the failed indications.

The D19 Accident Radiation Monitoring System may be started to monitor the 4 plant release points. If functional, this would qualify as a compensatory indicator for the respective D17 radiation monitor(s). Similarly, if no transient is in progress that would auto-initiate the D19 monitor, the D17 system may fulfill the function of a compensatory non-alarming indicator for the respective D19 monitors.

Control Rods being fully inserted is compensatory indication for Reactor power.

RECOGNITION CATEGORY S

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

References:

1. NUMARC/NESP-007 (Rev. 2), Site Area Emergency SS6
2. Updated Safety Analysis Report (USAR), Chapter 15A
3. Off-Normal Instruction (ONI) R61, Loss of Control Room Annunciators (Rev. 0)
4. Plant Emergency Instruction (PEI) B13, RPV Control (ATWS), Rev. A
5. Plant Emergency Instruction (PEI) B13, RPV Control (Non-ATWS), Rev. A
6. Plant Emergency Instruction (PEI) T23, Containment Control, Rev. A

Deviations/Comments:

1. None

RECOGNITION CATEGORY S**GENERAL EMERGENCY**

SG4DG1 Prolonged loss of all offsite power and ~~prolonged loss of all onsite AC power to Division 1 and 2 EH busses and continuing degradation of core cooling capability.~~

Operating Mode Applicability: Power Op., Hot Standby (Startup in BWRs), Hot Shutdown

Example Emergency Action Level:

1. ~~Prolonged loss of all offsite and onsite AC power as indicated by:~~
 - a. ~~Loss of power to (site specific) transformers.~~
 - AND**
 - b. ~~Failure of (site specific) emergency diesel generators to supply power to emergency busses.~~
 - AND**
 - c. ~~At least one of the following conditions exist:~~
 - ~~Restoration of at least one emergency bus within (site specific) hours is NOT likely~~
 - OR**
 - ~~(Site specific) indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.~~

Either:

Both of the following busses CANNOT be energized from any source in less than 4 hours:

- EH11
- EH12

OR

Entry into PEI-T23, Containment Flooding, based on inadequate core cooling due to a loss of ECCS capability

RECOGNITION CATEGORY S

Basis:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. This event is escalated to a General Emergency based on a prolonged loss of all AC power leading eventually to a loss of fuel clad, RCS, and Containment.

A four hour restoration time is allocated to re-energize either bus EH11 or EH12 from any AC power source. This restoration time is based on the Station Blackout (SBO) Coping Analysis described in USAR Chapter 15, Appendix H.

For event classification purposes, the "continued degradation of core cooling capability" is defined as entry into PEI-T23, Containment Flooding, to re-establish adequate core cooling for ATWS and non-ATWS conditions. To ensure continuity with the Fission Product Matrix (Table A-1) and Initiating Condition CG1, the criteria established by the PEI Bases Document for adequate core cooling under ATWS and non-ATWS conditions is used.

References:

1. NUMARC/NESP-007 (Rev. 2), General Emergency SG1
2. Plant Emergency Instruction (PEI) B13, RPV Control (Non-ATWS), Rev. A
3. Plant Emergency Instruction (PEI) B13, RPV Flooding, Rev. A
4. Plant Emergency Instruction (PEI) T23, Containment Flooding, Rev. A
5. Plant Emergency Instruction (PEI) Basis Document (Rev. 2 / Update 1)
6. Off-Normal Instruction (ONI), R10, Loss of AC Power (Rev. 4)
7. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Section 3/4.8.1
8. Updated safety Analysis Report (USAR), Chapter 15.2.6 and Appendix 15H

Deviations/Comments:

1. The IC title has been changed by adding the qualifier, "Division 1 and 2 EH (essential) Busses." and a time frame. This change meets the intent of the example EAL listed in NUMARC while being more descriptive for the Emergency Coordinator. Consistency between event classification titles is being sought to avoid the confusion created in the NUMARC document. (see NUMARC IC: SU1, SA1, SA5, SS1, SG1, SU7, SS3).
2. The phrase "AND continuing degradation of core cooling capability" was also added to IC title. Change was made to clearly indicate the significance of the IC and to emphasize the differences between DS1 (NUMARC IC SS1) and DG1 (NUMARC IC SG1) on the Initiating Condition Index.

