

July 21, 2004

Mr. Bryce L. Shriver  
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SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - PROPOSED  
REVISION TO EMERGENCY ACTION LEVELS (TAC NOS. MC1270 AND  
MC1271)

Dear Mr. Shriver:

By letter dated October 27, 2003, as supplemented by letters dated May 13 and June 3, 2004, PPL Susquehanna, LLC, submitted proposed changes to the Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2), Emergency Action Levels (EALs) for Nuclear Regulatory Commission (NRC) review and approval prior to implementation in accordance with Title 10 of the *Code of Federal Regulations*, Part 50, Appendix E.

The proposed changes revise the SSES 1 and 2 EALs to implement the guidance in Revision 4 to Nuclear Energy Institute's (NEI) Report 99-01, "Methodology for Development of Emergency Action Levels," which was endorsed under Revision 4 to Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors."

Based on its review, the NRC staff has concluded that the proposed SSES 1 and 2 EAL revision is consistent with the guidance in NEI 99-01, Revision 4, and provides an acceptable alternative as evaluated in the enclosed safety evaluation. As agreed to by your staff, the SSES 1 and 2 EAL changes shall be implemented within 30 days from the issuance date of this letter. If you have any questions, please contact me at 301-415-1030.

Sincerely,

**/RA/**

Richard V. Guzman, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosure: Safety Evaluation

cc w/encl: See next page

Mr. Bryce L. Shriver  
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Based on its review, the NRC staff has concluded that the proposed SSES 1 and 2 EAL revision is consistent with the guidance in NEI 99-01, Revision 4, and provides an acceptable alternative as evaluated in the enclosed safety evaluation. As agreed to by your staff, the SSES 1 and 2 EAL changes shall be implemented within 30 days from the issuance date of this letter. If you have any questions, please contact me at 301-415-1030.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO PROPOSED EMERGENCY ACTION LEVELS

BASED ON REVISION 4 TO NEI 99-01,

“METHODOLOGY FOR DEVELOPMENT OF EMERGENCY ACTION LEVELS,”

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NOS. 50-387 AND 50-388

1.0 INTRODUCTION

In its application dated October 27, 2003, as supplemented by letters dated May 13 and June 3, 2004, PPL Susquehanna, LLC (PPL, the licensee) submitted changes to the Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2), Emergency Action Levels (EALs) for Nuclear Regulatory Commission (NRC) review and approval prior to their implementation in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix E.

The proposed changes revise the SSES 1 and 2 EALs to implement the guidance in Revision 4 to Nuclear Energy Institute’s (NEI) Report 99-01, “Methodology for Development of Emergency Action Levels,” which was endorsed under Revision 4 to Regulatory Guide 1.101, “Emergency Planning and Preparedness for Nuclear Power Reactors.”

2.0 REGULATORY EVALUATION

The regulatory requirements and guidance which the NRC staff considered in its review of the application are as follows:

2.1 Regulations

Paragraph (a)(1) to Section 50.47, “Emergency Plans,” of 10 CFR Part 50 states in part, that no operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. Section 50.47 also establishes standards that must be met by the onsite and offsite emergency response plans for NRC staff to make a positive finding that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. One of these standards, 50.47(b)(4), stipulates that emergency plans include a standard emergency classification and action level scheme.

Enclosure

Section IV.B to Appendix E of 10 CFR Part 50 provides that emergency plans are to include EALs, which are to be used as criteria for determining the need for notification and participation of local and state agencies and which are to be used for determining when and what type of protective measures should be considered both onsite and offsite to protect health and safety. EALs are to be based on in-plant conditions and instrumentation, and also on onsite and offsite monitoring. Section IV.B of Appendix E also provides that EALs shall be discussed and agreed on by the applicant and state and local authorities, be approved by NRC, and be reviewed annually with state and local authorities.

Appendix E, Section IV.C of 10 CFR Part 50, provides that there are emergency classification levels (ECLs) that determine the extent of the participation of the emergency response organization, and that the ECLs include: (1) Notification of Unusual Event, (2) Alert, (3) Site Area Emergency, and (4) General Emergency. EALs are used by plant personnel in determining the appropriate ECL to declare.

## 2.2 Guidance

NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," (NUREG-0654) was published in November 1980 to provide specific acceptance criteria for complying with the standards set forth in Section 50.47 of 10 CFR Part 50. Appendix 1 of NUREG-0654 contains example initiating conditions (ICs) for each of the four ECLs that are used to initiate different levels of emergency response onsite and offsite. Section II.D.1 of NUREG-0654 states that plant parameter values or other information which correspond to the example ICs in Appendix 1 are to be identified. The ICs, in conjunction with the associated parameter values (and other information), make up the EAL scheme. Revision 2 of Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," published in 1981, endorsed NUREG-0654 as an acceptable method for complying with the standards in 10 CFR 50.47, including planning standard 50.47(b)(4) for development of an EAL scheme.

In January 1992, the nuclear industry, under the sponsorship of the Nuclear Management and Resources Council (NUMARC), now the Nuclear Energy Institute (NEI), published NUMARC/NESP-007, Revision 2, "Methodology for Development of Emergency Action Levels." NUMARC/NESP-007 provided more detailed guidance for the development of EAL schemes than that provided in NUREG-0654 and was based upon insights gained from more than 10 years of developing EAL schemes. NUMARC/NESP-007: (1) provided definitions to ECLs, ICs, and EALs, and indicated the relationship between these concepts; (2) provided a set of ICs which closely corresponded, in most instances, to those provided in NUREG-0654; (3) provided specific example EALs under individual ICs; (4) provided the bases for the ICs and EALs; and (5) delineated the operating mode for which the ICs and EALs were applicable. In 1992, NRC staff endorsed, in Revision 3 to Regulatory Guide (RG) 1.101, the NUMARC/NESP-007 methodology as an acceptable alternative method to that described in NUREG-0654 for developing EALs to meet the standard in 10 CFR 50.47(b)(4) and the requirements in Appendix E to 10 CFR Part 50 for EALs. In Revision 3 to RG 1.101, the NRC stated that "Licensees may use either NUREG 0654/FEMA-REP-1 or NUMARC/NESP-007 in developing their EAL scheme but may not use portions of both methodologies."

In January 2003, NEI submitted guidance under NEI 99-01, Revision 4, January 2003, "Methodology for Development of Emergency Action Levels," for developing EALs applicable in the shutdown and refueling modes of plant operations. NEI 99-01 also provided new guidance for developing EALs for permanently shutdown reactors and dry cask spent fuel storage at nuclear power plants. In addition, improvements to the NUMARC/NESP-007 EAL guidance were incorporated into NEI 99-01; these improvements were first developed (and the rationale behind the revision discussed) in NEI 97-03, Draft Final Revision 3, "Methodology for Development of Emergency Action Levels" (December 1998). NEI 97-03 was not endorsed by the NRC because the NRC applied its resources to the review of NEI 99-01, which incorporates the guidance in NEI 97-03. In July 2003, the NRC issued Revision 4 to RG 1.101 which endorsed the guidance contained in NEI 99-01 (Revision 4, January 2003), as acceptable to the NRC staff as an alternative method to that described in Appendix 1 to NUREG-0654/FEMA-REP-1 and NUMARC/NESP-007 for developing EALs required in Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4).

