

## ATTACHMENT 65001.24

### INSPECTION OF HUMAN FACTORS ENGINEERING HSI TASK SUPPORT VERIFICATION DESIGN ACCEPTANCE CRITERIA (DAC)-RELATED ITAAC

PROGRAM APPLICABILITY: 2503

#### 65001.24-01 INSPECTION OBJECTIVES

01.01 To confirm by inspection that the combined license (COL) holder (licensee) has implemented a Human Factors Engineering (HFE) task support verification process to yield Human-System Interfaces (HSI) in the main control room (MCR), simulator, and remote shutdown workstations (RSW)<sup>1</sup> in accordance with the NRC approved HFE task support verification implementation plan. The inspection will determine whether the task support verification and results meet the acceptance criteria as stated in the HSI Inspections, Tests, Analyses and Acceptance Criteria (ITAAC).

#### 65001.24-02 INSPECTION REQUIREMENTS AND GUIDANCE

02.01 Background. Inspection of ITAAC associated with a COL is intended to support the Commission finding stipulated in 10 CFR Part 52.103(g), specifically that the COL acceptance criteria (ITAAC acceptance criteria) have been met, and that the facility has been designed and built to conform to the licensing basis. The Commission policy for Design Acceptance Criteria (DAC), as defined in SECY-92-053, allows a licensee to provide HFE design process milestones as ITAAC. The HFE DAC-related ITAAC are inspected as the development process for the HFE design progresses and the licensee completes the ITAAC throughout the facility post-COL (construction) phase.

An HFE program, such as that described in NUREG-0711, provides the structure for ensuring that the HFE aspects of a plant are developed, designed, and evaluated on the basis of a structured, disciplined analysis using accepted HFE principles. Verification and Validation (V&V) evaluations are the part of a HFE program which comprehensively determine whether the design conforms to HFE design principles and if it enables plant personnel to successfully perform their tasks to achieve plant safety and other operational goals. HSI Task Support Verification is an important element of the V&V process.

Specifically, the objective of the HSI Task Support Verification inspection is to evaluate and verify that HSIs (such as alarms, displays, and controls) support personnel task requirements as determined by the task analysis.

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<sup>1</sup> The inspector can use the MCR, RSW and/or the Control Room Simulator to inspect the various HSIs described in this procedure. The inspector should use the most complete version of the HSI as practical at the time of the inspection.

The HSI Task Support Verification process includes several activities that:

- Use the task analysis to define HSI requirements for performance of personnel tasks that are based upon selected operational conditions.
- Verify that the HSIs and their characteristics (as defined in the HSI inventory and characterization) have been compared to the personnel task requirements identified in the task analysis.
- Ensure that Human Engineering Discrepancies (HEDs) are identified and documented when:
  - HSIs that are needed for task performance are not available.
  - When the HSI characteristics do not match personnel task requirements.
- Verify that HSI elements are necessary. Unnecessary HSI elements clutter the display and distract the user.
- Verify that new demands caused by modifications to systems support the ability of operators to monitor and control the updated system.
- Verify that HEDs related to task support verification are documented and identify HSIs, relevant task criteria, and the basis for deficiencies.

#### Inspection Requirements and Guidance:

- a. General Inspection Requirements. The licensee's commitments regarding implementation of the HSI Task Support Verification process are typically contained in a HSI Task Support Verification Implementation Plan provided as part of the Design Certification application. If a licensee is not referencing a Design Certification, the licensee must provide an implementation plan.

The purpose of this inspection activity is to confirm that the HSIs necessary to support operator tasks are available and designed in a way that supports operator tasks as defined by the task analyses. There are three general steps to be completed in this inspection:

- First is a review of the results summary report completed by the licensee in support of ITAAC closure. The inspector should review the results summary report to ensure that the information submitted is consistent with the approved implementation plan by confirming that the report includes the required elements as described in the design specific appendix of this Inspection Procedure.
- Second, the inspector will verify that the licensee has implemented the task support verification process as indicated in the results summary report by reviewing relevant process documents (such as discrepancy worksheets or any other available documents).
- Third, the inspector will confirm that a sample of HSIs have been designed in a manner that will support the activities listed in the task analysis. Additional guidance regarding sampling can be found in the "Additional Guidance" section below.

HSIs that do not conform to the requirements indicated in the task analysis (derived in accordance with Section 5 of NUREG-0711) should be documented and tracked as described in the licensee's Human Engineering Deficiency Resolution Implementation Plan.

The HSI Task Support Verification inspection should be conducted after the licensee has completed the HSI Task Support Verification results summary report. This inspection may be completed concurrently with the HFE Design Verification inspection.

Specific Guidance.- Gather pertinent information and discuss inspection planning and scheduling issues with the RII - Division of Construction Inspection and/or Office of New Reactors (NRO) HFE technical experts prior to the inspection. For example:

- Determine status of previous NRC inspection findings that may influence this inspection (HFE Design Verification inspection, HSI Task Support Verification for previous COLs, HED Resolution inspection, etc.).
- Identify and review licensee responses to applicable Generic Bulletins, Regulatory Issue Summaries and Information Notices issued since Design Certification approval to verify licensee compliance.