RECOGNITION CATEGORY S

3. NUMARC IC SG1 requires the Emergency Coordinator to check that offsite power distribution and onsite power distribution are available. These conditions are combined into one EAL. If the essential (EH) bus is de energized, it means that both offsite and onsite power sources were unable to connect to the divisional bus.
4. Per USAR Chapter 15, Appendix H - Section 2.1.5, the Perry Plant SBO coping duration is 4 hours. Based on this analysis, the USAR states that "the findings show that recovery from a Station Blackout (SBO) occurs in the most part in less than 4 hours, diesel generators are highly reliable, and that given a SBO, core damage is more dependent upon decay heat removal systems that are not AC dependent". Table 15H-1 provides the analyzed sequence of events for a SBO.

RECOGNITION CATEGORY S**GENERAL EMERGENCY**

SG2CG1 ~~Failure of the Reactor Protection system to initiate or complete an automatic scram and manual scram was not a successful shutdown, AND there is indication of an extreme challenge to the ability to cool the core.~~

Operating Mode Applicability: Power Op.

Example Emergency Action Level:

- ~~1. (Site specific) indications exist that automatic and manual scram were not successful.~~
AND
- ~~2. Either of the following:~~
 - ~~a. (Site specific) indications exist that the core cooling is extremely challenged.~~
OR
 - ~~b. (Site specific) indication exists that heat removal is extremely challenged.~~

Following automatic actuations of either of the following, "shutdown under all conditions without boron" has NOT been obtained:

- RPS
- RRCS

AND Either:

- Manual operator actions taken at 1H13-P680 were NOT successful in lowering Reactor power to less than 4%
- Reactor power CANNOT be determined.

AND Either of the following conditions exist:

- Entry into PEI-T23, Containment Flooding.
- In the UNSAFE region on the HCL figure

Basis:

CG1 is applicable if Mode 1 existed when the transient started and NOT the mode which exists at the time of classification. Refer to CA1 for Mode 2 applicability.

This condition indicates a failure of both the automatic protection system and manual efforts to scram the reactor concurrent with a challenge to the ability to cool the core.

RECOGNITION CATEGORY S

Four percent was selected to identify a successful manual scram. This power level is consistent with the decision process used in the PEI-B13, RPV Control (ATWS)-ENTRY. Power levels above the average power range monitor (APRM) downscale trip setpoint of 4% may challenge the ability to limit Containment heat-up and may require actions to deliberately lower RPV water level per PEI-B13 (ATWS) to reduce reactor power. It should NOT be confused with the definition of "shutdown under all conditions without boron."

A manual scram is any set of actions by the Reactor Operator(s) which results in a scram as defined above. These actions include placing the Reactor Mode Switch in the SHUTDOWN position, arming and depressing the RPS Manual Scram push buttons, and arming and depressing the RRCS Manual ARI push buttons, injection of boron, and PEI-SPI actions. If control rod insertion actions are still being implemented when a core limit is reached, a General Emergency shall be declared.

If Reactor power is unknown and the Reactor is NOT "shutdown under all conditions without boron," then it cannot be verified that power is less than 4%.

For event classification purposes, "an extreme challenge to the ability to cool the core" is defined as either:

- Entry into PEI-T23, Containment Flooding, based on an inability to adequately cool the core. During an ATWS condition, PEI-B13, RPV Control (ATWS), directs the Operator to deliberately lower RPV water level below the TAF (0") to reduce reactor power. Assurance of adequate core cooling is achieved when RPV level can be maintained at or above the Minimum Steam Cooling RPV Water Level (-30"). Under this ATWS condition, steam flow through the core is sufficient to preclude the peak clad temperature of the hottest fuel rod from exceeding 1500 degrees F. If level CANNOT be maintained at or above the Minimum Steam Cooling RPV Water Level, Operators are directed to initiate Containment Flooding per PEI-T23 in an attempt to re-establish adequate core cooling.
- In the UNSAFE region on the Heat Capacity Limit (HCL) figure. PEI-T23 directs the Operator to initiate an emergency depressurization per PEI-B13 in support of Containment Flooding. Per the PEI Bases Document under PEI-T23, Containment Control (Suppression Pool), sufficient Suppression Pool heat capacity will be available to ensure that the initiation of RPV depressurization will NOT result in exceeding the PCL before the rate of energy transfer from the RPV to the Containment is within the capacity of the Containment vent, so long as Suppression Pool parameters are maintained outside the UNSAFE region on the HCL figure. Therefore, availability of the Suppression Pool is critical in support of restoring adequate core cooling through Containment Flooding and ensuring a heat sink is available for heat removal via the SRVs.

