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Minimum Inventory

Discussion of ISG and Materials for SRP Revision

Discussion with TWG #5

August 25, 2008
Rockville, MD

Objectives

- Discuss minimum inventory provisions in ISG (draft Revision 1)
  - Some clarifications needed
- Discuss materials provided to NRC staff last week on process for identifying the minimum inventory
  - Answer NRC staff's questions on the materials
- Discuss process to address minimum inventory for operating plant modernization
- Define next steps

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Minimum Inventory Provisions in ISG

- Reviewed the minimum inventory section of the draft ISG revision:
  - Appears no changes were made to this section as compared to the version issued last summer
  - Recent changes in the definition of minimum inventory and other interactions with the staff lead to the need for some clarifications on the MI provisions
- Discuss questions/clarifications (provided in separate list)

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Process for Identifying MI for New Plants

- Updated materials (dated 8/18/2008) were provided to staff last week
- Materials contain:
  - Table 4-1, HSI Design Criteria Matrix
    - Same as version previously provided
  - Updated Section 3.2 on process for identifying MI for new plants
    - Updated to reflect new definition of minimum inventory as subset of supplemental HSIs
    - New flowchart illustrating process for identifying the MI

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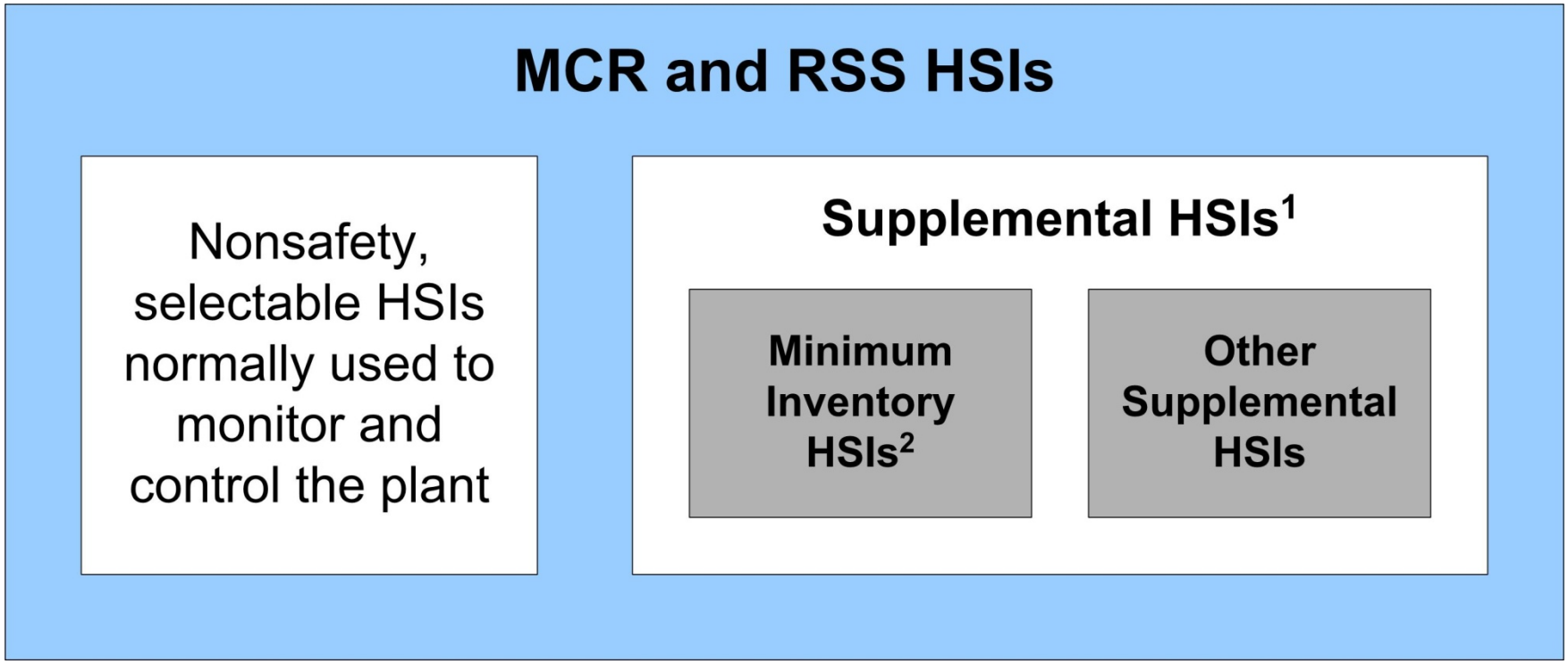
New Definition of Minimum Inventory