Contact the licensee for information needed to prepare the inspection plan such as:

- Licensee planned activities and schedule (used to focus inspection, minimize interference with licensee operations, and determine inspection sample).
- Availability of reports and supplemental documents needed to complete the inspection.
- Identify the bases for selection of specific individuals who performed independent review activities as part of the licensee's HSI Task Support Verification program Implementation Plan.
- Availability of licensee personnel during the period tentatively scheduled for the inspection.
- Changes to the HFE V&V program since any previous NRC inspection (e.g., policy, personnel, program description, implementing documents) or approval of the Implementation Plan.

#### Sampling:

Modern computer systems often utilize hierarchal menu structures. Each menu item can be thought of as a separate HSI. This makes it difficult to quantify an exact number of HSIs within a control room. Thus, the number of HSIs necessary in an inspection sample is not specified by this procedure. The inspector should look at as large of a sample as possible across a broad range of HSIs and operational tasks. The inspector should focus the inspection sample using risk significance when possible. The inspector should consider the following variables while selecting an inspection sample:

1. HSIs Types - HSIs such as the alarm panel and Visual Display Unit (VDU) are of particular importance and should be included in this sample. The inspector may choose to concentrate on certain HSIs based upon the document review of the results summary report (such as those HSIs that have posed particular difficulty for other licensees to design or construct).

2. Menu Hierarchy - HSI Components such as software menus may have multiple levels. It is not necessary to inspect every level of each; however the inspector should try to look at multiple levels. For instance, the inspector should inspect various levels of hierarchal menus (not just start-up screens).
3. Procedures - The inspector should also select a broad range of tasks covering a variety of operational conditions (normal operating procedures, emergency operating procedures (EOP), refueling procedures, etc.) that emphasize risk-significant and safety important tasks.

Dynamic Properties of HSIs:

The inspector is likely to find some tasks that require dynamic use of the HSI that may not be available at the time of the inspection. For example, some tasks will require that the simulator or plant be operating so that the operator can inspect changing values to determine if the HSI meets the particular task requirements (i.e. HSI response time/refresh rate, etc.) Although the inspector may not be able to evaluate the HSI at this time he/she should inspect the static capabilities of the HSI and make note of the limitations of the inspection. These limitations should be shared with the inspector(s) responsible for the HED Resolution inspection and the Integrated System Validation inspection. These subsequent inspections can be used to verify these dynamic capabilities.

- b. Requirements for Performance of Inspection. The inspection will be performed in accordance with this Inspection Procedure and the associated design specific appendix. Adjustments to the inspection plan will be communicated to Division of Construction Inspection in R-II to minimize impact to the licensee and to assist in revising inspection planning efforts accordingly.

Specific Guidance - No specific guidance.

- c. Requirements for Inspection Reporting. An inspection report and any findings will be prepared and approved in accordance with Inspection Manual Chapter 0613.

Specific Guidance - No specific guidance.

65001.24-03            RESOURCE ESTIMATE

The total estimated time to complete this inspection for one COL licensee is 80 staff hours.

65001.24-04            REFERENCES

1. U.S. Code of Federal Regulations, "Licenses, Certifications, and Approvals for Nuclear Power Plants," Part 52, Title 10, "Energy."
2. U.S. Nuclear Regulatory Commission, "Documenting 10 CFR Part 52 Construction and Test Inspections," Inspection Manual Chapter 0613, (ML082490463).

3. U.S. Nuclear Regulatory Commission, "Human Factors Engineering Program Review Model," NUREG-0711, February 2004, Agencywide Document Access and Management System (ADAMS) Accession No. ML040770540.
4. U.S. Nuclear Regulatory Commission, "Use of Design Acceptance Criteria During 10 CFR Part 52 Design Certification Reviews," Commission Paper SECY-92-053, February 19, 1992, ADAMS Accession No. ML003707942.

65001.24-05           PROCEDURE COMPLETION

Implementation of this IP is complete when the planned sample of attributes for the specified appendices has been completed.

END

Appendices:  
Appendix A

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## Appendix A

### Inspection Guide for AP1000 Human Factors Engineering HSI Task Support Verification: Confirmation of Task Analysis and Requirements Considered in Design

Appendix A contains Proprietary Information and is therefore not publicly available. NRC staff may access Appendix A by clicking [[Appendix A](#)] or through the Agency-wide Documents Access and Management System (ADAMS) (ADAMS Accession No. ML13199A156).

Attachment 1- Revision History for IP 65001.24

INSPECTION OF HUMAN FACTORS ENGINEERING TASK SUPPORT VALIDATION DESIGN  
ACCEPTANCE CRITERIA (DAC)-RELATED ITAAC

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
N/A	MI13169A130 08/27/13 CN 13-018	Initial issuance. To confirm by inspection that the combined license (COL) holder (licensee) has implemented a Human Factors Engineering (HFE) task support verification process to yield Human-System Interfaces (HSI) in the main control room (MCR), simulator, and remote shutdown workstations (RSW) in accordance with the NRC approved HFE task support verification implementation plan. The inspection will determine whether the task support verification and results meet the acceptance criteria as stated in the HSI Inspections, Tests, Analyses and Acceptance Criteria (ITAAC).	N/A	N/A