RECOGNITION CATEGORY S**References:**

1. NUMARC/NESP-007 (Rev. 2), General Emergency SG2
2. Plant Emergency Instruction (PEI) B13, RPV Control (ATWS), Rev. A
3. Plant Emergency Instruction (PEI) T23, Containment Flooding, Rev. A
4. Plant Emergency Instruction (PEI) Basis Document (Rev. 2 / Update 1)
5. Technical Specifications, Perry Nuclear Power Plant (Unit 1), Table 2.2.1-1

Deviations/Comments:

1. The initiating condition was modified to allow either the Reactor Protection System (RPS) or Redundant Reactivity Control System (RRCS) to initiate the automatic reactor scram. Since the initiation setpoints of the two systems are close together, it will require a post-scam evaluation to determine which system actually inserted the control rods. Automatic protection is provided in both cases.

RECOGNITION CATEGORY S

(INTENTIONALLY BLANK)

NUMARC/NESP-007 Cross-Reference

NUMARC/NESP-007 Cross-Reference

PERRY IC	NUMARC/NESP-007 IC
UNUSUAL EVENT	
AU1	SU4
AU2	SU5
AU3	FU1
CU1	SU2
DU1	SU1
EU1	SU7
FU1	HU2
FU2	HU1
GU1	AU2
GU2	AU2
HU1	AU1
HU2	AU1
JU1	SU3
KU1	SU6
KU2	SU6
LU1	HU1
MU1	HU3
NU1	HU4
OU1	HU5

NUMARC/NESP-007 Cross-Reference

PERRY IC	NUMARC/NESP-007 IC
ALERT	
AA1	FA1
AA2	FA1
BA1	SA3
CA1	SA2
DA1	SA5
DA2	SA1
FA1	HA2
GA1	AA2
GA2	AA3
HA1	AA1
HA2	AA1
IA1	HA5
JA1	SA4
LA1	HA1
MA1	HA3
NA1	HA4
OA1	HA6

NUMARC/NESP-007 Cross-Reference

PERRY IC	NUMARC/NESP-007 IC
SITE AREA EMERGENCY	
AS1	SS5
AS2	FS1
AS3	FS1
BS1	SS4
CS1	SS2
DS1	SS1
ES1	SS3
HS1	AS1
IS1	HS2
JS1	SS6
NS1	HS1
OS1	HS3

PERRY IC	NUMARC/NESP-007 IC
GENERAL EMERGENCY	
AG1	FG1
CG1	SG2
DG1	SG1
HG1	AG1
NG1	HG1
OG1	HG2

Attachment 3

OFFSITE AGENCY LETTERS OF CONCURRENCE SUBMITTED
AS PART OF ORIGINAL JANUARY 1993 SUBMITTAL
UNDER CEI LETTER PY-CEI/NRR-1584L

- o Lake County Board of Commissioners to Mr. M.J. Roseum (Emergency Planning Supervisor), dated June 15, 1993
- o Geauga County Board Of Commissioners to Mr. M.J. Roseum (Emergency Planning Supervisor), dated June 29, 1993
- o Ashtabula County Board of Commissioners to Mr. M.J. Roseum (Emergency Planning Supervisor), dated June 23, 1993
- o Mr. Larry Grove (Radiological Analysis Program Supervisor, Ohio Emergency Management Agency) to Mr. J.D. Anderson (Onsite Emergency Planner), dated October 26, 1992
- o Mr. James R. Williams (Chief of Staff, Ohio Emergency Management Agency) to the Nuclear Regulatory Commission, dated April 13, 1992

COUNTY OF LAKE



BOARD OF COUNTY COMMISSIONERS

ROBERT A. GARDNER JOHN F. PLATZ

MILDRED M. TEUSCHER

PAINESVILLE
(216) 357-2745

TOLL FREE
800-899-LAKE

FAX
(216) 357-2672

June 15, 1993


Mr. Marc Roseum, Emergency Planning Supervisor
Perry Nuclear Power Plant
P.O. Box 97
Perry, OH 44081


Dear Mr. Roseum,

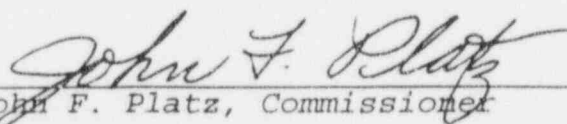
The Board of Lake County Commissioners, hereby concurs with the implementation of the new Nuclear Management and Resource Councils (NUMARC) Emergency Action Level Methodology as the primary mechanism of identifying and classifying Emergency Events at the Perry Nuclear Power Plant.