On October 8, 2003, Regulatory Issue Summary (RIS) 2003-18, "Use of NEI 99-01, Methodology for Development of Emergency Action Levels," was issued and provided guidance for developing or changing a standard emergency classification and action level scheme. In addition, this RIS provided the following recommendations to assist licensees in determining whether to seek prior NRC approval of deviations from the new guidance:

The staff recognizes that all changes to EALs do not warrant NRC review and approval. Licensees may make changes to their emergency plans without prior Commission approval when the changes do not decrease the effectiveness of the plans and the plans, as changed, continue to meet the standards of 10 CFR 50.47(b) and the requirements of Appendix E. Licensees adopting this latest guidance should consider the application of 10 CFR 50.54(q) and Appendix E, Section IV.B, as appropriate. In this regard licensees should consider the following: (A) NUREG-0654 users converting to NEI 99-01, Revision 4, should seek NRC prior approval since this is a change in scheme...

Since the proposed revision to the SSES 1 and 2 EALs involves the conversion from the NUREG-0654 scheme to NEI 99-01, Revision 4, the proposed changes were submitted to the NRC for approval prior to implementation by licensee, as recommended under RIS 2003-18.

### 3.0 TECHNICAL EVALUATION

The NRC staff has reviewed the licensee's regulatory and technical analyses in support of its proposed IC and EAL changes, which are described in their application dated October 27, 2003, as supplemented in letters dated May 13 and June 3, 2004. The technical evaluation was performed against the guidance provided in NEI 99-01, Revision 4. Deviations and significant differences in IC or EAL wording between PPL's submittal and NEI 99-01, Revision 4, were specifically identified and evaluated. Minor differences, such as station-specific terminology, system and component names, or formatting were not identified for further evaluation.

Initiating Conditions, entitled "Defueled Station Malfunctions," listed under Category D in NEI 99-01, Revision 4, are not applicable since both SSES 1 and 2 have current operating licenses, and, therefore, were not considered during this technical evaluation.

### 3.1 Definitions

#### NEI 99-01 Section 5.4

Section 5.4 of NEI 99-01 defines a significant transient as "an UNPLANNED event involving one or more of the following: (1) automatic turbine runback >25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) Safety Injection Activation, or (5) thermal power oscillations >10%."

#### Licensee Deviation

PPL defines a significant transient as "an UNPLANNED event involving one or more of the following: (1) Reactor Recirculation System runback involving a power reduction of over 25% thermal reactor power, (2) electrical load rejection >25% full electrical load, (3) Reactor Trip, (4) ECCS Activation, or (5) thermal power oscillations >10%."

#### NRC Staff's Evaluation

Per PPL's response to Request for Additional Information (RAI) question number 38 (RAI-38) of its June 3, 2004, letter, SSES 1 and 2 design does not have a turbine runback feature, but does have an automatic reactor recirculation system that initiates a reduction in thermal power based upon input parameters such as feedwater flow, RPV level, etc. PPL's response further states that a recirculation system runback is a comparable transient to that listed in the NEI guidance. This deviation is considered acceptable.

PPL also inserted the term "ECCS actuation," in lieu of "safety injection actuation," to account for terminology routinely used at SSES 1 and 2. PPL identified that this deviation does not impact the intent or scope of NEI 99-01 definition, and therefore, is considered acceptable.

### 3.2 Recognition Category R: Abnormal Rad Levels/Radiological Effluent

#### 3.2.1 Radiological Effluents

##### 3.2.1.1 Licensee RG1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AG1, with the following exceptions:

#### NEI 99-01, AG1 Initiating Condition

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mR TEDE [Total Effective Dose Equivalent] or 5000 mR Thyroid CDE [Thyroid Committed Dose Equivalent] for the Actual or Projected Duration of the Release Using Actual Meteorology.

#### Licensee RG1 Initiating Condition

Dose at the EMERGENCY PLAN BOUNDARY Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mrem TEDE or 5000 mrem Child Thyroid CDE for the Actual or Projected Duration of the Release Using Actual Meteorology.

#### NRC Staff's Evaluation

PPL's use of the site-specific Emergency Plan Boundary (EPB), which is defined as the Exclusion Area Boundary, is considered appropriate based on its use in the station's dose projection model and for the location of remote monitoring system (RMS) perimeter monitors. Therefore, this deviation is considered acceptable, in lieu of the actual site boundary as referenced in NEI 99-01 AG1, in IC statement and EAL Threshold Values 2, 4 and 5.

PPL uses child thyroid conversion factors in lieu of the use of adult thyroid conversion factors as referenced in NEI 99-01 AG1. This deviation is considered acceptable in the IC statement and EAL Threshold Values 2 and 5 per the guidance in NEI 99-01 based on the use of child thyroid CDE by the Commonwealth of Pennsylvania.

#### NEI 99-01, AG1/Example EAL 1

VALID reading on one or more of the following radiation monitors that exceeds or expected to exceed the reading shown for 15 minutes or longer: (site-specific list)

#### Licensee RG1/EAL Threshold Value 1

VALID Noble Gas vent stack monitor reading(s) that exceeds or is expected to exceed a site total release rate of  $6.2E+9 \mu\text{Ci}/\text{min}$  for 15 minutes or longer and Dose Projections are not available.

#### NRC Staff's Evaluation

PPL's insertion of the qualifier, "and Dose Projections are not available," is consistent with the NOTE statement contained in NEI 99-01 guidance, and therefore, is considered acceptable.

#### NEI 99-01, AG1/Example EAL 3

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]

#### Licensee RG1/EAL Threshold Value 3

A VALID reading sustained for 15 minutes or longer on the RMS perimeter radiation monitoring system greater than 1000 mR/hr. (The RMS perimeter

radiation monitoring system is only monitored when the [technical support center] TSC or [emergency operations facility] EOF is activated.)

#### NRC Staff's Evaluation

PPL's addition of the qualifier, "The RMS perimeter radiation monitoring system is only monitored when the TSC [Technical Support Center] or EOF [Emergency Operations Facility] is activated," reflects that RMS is not a normally monitored system, and therefore, would not be accessible to the Control Room for event classification prior to TSC or EOF activation. This deviation is considered acceptable.

#### NEI 99-01, AG1/Example EAL 4

Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 5000 mR for one hour of inhalation, at or beyond the site boundary.

#### Licensee RG1/EAL Threshold Values 4 and 5

Field survey results indicate closed window dose rates exceeding 1000 mR/hr expected to continue for more than one hour at or beyond the EPB.

OR

Analysis of field survey samples indicate child thyroid dose commitment at or beyond the EPB of 5000 mrem assuming one hour of inhalation.

#### NRC Staff's Evaluation

The proposed deviation does not alter the intent or threshold values for classification based on field survey (whole body) and thyroid dose commitment values reflected in NEI 99-01 AG1, and, therefore, is considered acceptable.

#### 3.2.1.2 Licensee RS1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AS1, with the following exceptions:

#### NEI 99-01, AS1 Initiating Condition

Offsite Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mR TEDE or 500 mR Thyroid CDE for the Actual or Projected Duration of the Release.

#### Licensee RS1 Initiating Condition

Dose at the EMERGENCY PLAN BOUNDARY Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mrem TEDE or 500 mrem Child Thyroid CDE for the Actual or Projected Duration of the Release.

