

# **FINAL SAFETY ANALYSIS REPORT**

## **CHAPTER 18**

### **HUMAN FACTORS ENGINEERING**

## **18.0 HUMAN FACTORS ENGINEERING**

This chapter of the U.S. EPR Final Safety Analysis Report (FSAR) is incorporated by reference with supplements as identified in the following sections.

## 18.1 HUMAN FACTORS ENGINEERING PROGRAM MANAGEMENT

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Holder Item in Section 18.1:

A COL applicant that references the U.S. EPR design will execute the NRC approved HFE program as described in this section.

This COL Holder Item is addressed as follows:

{PPL Bell Bend, LLC} shall execute the NRC approved Human Factors Engineering (HFE) program as described in U.S. EPR FSAR Section 18.1.

### 18.1.1 HUMAN FACTORS ENGINEERING PROGRAM GOALS, ASSUMPTIONS AND CONSTRAINTS, AND SCOPE

#### 18.1.1.1 Goals

No departures or supplements.

#### 18.1.1.2 Assumptions and Constraints

No departures or supplements.

#### 18.1.1.3 Applicable U.S. EPR Facilities

The U.S. EPR FSAR includes the following COL Item in Section 18.1.1.3:

A COL applicant that references the U.S. EPR design certification will be responsible for HFE design implementation for a new Emergency Operations Facility (EOF) or changes resulting from the addition of the U.S. EPR to an existing EOF.

This COL Item is addressed as follows:

{Susquehanna Steam Electric Station (SSES) Units 1 and 2 have an existing Emergency Operations Facility (EOF). A description of the EOF is provided in the BBNPP Emergency Plan. The BBNPP Emergency Plan is provided in Part 5 of the COL application. The existing EOF will be modified to accommodate an interface from BBNPP. Modifications to the existing EOF will be consistent with the U.S. EPR HFE (Human Factors Engineering) Human Factors Program described in U.S. EPR FSAR Chapter 18 and NUREG-0696 (NRC, 1981). These modifications will be evaluated using the U.S. EPR HFE Design Implementation process described in U.S. EPR FSAR Chapter 18. This process will verify the operability of the EOF features for BBNPP and ensure no degradation has occurred to SSES Units 1 and 2 features in the EOF. Specifically, the plan will verify that the design changes to the existing EOF consider the effects on personnel performance and that the changes will provide the necessary support to provide reasonable assurance of effective implementation of the Bell Bend Emergency Plan. Also, the modified EOF as-built design will be verified to conform to the verified and validated design that results from the HFE design process.} This verification will be addressed through site-specific ITAAC provided in Part 10 of the COL application.

#### 18.1.1.4 Applicable Human System Interfaces, Procedures, and Training

No departures or supplements.

**18.1.1.5 Applicable Plant Personnel**

No departures or supplements.

**18.1.1.6 Effects of Modifications on Personnel Performance**

No departures or supplements.

**18.1.2 HUMAN FACTORS ENGINEERING AND CONTROL ROOM DESIGN TEAM ORGANIZATION**

No departures or supplements.

**18.1.3 HUMAN FACTORS ENGINEERING PROCESSES AND PROCEDURES**

No departures or supplements.

**18.1.4 HUMAN FACTORS ENGINEERING ISSUES TRACKING**

No departures or supplements.

**18.1.5 TECHNICAL PROGRAM**

No departures or supplements.

**18.1.6 REFERENCES**

{NRC, 1981. Functional Criteria for Emergency Response Facilities, NUREG-0696, U.S. Nuclear Regulatory Commission, February 1981.}

**18.2 OPERATING EXPERIENCE REVIEW**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.3 FUNCTIONAL REQUIREMENTS ANALYSIS AND FUNCTION ALLOCATION**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.4 TASK ANALYSIS**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.5 STAFFING AND QUALIFICATIONS**

This section of the U.S. EPR FSAR is incorporated by reference with the following supplements.

The U.S. EPR FSAR includes the following COL Item in Section 18.5:

A COL applicant that references the U.S. EPR design will confirm that actual staffing levels and qualifications of plant personnel specified in Section 13.1 of the COL application remain bounded by regulatory requirements and results of the staffing and qualifications analysis.

This COL Item is addressed as follows:

Confirmation that actual staffing levels and qualifications of plant personnel specified in Section 13.1 remain bounded by regulatory requirements and results of staffing and qualifications analysis shall be verified by the implementation of ITAAC 5 of Tier 1 Table 3.4-1 of the U.S. EPR FSAR. Tier 1 Table 3.4-1 of the U.S. EPR FSAR is incorporated by reference in Part 10 of the COL application.



**18.6 HUMAN RELIABILITY ANALYSIS**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.7 HUMAN SYSTEM INTERFACE DESIGN**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.8 PROCEDURE DEVELOPMENT**

This section of the U.S. EPR FSAR is incorporated by reference with the following supplement.

The U.S. EPR FSAR includes the following COL Item in Section 18.8:

A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development program for site procedures.

This COL Item is addressed as follows:

Plant specific procedures are developed consistent with the guidance of the operational guidelines described in Section 18.8.2 of the U.S. EPR FSAR.

**18.9 TRAINING PROGRAM DEVELOPMENT**

This section of the U.S. EPR FSAR is incorporated by reference with the following supplement.

The U.S. EPR FSAR includes the following COL item in Section 18.9:

A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development of training program scope, structure, and methodology.

This COL Item is addressed as follows:

The training program is addressed in Section 13.2.

**18.10 VERIFICATION AND VALIDATION**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.11 DESIGN IMPLEMENTATION**

This section of the U.S. EPR FSAR is incorporated by reference.

**18.12 HUMAN PERFORMANCE MONITORING**

The U.S. EPR FSAR includes the following COL Holder Item in Section 18.12:

A COL applicant that references the U.S. EPR design certification will implement an HPM program similar to that which is described in this section.

This COL Holder Item is addressed as follows:

{PPL Bell Bend, LLC, shall implement a Human Performance Monitoring (HPM) Program as described in Section 18.12 of the U.S. EPR FSAR.}