Sincerely,

LAKE COUNTY BOARD OF COMMISSIONERS


Mildred M. Teuscher, President


Robert A. Gardner, Commissioner


John F. Platz, Commissioner

(KRG.166)

COUNTY
OF
GEAUGA



Board of
Commissioners

TONY GALL
NEIL C. HOFSTETTER
Wm. M. REPKE

June 29, 1993

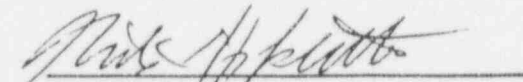
Mr. Marc Roseum
Emergency Planning Supervisor
Perry Nuclear Power Plant
P.O.Box 97
Perry, Ohio 44081

Dear Mr. Roseum:

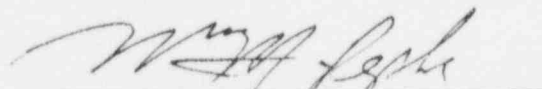
The Geauga County Board of Commissioners hereby concurs with the implementation of the New Nuclear Management and Resource Council's (NUMARC) Emergency Action Level Methodology as the primary mechanism of identifying and classifying emergency events at the Perry Nuclear Power Plant.

Sincerely,

Gauga County Board of Commissioners


Neil C. Hofstetter, President


Tony Gall


Wm. M. Repke

Ashtabula County Commissioners

25 West Jefferson Street
Jefferson, Ohio 44047-1092

216/576-3750

FAX 216/576-2344

COMMISSIONERS

Joanne M. Bento
Duane S. Feher
L. George Distel

Brian Condron
Administrator

Julie Chelciu
Clerk of the Board

June 23, 1993

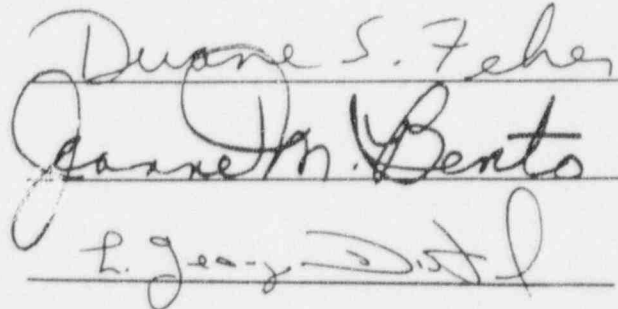
Mr. Marc Roseum
Emergency Planning Supervisor
Perry Nuclear Power Plant
P. O. Box 97
Perry, OH 44081

Dear Mr. Roseum

The Ashtabula County Commissioners hereby concur with your implementation of the Nuclear Management and Resource Councils (NUMARC) Emergency Action Level Methodology as the primary mechanism of identifying and the classifying of Emergency Events at the Perry Nuclear Power Plant.

Very truly yours,

ASHTABULA COUNTY COMMISSIONERS


Duane S. Feher
Joanne M. Bento
L. George Distel

STATE OF OHIO
ADJUTANT GENERAL'S DEPARTMENT
2825 WEST GRANVILLE ROAD
COLUMBUS, OHIO 43233-2712

EMERGENCY MANAGEMENT AGENCY

AGOH-EM-RERP

October 26, 1992

Mr. Joe Anderson, Onsite Emergency Planner
Cleveland Electric Illuminating Company
Perry Nuclear Power Plant
Mail Zone PY-PTC
10 Center Road
P.O. Box 97
Perry, Ohio 44081

Dear Mr. Anderson:

The Ohio Emergency Management Agency (Ohio EMA) appreciates the opportunity to review and comment on Perry Nuclear Power Plant's proposed Emergency Action Levels (EALs) using the NRC-approved NUMARC methodology. We have been in consultation with the Ohio Department of Health and the Ohio Environmental Protection Agency.