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Definitions

[1] ***Supplemental HSIs*** (alarms, controls and displays) are those that are needed *in addition to* the nonsafety, selectable HSIs normally used by the operators to monitor and control the plant. Examples include: HSIs that need to be implemented using equipment that is qualified to perform safety functions (and thus must be independent of the nonsafety HSIs); HSIs that need to be spatially dedicated and continuously visible, as opposed to selectable; and HSIs needed during normal power operation to handle failure or degradation of the normally-used HSIs.

[2] ***Minimum inventory HSIs*** are the set of alarms, controls and displays necessary for the operators to bring the plant to a safe shutdown condition and maintain it in a safe shutdown condition, when there is a loss of the nonsafety HSIs normally used to monitor and control the plant. This includes the HSIs needed to perform these functions under accident conditions (i.e., mitigation of design basis events, when the nonsafety HSIs cannot be assumed available) as well as during normal operating conditions when there is a failure or degradation of the normally-used HSIs. It also includes achieving safe shutdown from the remote shutdown station (RSS) when the main control room must be evacuated.

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Table 4-1: HSI Design Criteria Matrix

- Process for identifying MI relies on this table
- Table identifies HSI design criteria applicable to the full range of supplemental HSIs
  - Covers 11 functions/tasks (F/Ts)
  - Addresses different types of HSIs needed to support those F/Ts
  - Identifies design criteria including:
    - Hardware/software design criteria (particularly qualification, QA, independence criteria) – using four criteria groups
    - Accessibility criteria (from selectable to spatially dedicated, continuously visible or SDCV)

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Table 4-1 (cont'd)

- Addresses all of the supplemental HSIs
- Flags a subset of the supplemental HSIs that should be part of the minimum inventory
  - Identifies only ***types*** of HSIs, not specific instruments or variables, that should be part of MI
- Based on the definition of minimum inventory HSIs recently provided by the staff

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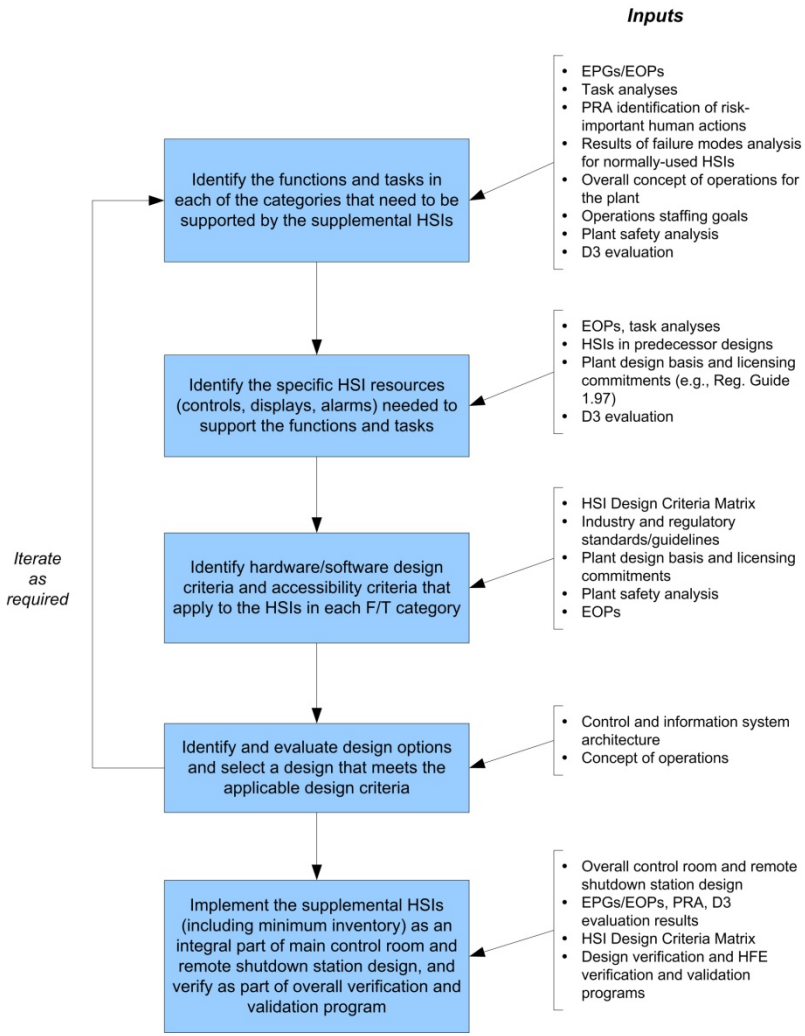
Process for Identifying and Implementing the Supplemental HSIs