#### NRC Staff's Evaluation

PPL's use of the site-specific Emergency Plan Boundary (EPB), which is defined as the Exclusion Area Boundary, is considered appropriate based on its use in the station's dose projection model and for the location of RMS perimeter monitors. Therefore, this deviation is considered acceptable, in lieu of the actual site boundary as referenced in NEI 99-01 AS1, in the IC statement and EAL Threshold Values 2, 4 and 5.

PPL uses child thyroid conversion factors in lieu of the use of adult thyroid conversion factors as referenced in NEI 99-01 AS1. This deviation is considered acceptable in the IC statement and EAL Threshold Values 2 and 5 per the guidance in NEI 99-01 based on the use of child thyroid CDE by the Commonwealth of Pennsylvania.

#### NEI 99-01, AS1/Example EAL 1

VALID reading on one or more of the following radiation monitors that exceeds or is expected to exceed the reading shown for 15 minutes or longer: (site-specific list)

#### Licensee RS1/EAL Threshold Value 1

VALID Noble Gas vent stack monitor reading(s) that exceeds or is expected to exceed a site total release rate of  $6.2E+8 \mu\text{Ci}/\text{min}$  for 15 minutes or longer and Dose Projections are not available.

#### NRC Staff's Evaluation

PPL's insertion of the qualifier, "and Dose Projections are not available," is consistent with the NOTE statement contained in the NEI 99-01 guidance, and therefore, is considered acceptable.

#### NEI 99-01, AS1/Example EAL 3

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]

#### Licensee RS1 / EAL Threshold Value 3

A VALID reading sustained for 15 minutes or longer on the RMS perimeter radiation monitoring system greater than 100 mR/hr. (The RMS perimeter radiation monitoring system is only monitored when the TSC or EOF is activated.)

#### NRC Staff's Evaluation

PPL's addition of the qualifier, "The RMS perimeter radiation monitoring system is only monitored when the TSC or EOF is activated," reflects that RMS is not a normally monitored system, and therefore, would not be accessible to the Control Room for event classification

prior to TSC or EOF activation. This deviation is considered acceptable.

NEI 99-01, AS1/Example EAL 4

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour; or analyses of field survey samples indicate thyroid CDE of 500 mR for one hour of inhalation, at or beyond the site boundary.

Licensee RS1/EAL Threshold Values 4 and 5

Field survey results indicate closed window dose rates exceeding 100 mR/hr expected to continue for more than one hour at or beyond the EPB.

OR

Analyses of field survey samples indicate child thyroid dose commitment at or beyond the EPB of 500 mrem assuming one hour of inhalation.

NRC Staff's Evaluation

The proposed deviation in the creation of two separate threshold values (whole body and child thyroid dose commitment) does not alter the intent or threshold values for classification based on the field survey (whole body) and thyroid dose commitment values reflected in NEI 99-01 AS1, and therefore, is considered acceptable.

3.2.1.3 Licensee RA1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AA1, with the following exceptions:

NEI 99-01, AA1/Example EAL 3

Confirmed sample analyses for gaseous or liquid releases indicates concentrations or release rates, with a release duration of 15 minutes or longer, in excess of 200 times (site-specific technical specifications).

Licensee RA1/EAL Threshold Values 2 and 3

Confirmed sample analyses for airborne releases indicate total site release rates for 15 minutes or longer resulting in dose rates at the SITE BOUNDARY of:

A. Noble gases > 1.0E+5 mrem/year whole body,

OR

B. Noble gases > 6.0E+5 mrem/year skin,

OR

C. I-131, I-133, H-3, and particulates with half-lives greater than 8 days >3.0E+5 mrem/year to any organ (inhalation pathways only).

OR

Confirmed sample analyses for liquid releases indicate concentrations in excess of 200 times the Technical Requirements Manual liquid effluent limits for 15 minutes or longer.

#### NRC Staff's Evaluation

The proposed deviation in the creation of two separate threshold values (airborne and liquid releases) does not alter the intent or threshold values for classification based on exceeding 200 times the Technical Specification limit for a duration of 60 minutes or longer as reflected in NEI 99-01 AA1, and therefore, is considered acceptable.

#### NEI 99-01, AA1/Example EAL 4

VALID reading on perimeter radiation monitoring system greater than 10.0 mR/hr above normal background sustained for 15 minutes or longer [for sites having telemetered perimeter monitors].

#### NRC Staff's Evaluation

PPL deletes NEI 99-01, AA1, Example EAL 4 from the SSES 1 and 2 EALs. Example EAL 4 was considered non-applicable by PPL since the RMS monitors are installed at the EPB rather than at the site boundary, and as such, would not be consistent with Offsite Dose Calculation Model (ODCM) thresholds in RA1 that are calculated based on the site boundary. In addition, RMS is not normally monitored or alarmed in the Control Room. Therefore, the deletion of NEI 99-01 AA1/Example EAL 4 is considered acceptable.

#### NEI 99-01, AA1/Example EAL 5

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 15 minutes or longer [for sites having such capability].

#### NRC Staff's Evaluation

PPL deletes NEI 99-01, AA1, Example EAL 5 from the SSES 1 and 2 EALs. SSES 1 and 2 does not have automatic real-time dose assessment capability. Therefore, deletion of NEI 99-01 AA1/Example EAL 5 is considered acceptable.

#### 3.2.1.4 Licensee RU1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AU1, with the following exceptions:

#### NEI 99-01, AU1 / Example EAL 3

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).

### Licensee RU1/EAL Threshold Values 2 and 3

Confirmed sample analyses for airborne releases indicate total site release rates with a release duration of 60 minutes or longer, resulting in dose rates at the SITE BOUNDARY of:

- A. Noble gases > 1000 mrem/year whole body,
- OR
- B. Noble gases > 6000 mrem/year skin,
- OR
- C. I-131, I-133, H-3 and particulates with half-lives greater than 8 days > 3000 mrem/year to any organ (inhalation pathways only).

OR

Confirmed sample analyses for liquid releases indicate concentrations with a release duration of 60 minutes or longer in excess of the two times the Technical Requirements Manual liquid effluent limits.

### NRC Staff's Evaluation

The proposed deviation in the creation of two separate threshold values (airborne and liquid releases) does not alter the intent or threshold values for classification based on exceeding two times the Technical Specification limit for a duration of 60 minutes or longer as reflected in NEI 99-01 AU1, and, therefore, is considered acceptable.

### NEI 99-01, AU1/Example EAL 4

VALID reading on perimeter radiation monitoring system greater than 0.10 mR/hr above normal background sustained for 60 minutes or longer [for sites having telemetered perimeter monitors].

### NRC Staff's Evaluation

PPL deletes NEI 99-01, AU1, Example EAL 4 from the SSES 1 and 2 EALs. Example EAL 4 was considered non-applicable by PPL since the RMS monitors are installed at the EPB rather than at the site boundary, and as such, would not be consistent with ODCM thresholds in RA1 that are calculated based on the site boundary. In addition, RMS is not normally monitored or alarmed in the Control Room. Therefore, deletion of NEI 99-01 AU1/Example EAL 4 is considered acceptable.

### NEI 99-01, AU1 / Example EAL 5

VALID indication on automatic real-time dose assessment capability greater than (site-specific value) for 60 minutes or longer [for sites having such capability].

## NRC Staff's Evaluation

PPL deletes NEI 99-01, AU1, Example EAL 5 from the SSES 1 and 2 EALs. SSES 1 and 2 does not have automatic real-time dose assessment capability. Therefore, the deletion of NEI 99-01 AU1/Example EAL 5 is considered acceptable.

