

Human Factors Engineering Program Management Plan LTR Status

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Pre-Application Meeting
Rockville, MD**



Outline

- HFE Program Management Plan LTR Outline
- Exemption requests from the nuclear power plant licensed operator staffing requirements specified in 10 CFR 50.54(m), following NUREG 1791 guidance

HFE Program Management Plan

- HFE Program Goal and Scope
- HFE Team and Organization
- HFE Process and Procedures
- HFE Issue Tracking System
- HFE Technical Elements
 - HFE Implementation Plan – OER, FRA & FA, TA, SQ, HRA
 - Stand-alone plans – HSI Design, Procedure Development
 - Plans supporting COLA activities – Training Design, HFE V&V, Design Implementation, Human Performance Monitoring

HFE Program Goal

- NuScale HFE Program goal is to provide systematic method to integrate HFE into plant analysis, design, evaluation, and implementation to achieve safe, efficient, reliable operation, maintenance, testing, inspection, and surveillance of the plant
 - Provide design criteria guiding HFE implementation
 - Provide integrated HFE process that can be practically implemented
 - Ensure personnel can perform tasks within safety, time, and performance criteria with HSIs provided
 - Provide high-quality interface between operators and plant systems to ensure safe plant shutdown, emergency core cooling, and operation of the plant and to alert operators to off-normal conditions

HFE Scope

- Scope covers
 - Assumptions and constraints
 - Applicable facilities
 - Applicable Human-System Interfaces (HSIs)
 - Applicable plant personnel
 - Exemption request support

NuScale HFE Team

- NuScale HFE team, together with other subject matter experts, includes the following appropriately qualified members and responsibilities (members representing non-HFE disciplines are not permanent and participate as needed)
 - **HFE Team Lead** — HFE Program process, schedule, and resources
 - **Human Factors Engineer** — Integration of HFE into SSC design, verification, and implementation
 - **Human Factors Design Engineer** — Analysis and development of design requirements
 - **Technical Project Management** — Schedules and interfaces with other disciplines
 - **Systems/Design Engineers** — Input to HFE on SSC (detailed characteristics and layout)

HFE Team at NuScale (cont.)

- **Nuclear Safety Engineer** — Input to HFE on reactivity control, safety assessment and classification, PRA, safety analyses and initiating events, ALARA philosophy, dose rates, plant zoning, task safety, and radiological aspects
- **Plant Operations** — Operators' input on operational activities and task characteristics
- **Training Specialists** — Input on requirements for development and evaluation of training
- **I&C Engineers** — Input design and integration of operational control functions, as well as design and evaluation of: displays, controls, and system software/hardware
- **Structural Design Engineer** — Input on plant layout, constructability, and inspectability

HFE Process and Procedures

- Process will fall under NuScale general project management plan under the NuScale Quality Plan
- NuScale engineering procedures to be used
 - HFE Issue Tracking Procedure
 - HFE Technical Elements Procedures

HFE Issue Tracking System

- Elements of HFEITS process
 - Identifies issues and Human Engineering Discrepancies (HEDs) and enters them into HFEITS log with a unique tracking number
 - Tracks, reviews, and periodically reports HFE issues and HEDs out to applicable activities
 - Assures issues identified throughout HFE Program are addressed
 - Facilitates resolution and assigns responsibilities for issue elimination or reduction to an acceptable level