All referenced agencies did receive Regulatory Guide 1.101, NUMARC NESP-007 Regulatory Analysis, "Revision of Regulatory Guide 1.101 to Accept the Guidance in NUMARC NESP-007 as an Alternative Methodology for the Development of Emergency Action Levels," as well as the proposed EALs. Ohio EMA did submit comments to the NRC on the Revision of Regulatory Guide 1.101 in March of 1992 (see attached). We understand that the new 10 CFR Part 20 and the new EPA Action Guides will impact NUMARC's methodology as well as the recent study of the NRC on the risks during shutdown. We request that we be notified of any changes made to these EALs based on revisions to the methodology.


The following is a summation of the comments from the Ohio Emergency Management Agency, Ohio Department of Health, and the Ohio Environmental Protection Agency:

- a. Both State and County health departments request notification from the utility if a contaminated injured person is transported off-site to a local hospital.
- b. The Ohio Emergency Management Agency, Ohio Department of Health, and the Ohio Environmental Protection Agency reserve the right to revise these comments upon receipt and review of comments from the NRC.

SUBJECT: Perry Nuclear Power Plant's EAL Proposal

The Ohio Emergency Management Agency accepts the proposed EALs based on the NUMARC methodology as an improvement to previous EALs based on NUREG-0654. It is apparent that the Perry Nuclear Power Plant has put a great deal of time and effort in the development of these EALs. This demonstrates their dedication to the safety of Ohio citizens.

Sincerely,


Larry Grove
Radiological Analysis Program
Supervisor

CAO/kb

Enclosures

cc:

Robert Owen, Ohio Dept. of Health
Zack Clayton, Environmental Protection Agency
Dean Jagger, Dept. of Industrial Relations
Dr. Don Noah, Ohio Dept. of Agriculture
John Vitellas, Public Utilities Commission of Ohio

STATE OF OHIO
ADJUTANT GENERAL'S DEPARTMENT
2825 WEST GRANVILLE ROAD
COLUMBUS, OHIO 43235-2712
EMERGENCY MANAGEMENT AGENCY

AGCH-EM-RERP

April 13, 1992

Regulatory Publications Branch
Division of Freedom of Information
and Publications Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sirs:

The Ohio Emergency Management Agency (Ohio EMA) requests consideration of its comments on Revision of Regulatory Guide 1.101 to accept the guidance in NUMARC/NESP-007, Revision 2 as an alternative methodology for the development of Emergency Action Levels (EALs).

Ohio EMA urges the NRC to accept the guidance in NUMARC/NESP-007, Rev. 2 as the alternative method for development of emergency action levels. It is understood that the implementation of the NUMARC guidance by licensees will be strictly on a volunteer basis. It is also understood that State and local governments shall have the opportunity to discuss and agree to any revisions to the emergency action levels in compliance to the requirements found in Section IV.B. of Appendix E to 10CFR Part 50.

Ohio EMA has reviewed the information contained in NUMARC/NESP-007 and the Regulatory Analysis to the Revision of Regulation Guide 1.101 and, therefore, offers the following comments to support its contention that the NUMARC/NESP-007 should be accepted as an alternative methodology:

1. NUMARC's methodology would result in consistency (EALs would lead to similar decision under similar circumstances at different plants).
2. NUMARC methodology would result in EAL development that would be more easily understood by offsite emergency planning and response.
3. NUMARC methodology would result in emergency classifications (especially site area and general emergency) being made at the same time or "earlier" than they would be, based on NUREG-0634 criteria. The more timely the notification, the more effective would be the offsite response.
4. NUMARC methodology would result in a reduction in the number of unusual events reported to State and local governments. State and local governments would only receive notification of unusual events if the event were a precursor to a more significant event that could potentially affect the safety of the public. This would significantly enhance the State and local governments' programs to respond to events by eliminating those events that do not have the potential to affect the safety of the public.

