

# Human Factors TWG Meeting

May 31 and June 1, 2007



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# Use of Multi-Channel VDUs

- Communications TWG agreement in principle
  - NRC staff has drafted guidance to permit the use of multi-channel non-safety related VDUs
- Key Human Factors issues to be addressed during designs
  - Multi-channel VDUs and safety related backup system
    - Consistency and/or compatibility between HSIs
    - System response time
  - Degraded HSI operations (Minimum Inventory)
    - Cues of need to transition
    - Transition
    - Training
    - Procedures
    - Manual action times
    - Staffing
    - Validation
  - Operational / functional restrictions
    - If necessary based on Communications TWG
- What else needs to be addressed?

# Manual Operator Actions

- D3 TWG agreements in principle:
  - Manual operator action is acceptable for accident mitigation (IEEE 603, BTP-19)
  - Actions based on EOPs
  - Best estimate analysis used to demonstrate that time expected for operator actions is less than time available
  - Validation through use of plant reference simulator
- Key human factors issue to be addressed
  - Defining an acceptable methodology to be used in best estimate analyses for defining time expected for operator actions
  - Industry developing technical paper to define details for an acceptable methodology based on agreements
  - Draft to NRC by July 18

# Basis for Prioritization

- High
  - Impacts vendor architecture / workstation design / simulator / control room
    - 2008 target date for reference design simulator
    - Late 2007 and early 2008 DCD / COLA submittals
- Medium
  - Needed to ensure review consistency and regulatory certainty in licensing review process
  - For new plants, applies to DAC/ITAAC closure
- Low

# Problem Statement Priorities

- PS 1 – Minimum Inventory (High)
- PS 2 – Computerized Procedures/Soft Controls (High)
- PS 3 – Role of personnel (Med) **Low**
- PS 4 – SPDS (Low)
- Graded Approach (High) **Medium**
- Multi-channel VDU (High)
- Manual Operator Actions (High)

# Graded Approach to HFE

- The Standard Review Plan allows a graded approach to HFE
- However:
  - For new plants, existing guidance does not adequately address
    - Basis for grading
    - Grading categories
    - Application of program elements to categories
  - For existing plants, NUREG-1764 guidance is narrowly focused on changes to risk important human actions
- This lack of guidance:
  - Contributes to regulatory uncertainty about the content of applications / amendments
  - Has the potential to contribute to inconsistencies in staff review efforts
- Proposal:
  - Industry develops a technical paper that provides needed guidance
  - NRC reviews / endorses methodology in interim guidance

## Graded Approach to HFE

- NUREG-0711, “Human Factors Engineering Program Review Model,” Section 1.4, “Graded Approach for Review” references NUREG-0800, “Standard review Plan,” Chapter 18, “Human factors Engineering” and states:

*“In its complete form, the review process provides a comprehensive, detailed evaluation. This approach should be used for the review of a new plant design or an extensive control room modernization.”*

- The existing regulatory guidance does not provide sufficient detail to allow designers and licensees to confidently apply a graded approach to HFE in their design.



# Graded Approach to HFE (continued)

- NUREG-0800 Chapter 18 states:
  - “This chapter provides detailed examples of graded review criteria for several reviews.”
- There are 2 key limitations:
  - **Chapter 18 provides no guidance for use of graded approaches in the design of a new plant** – the only grading or tailoring of the staff’s review that is discussed is for modifications to HSIs and modifications to risk-important human actions
  - **The guidance for review of HSI modifications does not address grading of the HFE design based on risk or complexity** – the guidance primarily addresses the need to tailor the review using a reduced set of review items and criteria appropriate for a modification to an existing design as opposed to a complete new design; it does not address grading the review of a modification based on the level of risk or complexity associated with the modification
- NUREG 1764 provides guidance on grading the review for modifications affecting risk important interactions
  - Focus is on human actions credited for safety



## Graded Approach to HFE (continued)

- A graded approach should be used when performing HFE activities as part of a design effort:
  - In order to ensure that all required HFE activities are performed at an appropriate level of rigor
  - To minimize unnecessary work
  - To focus regulatory and applicant resources where they are needed to meet safety and reliability goals