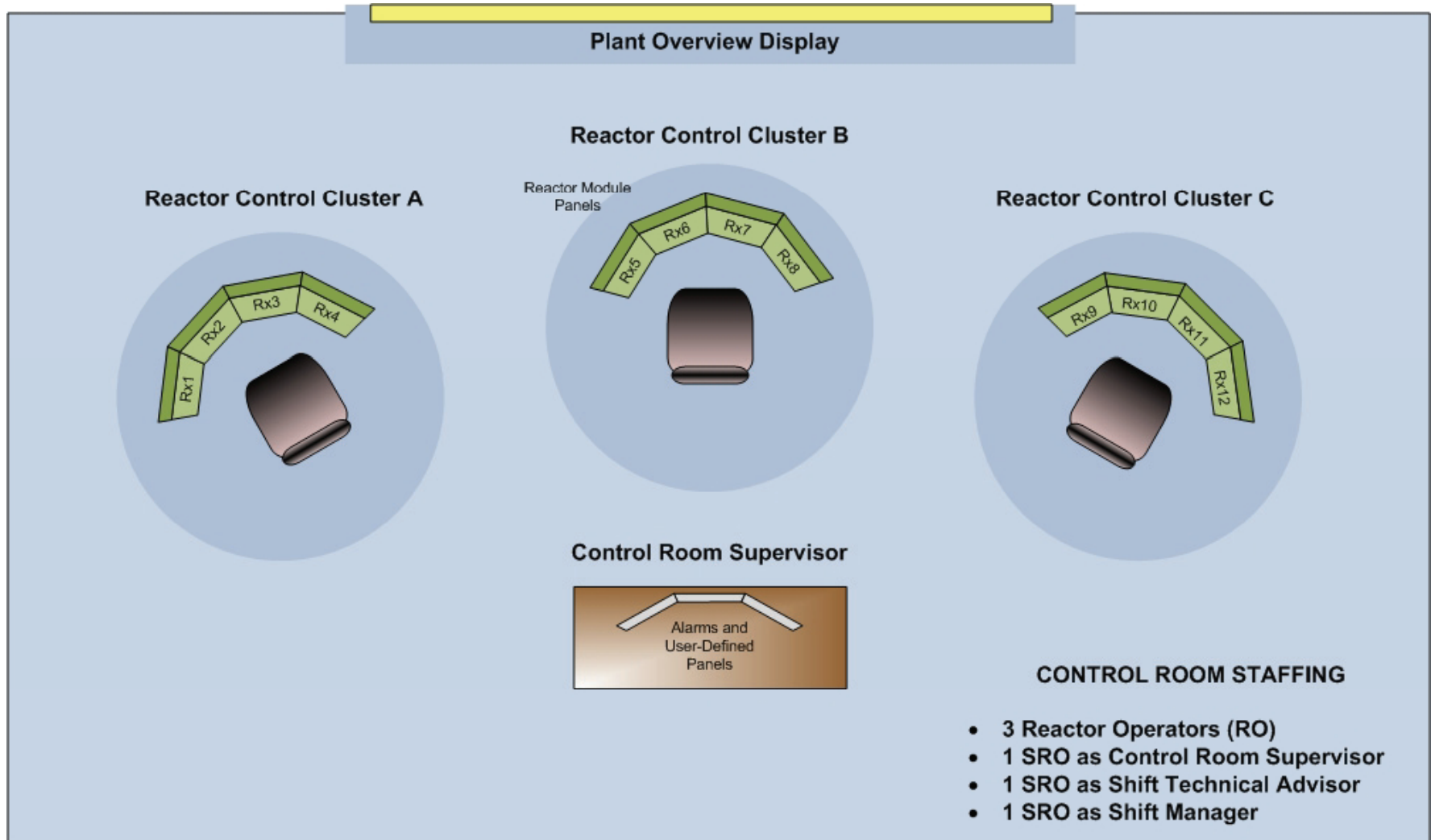
HFE Technical Elements

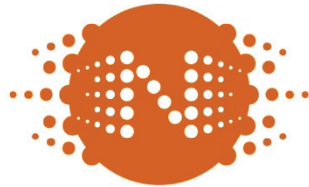
- HFE Implementation Plan
 - Operating Experience Review (OER)
 - Functional Requirements Analysis and Function Allocation (FRA & FA)
 - Task Analysis (TA)
 - Staffing and Qualifications (SQ)
 - Human Reliability Analysis (HRA)
- Stand-alone plans
 - Human-System Interface Design (HSI)
 - Procedure Development
- Plans supporting COLA activities
 - Training Design
 - Human Factors Verification and Validation
 - HFE Design implementation
 - Human performance monitoring

Exemption Request

- 10 CFR 50.54(m) Operator Staffing
 - Supported by HFE Program Management Plan
 - Follow NUREG 1791 guidance
 - Goal is Multi-Module monitoring and control

Multi-module Control Room Layout





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