

South Carolina Electric & Gas Company

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Enclosure 5

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

**APP-OCS-GEH-422, "AP1000 Human Factors Engineering
Discrepancy Resolution Process," Revision 1**

(LAR 13-18)



Westinghouse Non-Proprietary Class 3

AP1000

Human Factors Engineering Discrepancy Resolution Process

**APP-OCS-GEH-422,
Rev. 1**

August 2013

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REVISION HISTORY

RECORD OF CHANGES

Revision	Author	Description	Completed
A	Todd W. Van Meter	Preliminary Issue	06/2008
B	Todd W. Van Meter	Revision was created to prepare the document with proprietary markings for transmittal.	04/2009
0	Julie I. Reed	<p>Incorporation of APP-GW-GEE-4137, Rev. 0.</p> <p>Numerous updates to the References and Bibliography in accordance with latest documents and revisions.</p> <p>Minor editorial clarifications throughout the document.</p> <p>“Glossary of Terms”: Updated the definition of Independent Verifier.</p> <p>Section 2.1, “General Process,” Section 2.4, “Human Factors Tracking System” and Section 2.5, “The Analysis of the Cumulative Effects of Priority 1 and Priority 2 HEDs”: Updated “HFE design issue tracking database” to “Human Factors Tracking System”, and updated the reference to WNA-WI-00207-WAPP “Human Factors Tracking System Work Instruction.”</p> <p>Section 2.1, “General Process,” Section 2.2, “Prioritization,” and Section 2.6, “Analyzing and Resolving Priority 1 and Priority 2 HEDs”: Changed “HFE Design Engineer” to “HF Specialist” in order to align with the organizational structure.</p> <p>Section 2.1, “General Process,” Section 2.6, “Analyzing and Resolving Priority 1 and Priority 2 HEDs,” and Section 2.8, “Verifying HED Solutions”: Clarified that HEDs may involve HSI design, OCS design, operator training, operating procedures, or staffing and work organization aspects. Modified the description of the resolution process.</p> <p>Section 2.1, “General Process,” Section 2.2, “Prioritization,” and Section 2.8, “Verifying HED Solutions”: Changed “OCS Product Manager” to “Human Factors Manager” in order to align with the organizational structure.</p> <p>Section 2.2, “Prioritization,” Section 2.7 “Analyzing and Resolving Priority 3 HEDs”: Deleted statement that Priority 3 HEDs are not required to be entered into the HF Tracking System.</p>	03/2013

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REVISION HISTORY (cont.)

RECORD OF CHANGES (cont.)

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0 (cont.)	Julie I. Reed	Section 2.8, "Verifying HED Solutions": Added reference to NSNP 3.3.3, "Design Verification by Independent Review or Alternate Calculations." Added description of the mechanism to deal with design and procedure changes post-HED resolution, and added references APP-GW-G0Y-002, "AP1000 Configuration Management Plan" and WNA-PC-00005-WAPP, "AP1000 I&C Projects Configuration Management Plan."	3/2013
1	Julie I. Reed	Incorporation of APP-GW-GEE-4523, Rev. 0. Updated document revision numbers in the Bibliography. Section 2.8, "Verifying HED Solution": Corrected proprietary markings in the first paragraph. Note: An alternative document number is APP-OCS-GEH-420 (proprietary version).	See EDMS

DOCUMENT TRACEABILITY & COMPLIANCE

Created to Support the Following Document(s)	Document Number	Revision
AP1000 Human Factors Engineering Program Plan	APP-OCS-GBH-001	1

OPEN ITEMS

Item	Description	Status
None		

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ACRONYMS AND TRADEMARKS

Acronyms used in the document are defined in APP-GW-J9Y-001 (WNA-PS-00016-GEN), “Standard Acronyms and Definitions” (Reference 1), or included below to ensure unambiguous understanding of their use within this document.

Acronym	Definition
HF	Human Factors

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GLOSSARY OF TERMS

Standard terms used in the document are defined in APP-GW-J9Y-001 (WNA-PS-00016-GEN), “Standard Acronyms and Definitions” (Reference 1), or included below to ensure unambiguous understanding of their use within this document.

Term	Definition
Design Solution	The process of modifying human-system interface (HSI) resources or the Operation and Control Center System (OCS) to comply with design guidance and criteria.
Exception	A justified (i.e., documented and approved) departure from specified guidance or requirements.
Human Engineering Discrepancy	A departure of the AP1000® design from Human Factors Engineering (HFE) design guidance and/or human performance criteria as identified during the execution of HFE verification and validation activities.
Independent Verifier	Any competent individual(s) or group(s) other than those who performed the original design work, but who may be from the same organization or group.

REFERENCES

Following is a list of references used throughout this document.

1. APP-GW-J9Y-001, Rev 0 (WNA-PS-00016-GEN, Rev 5), "Standard Acronyms and Definitions," Westinghouse Electric Company LLC. (Proprietary)
2. APP-OCS-GBH-001, Rev. 1, "AP1000 Human Factors Engineering Program Plan," Westinghouse Electric Company LLC. (Proprietary)
3. APP-OCS-GEH-020, Rev. 2 (WCAP-15860), "Programmatic Level Description of the AP1000 Human Factors Verification and Validation Plan," Westinghouse Electric Company LLC.
4. NUREG-0711, Rev. 2, "Human Factors Engineering Program Review Model," U.S. Nuclear Regulatory Commission.
5. WEC 3.3.3, Rev. 0.0, "Design Verification," Westinghouse Electric Company LLC, effective March 26, 2013.
6. APP-GW-G0Y-002, Rev. 3, "AP1000 Configuration Management Plan," Westinghouse Electric Company LLC. (Proprietary)
7. WNA-PC-00005-WAPP, Rev. 2, "AP1000 I&C Projects Configuration Management Plan," Westinghouse Electric Company LLC. (Proprietary)

BIBLIOGRAPHY

Following is a list of sources that were considered in preparing this document, or that provide additional information.