### 3.2.2 Abnormal Radiation Levels

#### 3.2.2.1 Licensee RA2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AA3, and, therefore, are considered acceptable.

#### 3.2.2.2 Licensee RU2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AU2, with the following exceptions:

NEI 99-01, AU2/Example EAL 1.b

Unplanned VALID (site-specific) Direct Area Monitor reading increases.

Licensee RU2/EAL Threshold Value 1.B

UNPLANNED VALID Refuel Floor Area Radiation Monitor (Table R-2) readings greater than 500 mR/hr.

## NRC Staff's Evaluation

PPL has chosen to identify a specific monitor reading to represent "reading increasing." The monitor reading selected (500 mR/hr) is above normal operation set points to preclude inadvertent entry, but low enough to provide an indication of loss of water level. Per licensee RU2 Basis, refuel floor radiation monitor readings have been calculated well in excess of 1 R/hr based on the extent of the cavity drain down accident. The establishment of a 500 mR/hr threshold is considered consistent with the intent of NEI 99-01 AU2, and, therefore, is considered acceptable.

### 3.2.3 Irradiated Fuel Accidents

#### 3.2.3.1 Licensee RA3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category A, AA2, with the following exception:

NEI 99-01, AA2/Example EAL 2

Water level less than (site-specific) feet for the reactor refueling cavity, spent fuel pool and fuel transfer canal that will result in irradiated fuel uncovering.

### Licensee RA3/EAL Threshold Values 2 and 3

Water level < 22 feet above the RPV flange for the reactor refueling cavity that will result in irradiated fuel uncovering.

OR

Water level < 22 feet above seated irradiated fuel for the spent fuel pool that will result in irradiated fuel uncovering.

### NRC Staff's Evaluation

The proposed deviation in the creation of two separate threshold values (reactor refueling cavity and spent fuel pool) does not alter the intent or threshold values for classification as reflected in NEI 99-01 AU1, and, therefore, is considered acceptable.

### 3.3 Recognition Category F: Fission Product Barrier Degradation

#### 3.3.1 Fuel Clad Barrier

##### 3.3.1.1 Reactor Coolant Activity Level (1.a)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: Fuel Clad Barrier Example EAL 1 (Primary Coolant Activity Level), and, therefore, are considered acceptable.

##### 3.3.1.2 RPV Level (1.b)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: Fuel Clad Barrier Example EAL 2 (Reactor Vessel Water Level), and, therefore, are considered acceptable.

##### 3.3.1.3 Drywell Radiation (1.e)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: Fuel Clad Barrier Example EAL 3 (Drywell Radiation Monitoring), and, therefore, are considered acceptable.

##### 3.3.1.4 Emergency Director/Recovery Manager Judgement (1.f)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: Fuel Clad Barrier Example EAL 5 (Emergency Director Judgment), and, therefore, are considered acceptable.

#### 3.3.2 Reactor Coolant System Barrier

##### 3.3.2.1 RPV Level (2.b)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 2 (Reactor Vessel Water Level), and, therefore,

are considered acceptable.

### 3.3.2.2 RCS Leak Rate Or Containment Isolation Failure Or Breach/Bypass (2.c)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 3 with the exception that the parameter "RCS Leak Rate," is used in NEI 99-01 as compared to the parameter, "RCS Leak Rate Or Containment Isolation Failure Or Breach/Bypass," used in PPL's Reactor Coolant System 2.c EAL.

#### NRC Staff's Evaluation

PPL added, "Or Containment Isolation Failure Or Breach/Bypass," to reflect NEI 99-01 criteria indicating an unisolable main steam line break or primary system leakage outside the drywell. The proposed change to the EAL Threshold Value statement does not alter the implementation of NEI 99-01 example EAL criteria or thresholds, and, therefore, is considered acceptable.

### 3.3.2.3 Drywell Pressure (2.d)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 1 (Drywell Pressure), with the following exception:

NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 1 – LOSS

Pressure GREATER THAN (site-specific) PSIG

Licensee Reactor Coolant System 2.d – LOSS

Drywell Pressure > 1.72 pig

AND

Indication of a RCS leak inside drywell

#### NRC Staff's Evaluation

PPL added the qualifier, "AND Indication of a RCS leak inside drywell," to differentiate between an increase in drywell pressure due to a loss of drywell cooling, which alone does not reflect a loss of RCS barrier. The proposed change is consistent with the NEI 99-01 basis, which states that the site-specific value for drywell pressure indicates a LOCA, and, therefore, is considered acceptable.

### 3.3.2.4 Drywell Radiation (2.e)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 4 (Drywell Radiation Monitoring), with the following exception:

NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 4 – LOSS

Drywell Radiation monitor reading GREATER THAN (site-specific) R/hr

Licensee Reactor Coolant System Barrier 2.e – LOSS

Containment High Range Radiation Monitor reading > 7 R/hr

AND

Indication of a RCS leak inside drywell

NRC Staff's Evaluation

PPL added the qualifier “AND Indication of a RCS leak inside drywell” to differentiate radiation from a cloud of released RCS gases from radiation from adjacent piping and components containing elevated reactor coolant activity, but not reflecting a loss of RCS barrier. The proposed change is consistent with the NEI 99-01 basis, which provides a caution regarding the potential erroneous application due to the location of the drywell radiation monitor with respect to RCS piping, and, therefore, is considered acceptable.

### 3.3.2.5 Emergency Director/Recovery Manager Judgement (2.f)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: RCS Barrier Example EAL 6, “Emergency Director Judgment,” and, therefore, are considered acceptable.

### 3.3.3 Primary Containment Barrier

#### 3.3.3.1 RPV Level (3.b)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 2 (Reactor Vessel Water Level) and, therefore, are considered acceptable.

#### 3.3.3.2 RCS Leak Rate Or Containment Isolation Failure Or Breach/Bypass (3.c)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 3 (CNMT Isolation Failure or Bypass), with the following exception:

NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 3

CNMT Isolation Failure or Bypass

Licensee Primary Containment 3.c

RCS Leak Rate Or Containment Isolation Failure Or Breach/Bypass

## NRC Staff's Evaluation

PPL added "RCS Leak Rate OR..." to reflect NEI 99-01 criteria indicating a possible RCS leak outside containment. The proposed change to EAL Threshold Value statement does not alter the implementation of NEI 99-01 example EAL criteria or thresholds, and, therefore, is considered acceptable.

### 3.3.3.3 Drywell Pressure (3.d)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 1 (Drywell Pressure), and, therefore, are considered acceptable.

### 3.3.3.4 Drywell Radiation (3.e)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 4 (Significant Radioactive Inventory in Containment), and, therefore, are considered acceptable.

### 3.3.3.5 Emergency Director/Recovery Manager Judgment (3.f)

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Table 5-F-2 Basis: [Primary] Containment Barrier Example EAL 6 (Emergency Director Judgment), and, therefore, are considered acceptable.

## 3.4 Recognition Category M: System Malfunctions

### 3.4.1 Loss of AC Power

#### 3.4.1.1 Licensee MG1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SG1, and, therefore, are considered acceptable.

#### 3.4.1.2 Licensee MS1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SS1, with the following exception:

NEI 99-01, SS1/Example EAL 1

Loss of power to (site-specific) transformers

AND

Failure of (site-specific) emergency generators to supply power to emergency busses.