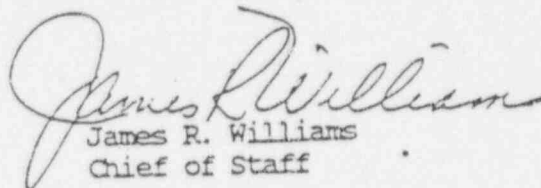
Subject: NUMARC/NESP-007

In addition to comments supporting the NUMARC methodology, Ohio EMA has the following concerns and comments:

1. State and local governments reserve the right to request that licensee nonemergency notification be tailored to meet their needs. In some cases, State and local governments have a need to provide the public with information on the status of an occurrence at the licensed facility that may invoke concern by the public (for example, the transport of a contaminated injured individual from the site to an offsite hospital is likely to raise public concern. It is expected that such an event would involve a follow-up visit by the state radiological health unit).
2. Studies of shutdown risk may impact and result in revisions to methodology contained in NUREG-0654 and NUMARC/NESP-007. Ohio EMA requests that the Nuclear Regulatory Commission keeps the State informed of any revisions by notifying the State of Ohio Liaison Officer.
3. Ohio EMA requests the opportunity to participate in any training/workshops provided by the NRC or NUMARC on review or implementation of the NUMARC methodology for development of emergency action levels.

Thank you for the opportunity to comment on this important topic. We at the Ohio Emergency Management Agency remain committed to the safety of Ohio's citizens.

Sincerely,


James R. Williams
Chief of Staff

CAO:kb

cc:

Robert Owen, Ohio Department of Health
Zack Clayton, Ohio Environmental Protection Agency
Dean Jagger, Department of Industrial Relations
Dr. Don Noah, Ohio Department of Agriculture
Robert Moazampour, Public Utilities Commission of Ohio

Attachment 4

**LETTERS DOCUMENTING CONTINUING OFFSITE AGENCY
CONCURRENCE**

- o Mr. Larry A. Grove (Radiological Branch Chief, Ohio Emergency Management Agency) to Mr. J.D. Anderson, dated December 13, 1995
- o Mr. M.J. Roseum to the Mr. Robert Retzler (Director, Lake County Emergency Management Agency), dated January 12, 1996
- o Mr. M.J. Roseum to the Mr. Dale Wedge (Director, Geauga County Emergency Management Agency), dated January 12, 1996
- o Mr. M.J. Roseum to the Mr. Edward Somppi (Director, Ashtabula County Emergency Management Agency), dated January 12, 1996



Dale Shipley
Deputy Director
Emergency Management Agency
2855 West Dublin-Granville Road
Columbus, OH 43235-2206
(614) 889-7150

Attachment 4 (Cont.)

OHIO DEPARTMENT OF PUBLIC SAFETY

- Administration
- Ohio State Highway Patrol
- Bureau of Motor Vehicles
- Division of Emergency Medical Services
- Emergency Management Agency

December 13, 1995

Mr. Joseph Anderson
Perry Nuclear Power Plant
P.O. Box 97
Perry, OH 44081

Dear Mr. Anderson:

Thank you for the opportunity to review the Perry Plant-Specific EAL Guideline based on NUMARC methodology as well as the companion "User's Guide".

After review of the Guideline document, we contend that most of the Initiating Conditions, ICs, incorporate NUMARC examples, with exceptions as allowed for plant specifics and clarification. We feel that these exceptions are appropriate.

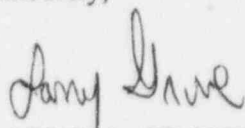
We appreciate the incorporation of the child thyroid as the committed dose equivalent as requested by the State in earlier meetings.

We also appreciate the early declaration of Unusual Event for loss of all communications while still maintaining the capability to contact state and counties even though this IC does not have the capability to initiate a higher classification.

Upon review of the "User's Guide", we contend that this document is very easy to use. The Initiating Condition Index and the Fission Product Barrier Matrix facilitate the use of this document. However, there is a concern with the reference to the ODCM, Offsite Dose Calculation Document. We do not have access to this document; therefore we cannot compare our gaseous release data as obtained from the Nuclear Data System or the Emergency Response Data System for Vent 1 and 2, OG, or TB/HB.

Finally, we request a training session on the EALs to include the Ohio Department of Health and the Ohio Environmental Protection Agency and county personnel, to be conducted on a mutually agreed upon date scheduled after Perry's refueling outage.

Sincerely,


LARRY A. GROVE
Radiological Branch Chief

Mission Statement

to save lives, reduce injuries and economic losses on the streets and highways of Ohio, and to regulate driver licensing and vehicle registration with the most cost effective methods available.





THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

P.O. BOX 97 ■ PERRY, OHIO 44081 ■ TELEPHONE (216) 259-3737 ■ ADDRESS - 10 CENTER ROAD
FROM CLEVELAND: 479-1260

January 12, 1996

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PY-S-S0-8787

Mr. Robert Retzler, Director
Lake County Emergency Management Agency
P.O. Box 480
Mentor, OH 44061

Reference: Implementation of NUMARC/NESP-007 Based Emergency Action Level (EAL)
Methodology

Dear Mr. Retzler:

This letter serves to document the Lake County Emergency Management Agency's continuing support for the implementation of a revised EAL scheme based on NUMARC/NESP-007.