1. APP-GW-GL-700, Rev. 19, "AP1000 Design Control Document," Westinghouse Electric Company LLC.
- | 2. APP-OCS-GEH-120, Rev. 1, "AP1000 Human Factors Engineering Design Verification Plan," Westinghouse Electric Company LLC. (Proprietary)
- | 3. APP-OCS-GEH-220, Rev. 1, "AP1000 Human Factors Engineering Task Support Verification Plan," Westinghouse Electric Company LLC. (Proprietary)
- | 4. APP-OCS-GEH-320, Rev. 3, "AP1000 Human Factors Engineering Integrated System Validation Plan," Westinghouse Electric Company LLC. (Proprietary)
5. WNA-WI-00207-WAPP, Rev. 0, "Human Factors Tracking System Work Instruction," Westinghouse Electric Company LLC. (Proprietary)
- | 6. APP-OCS-GEH-520, Rev. 2, "AP1000 Plant Startup Human Factors Engineering Design Verification Plan," Westinghouse Electric Company LLC. (Proprietary).

SECTION 1 INTRODUCTION

1.1 OVERVIEW

The purpose of this document is to define the procedure for the Human Factors Engineering (HFE) Discrepancy Resolution Process for the AP1000® plant.

This document is based on the requirements and guidance described in APP-GW-GL-700, "AP1000 Design Control Document" (Bibliog 1); APP-OCS-GBH-001, "AP1000 Human Factors Engineering Program Plan" (Reference 2); APP-OCS-GEH-020, "Programmatic Level Description of the AP1000 Human Factors Verification and Validation Plan" (Reference 3); and NUREG-0711, "Human Factors Engineering Program Review Model" (Reference 4).

1.2 SCOPE

The scope of this document is limited to the Human Engineering Discrepancies (HEDs) identified by the following AP1000 HFE verification and validation (V&V) activities and associated documents:

1. APP-OCS-GEH-120, "AP1000 Human Factors Engineering Design Verification Plan" (Bibliog 2)
2. APP-OCS-GEH-220, "AP1000 Human Factors Engineering Task Support Verification Plan" (Bibliog 3)
3. APP-OCS-GEH-320, "AP1000 Human Factors Engineering Integrated System Validation Plan" (Bibliog 4)

1.3 OBJECTIVE

The overall objective of this document is to ensure that HEDs are documented, tracked, and adequately addressed in the final AP1000 HFE design configuration.

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SECTION 2 RESOLUTION PROCESS

2.1 GENERAL PROCESS

The AP1000 HFE V&V activities will result in the identification of a number of HEDs. The HEDs will be prioritized per Section 2.2, "Prioritization," of this document. [

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2.2 PRIORITIZATION

A safety (or risk-significance) assessment for each HED is performed by the HF group, and approved by the HF Manager or designee. The purpose of this is to prioritize the HEDs such that HEDs that are significant, important or related to safety receive the highest priority. [

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2.3 CATEGORIZING PRIORITY 1 AND PRIORITY 2 HEDS

In order to analyze the cumulative effects of priority 1 and priority 2 HEDs, each HED is categorized (as applicable) by:

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2.4 HUMAN FACTORS TRACKING SYSTEM

The HEDs are entered into the Human Factors Tracking System in accordance with WNA-WI-00207-WAPP, "Human Factors Tracking System Work Instruction" (Bibliog 5).

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2.5 THE ANALYSIS OF THE CUMULATIVE EFFECTS OF PRIORITY 1 AND PRIORITY 2 HEDS

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2.6 ANALYZING AND RESOLVING PRIORITY 1 AND PRIORITY 2 HEDS

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The HED resolutions are verified in accordance with Section 2.8, "Verifying HED Resolutions."

2.7 ANALYZING AND RESOLVING PRIORITY 3 HEDS

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2.8 VERIFYING HED SOLUTIONS

For HED design resolutions that are associated with the HFE Design Verification Plan (Bibliog 2) or the HFE Task Support Verification Plan (Bibliog 3), independent verifiers will evaluate the HSI design changes using the same standards, guidance and methodology as described in the applicable verification plan. The purpose of the evaluation is to provide reasonable assurance that the HSI resources and OCS designs satisfy the applicable criteria. See WEC 3.3.3, "Design Verification" (Reference 5), for additional guidance on personnel independence and qualifications.

For HED design resolutions that are associated with the HFE Integrated System Validation Plan (Bibliog 4), the HF group will determine the appropriate evaluation processes, using a graded approach, based on the complexity and impact of the changes. [

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The evaluation processes and associated results will be documented as part of the "Human Factors Engineering Resolution Verification Report."

For each HED that cannot be resolved until the plant is built, the HF Manager ensures that the plant startup HFE verification plan (APP-OCS-GEH-520, Bibliog 6) includes a mechanism to check and resolve the issue. [

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2.9 HFE DISCREPANCY RESOLUTION REPORT REQUIREMENTS

“Human Factors Engineering Resolution Verification Report” will contain the following information:

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