AND

Failure to restore power to at least one emergency bus within (site-specific) minutes from the time of a loss of both offsite and onsite AC power.

#### Licensee MS1/EAL Threshold Value 1

Loss of power from Startup Transformer 10 AND 20 to either unit.

AND

All 4.16 kV ESS Buses on either unit are de-energized.

AND

Failure to restore power to at least two 4.16 kV ESS busses on each unit within fifteen minutes from the time of loss of both offsite and ON SITE AC power.

#### NRC Staff's Evaluation

Per PPL's MS1 Basis, the SSES 1 and 2 Individual Plant Evaluation (IPE) indicates that it is necessary to restore at least two 4.16 kV ESS busses, rather than one bus as identified in NEI 99-01 criteria, to avoid jeopardizing decay heat removal and vessel make-up capability. All combinations of two 4.16 kV busses on both units do not result in plant damage unless additional failures exist. The proposed change addresses plant-specific electrical distribution system design while continuing to address NEI 99-01 intent, and, therefore, is considered acceptable.

#### 3.4.1.3 Licensee MA1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SA5, with the following exception:

#### NEI 99-01, SA5/Example EAL 1

AC power capability to site-specific essential busses reduced to a single power source for greater than 15 minutes.

AND

Any additional single failure will result in station blackout.

#### Licensee MA1/EAL Threshold Values 1 and 2

Loss of power from Startup Transformer 10 AND 20 to either unit for > 15 minutes.

AND

Onsite AC power is reduced to a single 4.16 kV ESS Bus on either unit.

OR

Loss of power from Startup Transformer 10 OR 20 to either unit for > 15 minutes.

AND

Onsite AC power is not available.

#### NRC Staff's Evaluation

PPL's proposed changes to create two separate EAL Threshold Values have been evaluated as consistent with NEI Example EAL criteria, and, therefore, are considered acceptable.

#### 3.4.1.4 Licensee MU1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S: SU1, with the following exception:

NEI 99-01, SU1/Example EAL 1

Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

At least (site-specific) emergency generators are supplying power to emergency busses.

Licensee MU1/EAL Threshold Value 1

Loss of power from Startup Transformer 10 AND 20 to either unit for > 15 minutes.

#### NRC Staff's Evaluation

Per Section 4 to PPL's submittal, the design of the off-site power sources for SSES 1 and 2 is such that a loss of both sources would result in an automatic shutdown of both units. Even if onsite power sources were available, this situation represents a degradation in the level of safety of the plant that is consistent with the intent of a Notification of Unusual Event (NOUE). The proposed licensee deviation of eliminating NEI 99-01 MU1 criteria 1.b would continue to require the classification of an NOUE due to the loss of offsite power to essential busses for greater than 15 minutes, and does not impact the intent of NEI 99-01 MU1. Availability of onsite AC power sources is contained in and evaluated under licensee MA1 for possible escalation to an Alert classification. Therefore, the proposed deviation is considered acceptable.

#### 3.4.2 Loss of DC Power

##### 3.4.2.1 Licensee MS2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SS3, and, therefore, are considered acceptable.

#### 3.4.3 Failure of Reactor Protection System

##### 3.4.3.1 Licensee MG3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SG2, with the following exceptions:

NEI 99-01, SG2/Example EAL 1

Indications exist that automatic and manual scram were not successful.

AND

Either of the following: (a or b)

a. Indication(s) exists that the core cooling is extremely challenged.

OR

b. Indication(s) exists that the heat removal is extremely challenged.

#### Licensee MG3/EAL Threshold Value 1

Indication(s) exist that indicate that Reactor Protection System setpoint was exceeded.

AND

RPS [Reactor Protection System], ARI [Alternate Rod Insertion] and Manual Scram/ARI fail to initiate and complete a scram that reduces reactor power to < 5%.

AND

A. Reactor water level cannot be maintained > -205".

OR

B. The combination of RPV Pressure and Suppression Pool Temperature cannot be maintained below the HCTL [Heat Capability Temperature Limit] curve.

#### NRC Staff's Evaluation

PPL proposes to define an unsuccessful automatic and manual scram as the failure of the RPS, ARI and Manual Scram/ARI to reduce power below 5%. Per the MG3 Basis, procedure EO-000-113 establishes 5% power as coincident with a loss of scram capability as the IC for various plant responses to anticipated transient without scram (ATWS) events. This interpretation is consistent with NEI 99-01 SG2 Basis, which states that typically 3% to 5% is the reactor power associated with the safety system design and exceeding this value may imply that a core melt sequence exists. The proposed deviation to interpret what constitutes an unsuccessful scram is considered acceptable.

Reactor water level cannot be maintained > -205" has been established by the licensee as indication that core cooling is extremely challenged. Per the licensee MG3 Basis, the value of -205" is the Minimum Zero-Injection RPV Water Level and is defined to be the lowest RPV water level at which the covered portion of the reactor core will generate sufficient steam to preclude clad temperature in the uncovered portion of the core from exceeding 1800F. This interpretation is consistent with that defined in the NEI 99-01 SG2 Bases as the Minimum Steam Cooling RPV Water Level, and, therefore, are considered acceptable.

Exceeding the HCTL curve limits due to RPV pressure and Suppression Pool temperature has been established by the licensee as indication that heat removal is extremely challenged. Exceeding the HCTL limits would also infer that the main condenser was no longer available as a heat sink per the SSES 1 and 2 Emergency Operating Procedures (EOPs). This interpretation is consistent with that defined in NEI 99-01 SG2 Basis as the inability to remove heat via the main condenser or via the suppression pool or torus (e.g. due to high pool water temperature), and, therefore, is considered acceptable.

### 3.4.3.1 Licensee MS3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SS2, with the following exception:

NEI 99-01, SS2/Example EAL 1

Indication(s) exist that automatic and manual scram were not successful.

Licensee MS3/EAL Threshold Value 1

Indication(s) exist that indicate that Reactor Protection System setpoint was exceeded.

AND

RPS, ARI, and Manual Scram/ARI fail to initiate and complete a scram that reduces reactor power to < 5%.

NRC Staff's Evaluation

PPL proposes to define an unsuccessful automatic and manual scram as the failure of the RPS, ARI, and Manual Scram/ARI to reduce power below 5%, which per the licensee MG3 Basis is established by the SSES 1 and 2 EOPs as coincident with a loss of scram capability as the IC for various plant responses to ATWS events. This interpretation is consistent with NEI 99-01 SG2 Basis, which states that typically 3% to 5% is the reactor power associated with the safety system design and exceeding this value may imply that a core melt sequence exists. The proposed deviation to interpret what constitutes an unsuccessful scram is considered acceptable.

### 3.4.3.3 Licensee MA3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SA2, with the following exception:

NEI 99-01, SA2/Example EAL 1

Indication(s) exist that indicate that reactor protection system setpoint was exceeded and automatic scram did not occur, and a successful manual scram occurred.

Licensee MA3/EAL Threshold Value 1

Indication(s) exist that indicate that Reactor Protection System setpoint was exceeded.

AND

RPS automatic scram did not occur.

AND

A Manual Scram or ARI initiates and reduces reactor power to < 5%.