Enclosed is a copy of the training handout used to brief Lake County Emergency Management Agency (EMA) staff members and Commissioners on December 1 and December 6 respectively. As discussed, the significant changes in the proposed NUMARC/NESP-007 based EALs over the original 1993 submittal to the Nuclear Regulatory Commission (NRC) focus on various human-factoring issues, including text formatting, consistent use of terminology, and writing style. Based on these issues, the implementation of the 1993 EAL submittal was delayed until appropriate revisions and subsequent reviews could be completed.

My intent is to submit the revised NUMARC/NESP-007 based EALs to the NRC by mid-February 1996 for approval review. Final implementation has been targeted for November 1996 to allow for the 1996 Emergency Preparedness Exercise and allow sufficient time for training and related procedure changes to be completed. As with the original 1993 EAL submittal to the NRC, final approval of the proposed NUMARC/NESP-007 based EALs by Lake County is reserved until NRC review comments are resolved and written concurrence from the NRC obtained.

Please do not hesitate to call me if you have any questions or concerns over the submittal of the revised NUMARC/NESP-007 based EALs to the NRC and their planned implementation in November 1996.

Sincerely yours,

Handwritten signature of Marcus J. Roseum.

Marcus J. Roseum
Supervisor, Emergency Planning Unit

MJR:jda

Enclosure

NUMARC/NESP-007 BASED EMERGENCY ACTION LEVELS (EALs)

A. ORIGINAL EAL REVISION:

- SUBMITTED TO THE NUCLEAR REGULATORY COMMISSION IN JANUARY 1993
- NRC CONCURRENCE RECEIVED ON SEPTEMBER 29, 1993
- DUE TO PLANT USER "HUMAN-FACTORING" CONCERNS, IMPLEMENTATION OF EAL REVISION POSTPONED

B. REVISED NUMARC/NESP-007 BASED EALs:

- "AND/OR" LOGIC REPLACED WITH "DECISION TABLES"
- EXISTING WRITING STYLE USED FOR LICENSED OPERATOR PROCEDURES USED
- "LOSS/CHALLENGE" CRITERIA FOR FISSION PRODUCT BARRIERS (i.e. fuel, Reactor Coolant System, and Containment) CONSOLIDATED ON SINGLE FORM
- EXTENSIVE REVIEW AND "BUY-OFF" BY USERS PRIOR TO SUBMITTING TO THE NRC

GOALS:

- 1) SUBMITTAL TO THE NRC BY FEBRUARY 1996
- 2) IMPLEMENTATION IN NOVEMBER 1996

C. INTERIM ENHANCEMENTS:

- ADOPTION OF NRC BRANCH POSITION PAPER TO ELIMINATE SPECIFIC UNUSUAL EVENT INITIATING CONDITIONS
 - ⇒ Inadvertent initiation of an emergency water make-up system to the Reactor Vessel [IN PLACE]
 - ⇒ Contaminated injury requiring transportation to an offsite medical facility [JANUARY 1996]
- IMPLEMENTATION OF EAL REFORMATTING BASED REVISED NUMARC/ NESP-007 SUBMITTAL



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FROM CLEVELAND: 479-1260

January 12, 1996

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PY-S-S0-8789

Mr. Dale Wedge, Director
Geauga County Emergency Management Agency
12518 Merritt Road
Chardon, OH 44024

Reference: Implementation of NUMARC/NESP-007 Based Emergency Action Level (EAL)
Methodology

Dear Mr. Wedge:

This letter serves to document the Geauga County Emergency Management Agency's continuing support for the implementation of a revised EAL scheme based on NUMARC/NESP-007.

Enclosed is a copy of the training handout used to brief Geauga County Emergency Management Agency (EMA) staff members and Commissioners on December 1 and December 6 respectively. As discussed, the significant changes in the proposed NUMARC/NESP-007 based EALs over the original 1993 submittal to the Nuclear Regulatory Commission (NRC) focus on various human-factoring issues, including text formatting, consistent use of terminology, and writing style. Based on these issues, the implementation of the 1993 EAL submittal was delayed until appropriate revisions and subsequent reviews could be completed.