## NRC Staff's Evaluation

PPL proposes to define an unsuccessful automatic and manual scram as the failure of the RPS, ARI, and Manual Scram/ARI to reduce power below 5%, which per the licensee MG3 Basis is established by the SSES 1 and 2 EOPs as coincident with a loss of scram capability as the IC for various plant responses to ATWS events. This interpretation is consistent with NEI 99-01 SG2 Basis, which states that typically 3% to 5% is the reactor power associated with the safety system design and exceeding this value may imply that a core melt sequence exists. The proposed deviation to interpret what constitutes an unsuccessful scram is considered acceptable.

### 3.4.4 Decay Heat Removal

#### 3.4.4.1 Licensee MS4

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SS4, and, therefore, are considered acceptable.

### 3.4.5 Loss of Annunciators

#### 3.4.5.1 Licensee MS5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SS6, and, therefore, are considered acceptable.

#### 3.4.5.2 Licensee MA5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SA4, and, therefore, are considered acceptable.

#### 3.4.5.3 Licensee MU5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU3, and, therefore, are considered acceptable.

### 3.4.6 Reactor Coolant System Leakage

#### 3.4.6.1 Licensee MU6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU5, and, therefore, are considered acceptable.

### 3.4.7 Fuel Clad Degradation

#### 3.4.7.1 Licensee MU7

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU4, and, therefore, are considered acceptable.

### 3.4.8 Loss of Communications

#### 3.4.8.1 Licensee MU8

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU6, and, therefore, are considered acceptable.

### 3.4.9 Technical Specifications

#### 3.4.9.1 Licensee MU9

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU2, and, therefore, are considered acceptable.

### 3.4.10 Inadvertent Criticality

#### 3.4.10.1 Licensee MU10

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category S, SU8, with the following exception:

NEI 99-01, SU8/Example EALs 1 and 2

An UNPLANNED extended positive period observed on nuclear instrumentation.

An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Licensee MU10/EAL Threshold Value 1

An UNPLANNED extended positive period observed on nuclear instrumentation.

### NRC Staff's Evaluation

PPL deleted the criteria, "An UNPLANNED sustained positive startup rate observed on nuclear instrumentation," based on the site-specific use of reactor period to monitor reactor power during startup. Therefore, this deviation is considered acceptable based on plant design and procedures.

## 3.5 Recognition Category O: Hazards and Other Conditions

### 3.5.1 Security Events

#### 3.5.1.1 Licensee OG1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HG1, with the following exception:

NEI 99-01, HG1/Example EAL 1

A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions.

Licensee OG1/EAL Threshold Values 1 and 2

A HOSTILE FORCE has taken control of plant equipment such that plant personnel are unable to operate equipment required to maintain safety functions as indicated by:

1. Loss of physical control of a vital area such that operation of equipment required for safe shutdown is lost.
- OR
2. Loss of physical control of spent fuel pool cooling systems if imminent fuel damage is likely. (E.g., freshly off-loaded reactor core in the pool).

NRC Staff's Evaluation

The NEI 99-01 AG1 Basis guidance for the interpretation on the loss of physical control of a vital area or spent fuel pool cooling systems has been incorporated by PPL in the EAL threshold. As such, the proposed modification of the EAL threshold values does not alter the intent of the IC or NEI 99-01 EAL criteria. Therefore, the deviation is considered acceptable.

3.5.1.2 Licensee OS1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HS1, with the following exceptions:

NEI 99-01, HS1/Examples EAL 1 and 2

INTRUSION into the plant VITAL AREA by a HOSTILE FORCE.

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision.

Licensee OS1/EAL Threshold Values 1 and 2

INTRUSION into the plant VITAL AREA by a HOSTILE FORCE as confirmed by the Security or Assistant Security Shift Supervisor.

OR

Any act of SABOTAGE, HOSTAGE OR EXTORTION as confirmed by the Security or Assistant Security Shift Supervisor which results in actual or likely major failures of plant functions needed for protection of the public as judged by the Shift Manager / Emergency Director.

### NRC Staff's Evaluation

Confirmation of the intrusion of a hostile force in a vital area would be made and reported to the Control Room by station security. Incorporation of the qualifier, "as confirmed by the Security or Assistant Security Shift Supervisor," is consistent with plant procedures and does not alter intent or criteria of NEI 99-01 HS1. Therefore, proposed deviation to EAL Threshold Value 1 is considered acceptable.

Under EAL Threshold Value 2, PPL has chosen to incorporate specific security events based on guidance contained in NEI 99-01 HS1 Basis, rather than reference the Safeguards Contingency Plan. The specific incorporation of acts of sabotage, hostage or extortion does not alter the intent or criteria of NEI 99-01, and, therefore is acceptable.

#### 3.5.1.3 Licensee OA1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA4, with the following exceptions:

NEI 99-01, HA4/Examples EAL 1 and 2

INTRUSION into the plant PROTECTED AREA by a HOSTILE FORCE.

Other security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervisor.

Licensee OA1/EAL Threshold Values 1 and 2

INTRUSION into the PROTECTED AREA by a HOSTILE FORCE as confirmed by the Security or Assistant Security Shift Supervisor.

OR

Any act of SABOTAGE, HOSTAGE, EXTORTION or CIVIL DISTURBANCE / STRIKE ACTION as confirmed by the Security or Assistant Security Shift Supervisor which results in an actual or potential substantial degradation of the level of safety of the plant as judged by the Shift Manager / Emergency Director.

### NRC Staff's Evaluation

Confirmation of the intrusion of a hostile force in the protected area would be made and reported to the Control Room by station security. Incorporation of the qualifier, "as confirmed by the Security or Assistant Security Shift Supervisor," is consistent with plant procedures and does not alter the intent or criteria of NEI 99-01 HA4. Therefore, the proposed deviation to EAL Threshold Value 1 is considered acceptable.

Under EAL Threshold Value 2, PPL has chosen to incorporate specific security events based on guidance contained in NEI 99-01 HA4 Basis, rather than reference the Safeguards Contingency Plan. The specific incorporation of acts of sabotage, hostage, extortion or civil disturbance/strike action does not alter the intent or criteria of NEI 99-01 and, therefore is acceptable.

### 3.5.1.4 Licensee OU1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HU4, with the following exceptions:

NEI 99-01, HU4/Example EALs 1 and 2

Security events as determined from (site-specific) Safeguards Contingency Plan and reported by the (site-specific) security shift supervision.

A credible site-specific security threat notification.

Licensee OU1/EAL Threshold Values 1, 2, 3 and 4

INTRUSION into the OWNER CONTROLLED AREA by a HOSTILE FORCE.

OR

Any act of SABOTAGE, HOSTAGE, EXTORTION or CIVIL DISTURBANCE / STRIKE ACTION as confirmed by the Security or Assistant Security Shift Supervisor which results in potential degradation of the level of safety of the plant as judged by the Shift Manager / Emergency Director.

OR

A credible site specific security threat notification

OR

Confirmed Security Event with potential loss of level of safety of the ISFSI [Independent Spent Fuel Storage Installation].

### NRC Staff's Evaluation

Per the SSES 1 and 2 Safeguards Contingency Plan, an intrusion into the Owner Controlled Area by a hostile force is considered a potential degradation to the level of safety of the plant. Since NEI 99-01 HU4 specifies that security events should be based on a site-specific Safeguards Contingency Plan, EAL Threshold Value 1 is considered acceptable.

Under EAL Threshold Value 2, PPL has chosen to incorporate specific security events based on guidance contained in NEI 99-01 HU4 Basis, rather than reference Safeguards Contingency Plan. The specific incorporation of acts of sabotage, hostage, extortion or civil disturbance/strike action does not alter the intent or criteria of NEI 99-01, and, therefore is acceptable.

EAL Threshold Value 3 is consistent with NEI 99-01 HU4/Example EAL 2, and, therefore, is considered acceptable.

EAL Threshold Value 4 is intended to address NEI 99-01 E-HU2, "Confirmed Security Event with potential loss of level of safety of the ISFSI," and is consistent with the NEI 99-01 example EAL criteria and basis. EAL Threshold Value 4 would result in the appropriate classification of an NOUE based on a threat to the ISFSI per NEI 99-01 E-HU2 and, therefore, is considered an acceptable deviation from a separate IC to address NEI 99-01 E-HU2.

### 3.5.2 Control Room Evacuation

#### 3.5.2.1 Licensee OS2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HS2 and, therefore, are considered acceptable.

#### 3.5.2.2 Licensee OA2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA5 and, therefore, are considered acceptable.

### 3.5.3 Natural or Man-Made Events

#### 3.5.3.1 Licensee OA3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA1 and, therefore, are considered acceptable.

#### 3.5.3.2 Licensee OU3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HU1 and, therefore, are considered acceptable.

### 3.5.4 Fire/Explosion

#### 3.5.4.1 Licensee OA4

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA2 and, therefore, are considered acceptable.

#### 3.5.4.2 Licensee OU4

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HU2 and, therefore, are considered acceptable.

### 3.5.5 Toxic or Flammable Gases

#### 3.5.5.1 Licensee OA5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA3 and, therefore, are considered acceptable.

#### 3.5.5.2 Licensee OU5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HU3 and, therefore, are considered acceptable.

### 3.5.6 Discretionary

#### 3.5.6.1 Licensee OG6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HG2 and, therefore, are considered acceptable.

#### 3.5.6.2 Licensee OS6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HS3 and, therefore, are considered acceptable.

#### 3.5.6.3 Licensee OA6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HA6 and, therefore, are considered acceptable.

#### 3.5.6.4 Licensee OU6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category H, HU5 and, therefore, are considered acceptable.

### 3.6 Recognition Category E: ISFSI Malfunctions

#### 3.6.1 Dry Fuel Storage

##### 3.6.1.1. Licensee EU1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category E, E-HU1 and E-HU2, with the following exceptions:

NEI 99-01, E-HU1/Example EAL 1

Natural phenomena events affecting a loaded cask CONFINEMENT BOUNDARY.

Licensee OU3/EAL Threshold Values 1 and 2

Earthquake detected by seismic instrumentation systems.

OR

Tornado or SUSTAINED HIGH WINDS greater than 80 mph impact ON SITE within the PROTECTED AREA.

#### NRC Staff's Evaluation

Natural phenomena events affecting a loaded cask confinement boundary are not included under EU1, since the ISFSI is within the Protected Area. In the response to RAI-68, PPL states that "The CSAR [Certified Safety Analysis Report], Section 3.2, Structural and Mechanical Safety,

specified the requirement for Seismic, Wind and Tornado loading for the ISFSI...The various loadings specified in the CSAR are the same as [than] those specified in the FSAR for other structures within the PROTECTED AREA. Therefore, it is appropriate to include the ISFSI under EAL OU3." Based on this justification, the deviation to address E-HU1, Example EAL 1 under licensee OU3, EAL Threshold values 1 and 2 is considered acceptable.

NEI 99-01, E-HU1/Example EAL 2

Accident conditions affecting a loaded cask CONFINEMENT BOUNDARY.

Licensee OU3/EAL Threshold Value 4

Report by plant personnel of an unanticipated EXPLOSION within the PROTECTED AREA resulting in VISIBLE DAMAGE to permanent structures or equipment. [Per licensee OU3 Basis, EAL 4]: This EAL addresses only those EXPLOSIONS of sufficient force to damage permanent structures or equipment within the PROTECTED AREA including the ISFSI.

Licensee OU4/EAL Threshold Value 1

FIRE in buildings or areas contiguous to any of the following areas not extinguished within 15 minutes of control room notification or verification of a control room alarm:...• Interim Spent Fuel Storage Installation (ISFSI).

Licensee EU1 / EAL Threshold Values 1 and 2

From the point the cask is being lowered from the refuel floor, situations are occurring or have occurred during the transport of the irradiated spent fuel to the ON SITE storage facility, which jeopardize the integrity of the spent fuel or its container as indicated by:

- A. Radiological readings exceed 2 R/hour at the external surface of any transfer cask or horizontal storage module.  
OR
- B. Radiological readings exceed 1 R/hour one foot away from the external surface of any transfer cask or horizontal storage module.  
OR
2. Situations are occurring or have occurred at the irradiated spent fuel storage facility, which jeopardize the integrity of the dry cask storage system as indicated by:
  - A. Radiological readings exceed 2 R/hour at the external surface of any transfer cask or horizontal storage module.  
OR
  - B. Radiological readings exceed 1 R/hour one foot away from the external surface of any transfer cask or horizontal storage module.

## NRC Staff's Evaluation

Per PPL's Response to RAI-70, specific threshold values reflecting accident conditions per NEI 99-01 E-HU1 Basis (i.e., dropped cask, a tipped over cask) are based on NEP [Nuclear Emergency Plan] Technical Basis 99-001, "Dry Cask Storage Facility." These thresholds, in combination with the declaration of an NOUE based on an explosion or fire impacting the ISFSI per OU3/EAL 4 and OU4/EAL 1, are considered an acceptable deviation and meet the intent of NEI 99-01 E-HU1.

### 3.7 Recognition Category C: Cold Shutdown/Refueling System Malfunctions

#### 3.7.1 Loss of AC Power

##### 3.7.1.1 Licensee CA1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CA3, with the following exceptions:

#### NEI 99-01, CA3/Example EAL 1

Loss of power to (site-specific) transformers.

AND

Failure of (site-specific) emergency generators to supply power to emergency busses.

AND

Failure to restore power to at least one emergency bus within 15 minutes from the time of loss of both offsite and onsite AC power.

#### Licensee CA1/EAL Threshold Value 1

Loss of power from Startup Transformer 10 AND 20.

AND

All 4.16 kV ESS [Engineered Safeguards System] Busses on either unit are de-energized.

AND

Failure to restore power to at least two 4.16 ESS busses on each unit within fifteen minutes from the time of loss of both offsite and onsite AC power.

## NRC Staff's Evaluation

PPL's response to RAI-71 states that "Based on the Susquehanna SES IPE, it is necessary to restore at least two 4.16 kV ESS busses to avoid jeopardizing decay heat removal and vessel makeup capability. Any combination of two 4.16 kV busses on both units prevents plant damage unless additional failures exist." The proposed change addresses plant-specific electrical distribution system design while continuing to address NEI 99-01 intent, and therefore, is considered acceptable.

### 3.7.1.2 Licensee CU1

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU3, with the following exceptions:

#### NEI 99-01, CU3/Example EAL 1

Loss of power to (site-specific) transformers for greater than 15 minutes.

AND

At least (site-specific) emergency generators are supplying power to emergency busses.

#### Licensee CU1/EAL Threshold Value 1

Loss of power from Startup Transformer 10 AND 20 for > 15 minutes.