My intent is to submit the revised NUMARC/NESP-007 based EALs to the NRC by mid-February 1996 for approval review. Final implementation has been targeted for November 1996 to allow for the 1996 Emergency Preparedness Exercise and allow sufficient time for training and related procedure changes to be completed. As with the original 1993 EAL submittal to the NRC, final approval of the proposed NUMARC/NESP-007 based EALs by Geauga County is reserved until NRC review comments are resolved and written concurrence from the NRC obtained.

Please do not hesitate to call me if you have any questions or concerns over the submittal of the revised NUMARC/NESP-007 based EALs to the NRC and their planned implementation in November 1996.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'Marcus J. Roseum'. The signature is fluid and cursive, with a long horizontal stroke at the end.

Marcus J. Roseum
Supervisor, Emergency Planning Unit

MJR:jda

Enclosure

NUMARC/NESP-007 BASED EMERGENCY ACTION LEVELS (EALs)

A. ORIGINAL EAL REVISION:

- SUBMITTED TO THE NUCLEAR REGULATORY COMMISSION IN JANUARY 1993
- NRC CONCURRENCE RECEIVED ON SEPTEMBER 29, 1993
- DUE TO PLANT USER "HUMAN-FACTORING" CONCERNS, IMPLEMENTATION OF EAL REVISION POSTPONED

B. REVISED NUMARC/NESP-007 BASED EALs:

- "AND/OR" LOGIC REPLACED WITH "DECISION TABLES"
- EXISTING WRITING STYLE USED FOR LICENSED OPERATOR PROCEDURES USED
- "LOSS/CHALLENGE" CRITERIA FOR FISSION PRODUCT BARRIERS (i.e. fuel, Reactor Coolant System, and Containment) CONSOLIDATED ON SINGLE FORM
- EXTENSIVE REVIEW AND "BUY-OFF" BY USERS PRIOR TO SUBMITTING TO THE NRC

GOALS:

- 1) SUBMITTAL TO THE NRC BY FEBRUARY 1996
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C. INTERIM ENHANCEMENTS:

- ADOPTION OF NRC BRANCH POSITION PAPER TO ELIMINATE SPECIFIC UNUSUAL EVENT INITIATING CONDITIONS
 - ⇒ Inadvertent initiation of an emergency water make-up system to the Reactor Vessel [IN PLACE]
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FROM CLEVELAND: 479-1260

January 12, 1996

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PY-S-S0-8788

Mr. Edward Somppi, Director
Ashtabula County Emergency Management Agency
25 West Jefferson Street
Jefferson, OH 44047

Reference: Implementation of NUMARC/NESP-007 Based Emergency Action Level (EAL)
Methodology

Dear Mr. Somppi:

This letter serves to document the Ashtabula County Emergency Management Agency's continuing support for the implementation of a revised EAL scheme based on NUMARC/NESP-007.

Enclosed is a copy of the training handout used to brief Ashtabula County Emergency Management Agency (EMA) staff members and Commissioners on December 1 and December 6 respectively. As discussed, the significant changes in the proposed NUMARC/NESP-007 based EALs over the original 1993 submittal to the Nuclear Regulatory Commission (NRC) focus on various human-factoring issues, including text formatting, consistent use of terminology, and writing style. Based on these issues, the implementation of the 1993 EAL submittal was delayed until appropriate revisions and subsequent reviews could be completed.

My intent is to submit the revised NUMARC/NESP-007 based EALs to the NRC by mid-February 1996 for approval review. Final implementation has been targeted for November 1996 to allow for the 1996 Emergency Preparedness Exercise and allow sufficient time for training and related procedure changes to be completed. As with the original 1993 EAL submittal to the NRC, final approval of the proposed NUMARC/NESP-007 based EALs by Ashtabula County is reserved until NRC review comments are resolved and written concurrence from the NRC obtained.

Please do not hesitate to call me if you have any questions or concerns over the submittal of the revised NUMARC/NESP-007 based EALs to the NRC and their planned implementation in November 1996.

Sincerely yours,

Handwritten signature of Marcus J. Roseum.

Marcus J. Roseum
Supervisor, Emergency Planning Unit

MJR:jda

Enclosure

NUMARC/NESP-007 BASED EMERGENCY ACTION LEVELS (EALs)

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