#### NRC Staff's Evaluation

Per Section 4 to PPL's June 3, 2004, submittal, the design of the off-site power sources for SSES 1 and 2 is such that a loss of both sources would result in an automatic shutdown of both units. Even if onsite power sources were available, this situation represents a degradation in the level of safety of the plant that is consistent with the intent of an NOUE. The proposed licensee deviation eliminating NEI 99-01 CU3 criteria 1.b would continue to require the classification of an NOUE due to the loss of offsite power to essential busses for greater than 15 minutes, and does not impact the intent of NEI 99-01 CU3. Availability of onsite AC power sources is contained in and evaluated under licensee CA1 for possible escalation to an Alert classification. Therefore, this deviation is considered acceptable.

### 3.7.2 Loss of DC Power

#### 3.7.2.1 Licensee CU2

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU7 and, therefore, are considered acceptable.

### 3.7.3 Decay Heat Removal

#### 3.7.3.1 Licensee CA3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CA4 with the following exceptions:

#### NEI 99-01, CA4/Example EALs 1, 2 and 3

With CONTAINMENT CLOSURE and RCS integrity not established an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit.

[OR]

With CONTAINMENT CLOSURE established and RCS integrity not established or RCS inventory reduced an UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 20 minutes<sup>1</sup>.

[OR]

An UNPLANNED event results in RCS temperature exceeding the Technical Specification cold shutdown temperature limit for greater than 60 minutes<sup>1</sup> or results in an RCS pressure increase of greater than (site-specific) psig.

<sup>1</sup> Note: If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

#### Licensee CA3/EAL Threshold Values 1, 2 and 3

With Secondary Containment and RCS integrity<sup>1</sup> not established, an UNPLANNED event results in RCS temperature > 200°F.

OR

With Secondary Containment established and RCS integrity<sup>1</sup> not established, an UNPLANNED event results in RCS temperature > 200°F for > 20 minutes<sup>2</sup>.

OR

An UNPLANNED event results in RCS temperature > 200°F for > 60 minutes<sup>2</sup> or results in an RCS pressure increase of greater than 20 psig.

<sup>1</sup>NOTE: By definition, in Mode 5 RCS integrity is not established.

<sup>2</sup>NOTE: If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced then this EAL is not applicable.

#### NRC Staff's Evaluation

The term "Secondary Containment" is used by PPL in lieu of the NEI 99-01 term "Containment Closure." Per definition in Section 2, containment closure is considered to be secondary containment. This interpretation is consistent with the definition for containment closure in NEI 99-01, Section 5.4 and, therefore, is considered acceptable.

PPL defines "exceeding the Technical Specification cold shutdown temperature limit" as "> 200°F." This interpretation is consistent with SSES 1 and 2 Technical Specifications, and, therefore, is considered acceptable.

The clarification NOTE added in EAL Threshold Values 1 and 2 states that in Mode 5 RCS integrity is not established. This interpretation is consistent with SSES 1 and 2 Technical Specifications, and, therefore, is considered acceptable.

Per the NEI 99-01 CA4 Basis, the qualifier, "or RCS inventory is reduced," is applicable to mid-loop operations in pressurized water reactors (PWRs), and therefore, deletion of this criteria under EAL Threshold Value 2 is considered acceptable.

### 3.7.3.2 Licensee CU3

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU4, and, therefore, are considered acceptable.

### 3.7.4 RCS Leakage/RCS Draindown

#### 3.7.4.1 Licensee CG4

The term "Secondary Containment" is used by PPL in lieu of the NEI 99-01 term "Containment Closure." Per the definition in Section 2, containment closure is considered to be secondary containment. This interpretation is consistent with the definition for containment closure in NEI 99-01, Section 5.4. The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CG1, and, therefore, are considered acceptable.

#### 3.7.4.2 Licensee CS4

The term "Secondary Containment" is used by PPL in lieu of the NEI 99-01 term "Containment Closure." Per the definition in Section 2, containment closure is considered to be secondary containment. This interpretation is consistent with the definition for containment closure in NEI 99-01, Section 5.4. The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CS1, and, therefore, are considered acceptable.

#### 3.7.4.3 Licensee CA4

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CA1, and, therefore, are considered acceptable.

#### 3.7.4.4 Licensee CU4

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU1, and, therefore, are considered acceptable.

### 3.7.5 Loss of RPV Inventory

#### 3.7.5.1 Licensee CS5

The term "Secondary Containment" is used by PPL in lieu of the NEI 99-01 term "Containment Closure." Per definition in Section 2, containment closure is considered to be secondary containment. This interpretation is consistent with the definition for containment closure in NEI 99-01. The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CS2, and, therefore, are considered acceptable.

#### 3.7.5.2 Licensee CA5

Proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CA2, and, therefore, are considered acceptable.

### 3.7.5.3 Licensee CU5

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU2, and, therefore, are considered acceptable.

### 3.7.6 Fuel Clad Degradation

#### 3.7.6.1 Licensee CU6

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU5, and, therefore, are considered acceptable.

### 3.7.7 Loss of Communications

#### 3.7.7.1 Licensee CU7

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU6, and, therefore, are considered acceptable.

### 3.7.8 Inadvertent Criticality

#### 3.7.8.1 Licensee CU8

The proposed IC and EAL Threshold Values are consistent with the guidance in NEI 99-01, Category C, CU8, with the following exception:

NEI 99-01, CU8/Example EALs 1 and 2

An UNPLANNED extended positive period observed on nuclear instrumentation.

[OR]

An UNPLANNED sustained positive startup rate observed on nuclear instrumentation.

Licensee CU8/EAL Threshold Value 1

An UNPLANNED extended positive period observed on nuclear instrumentation.

### NRC Staff's Evaluation

PPL deleted the criteria, "An UNPLANNED sustained positive startup rate observed on nuclear instrumentation," based on the site-specific use of reactor period to monitor reactor power during startup. Therefore, this deviation is considered acceptable based on SSES 1 and 2 plant design and procedures.

## 4.0 CONCLUSION

The NRC staff has determined that PPL's proposed SSES 1 and 2 EAL conversion from the NUREG-0654-based scheme to NEI 99-01, Revision 4, as submitted under application dated October 27, 2003, are acceptable. Based on the responses to RAIs and the proposed changes

provided under supplemental letters dated May 13 and June 3, 2004, the NRC staff finds that the proposed SSES 1 and 2 EAL revision is consistent with the guidance in NEI 99-01, Revision 4, and provides an acceptable alternative as evaluated under the technical evaluation section of this safety evaluation. Therefore, the proposed SSES 1 and 2 EAL revision to the NEI 99-01, Revision 4, scheme is acceptable.

The NRC staff also finds that the SSES 1 and 2 EAL changes meet the standards of 10 CFR 50.47(b) and the requirements of Appendix E of 10 CFR Part 50. Therefore, the Commission concludes, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the approval of the proposed emergency plan changes will not be inimical to the common defense and security or to the health and safety of the public.

In the cover letter to their October 27, 2003 application, the licensee states that the proposed EALs have been discussed and agreed to by the Commonwealth of Pennsylvania and the Counties of Columbia and Luzerne. Documentation of this review and concurrence by State and local counties and governmental agencies was provided by licensee in Attachment 2 to letter PLA-5720, dated May 13, 2004. A review of the documentation provided is considered acceptable in meeting the requirements of Section IV.B to Appendix E of 10 CFR Part 50.

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