- Process shown in Figure 3-3
- Performed as part of overall control room and RSS design
- Verified as part of HSI design verification and HFE V&V

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Process for Identifying Minimum Inventory HSIs

- Process shown in Figure 3-4
- Two-step process:
  - Initial identification of MI based on early design information and analyses
    - Information available at DCD stage
    - Provide this list as part of Tier 2*
  - Verification using full set of design information
    - Can be part of ITAAC

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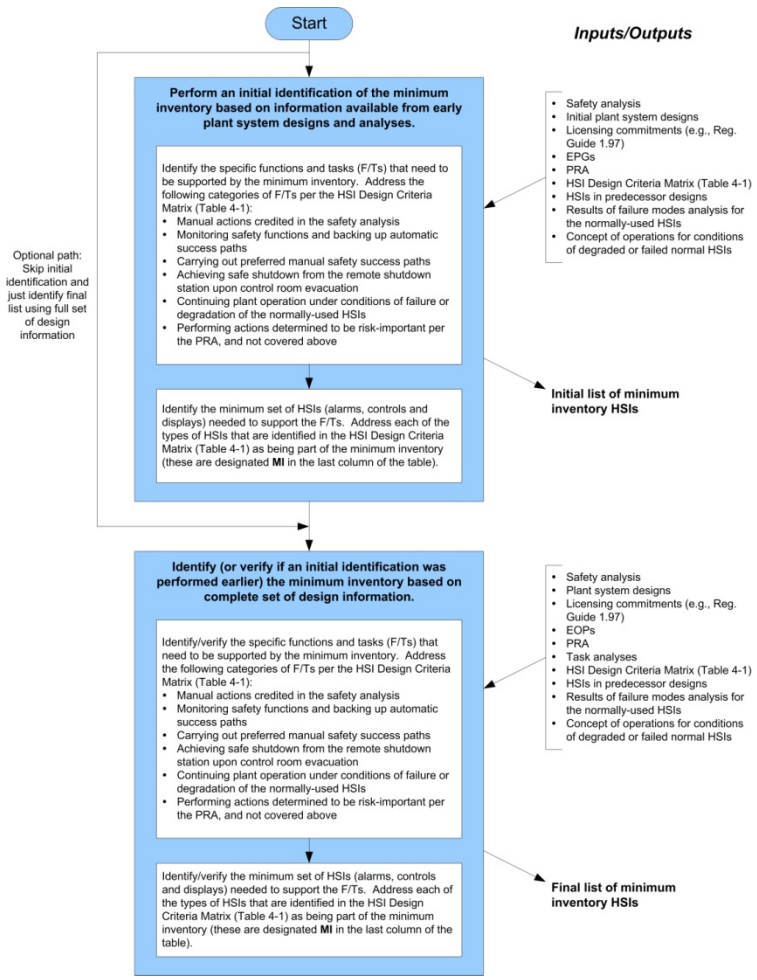
Process for Identifying Minimum Inventory HSIs (cont'd)



- Process shown in Figure 3-4
- Lists inputs that can be used in developing the initial MI list
  - Still being refined – changes likely
  - Ex: EPGs
- Completeness of MI is verified using full set of design information

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Questions received from the staff

- Why are there no alarms identified as part of MI?
  - Table 4-1 does not identify any alarms that are necessary for safe shutdown and need to be independent of the normally-used HSIs
    - Thus they may not be available when the normal HSIs fail
  - Operator actions supported by MI are typically driven by procedure, not relying on alarms
  - Alarms are still part of the supplemental HSIs (e.g., a number of alarms are identified as requiring SDCV implementation)
    - Part of supplemental HSIs, but not minimum inventory

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Questions received from the staff (cont'd)

- Figure 3-4 seems to be a reiteration of Table 4-1. Please explain the difference/relationship between the table and the figure
  - The table identifies which ***types*** of HSIs supporting which F/Ts should be part of the minimum inventory
  - The figure shows the two-step process for identifying the ***specific HSIs*** (i.e., specific variables like SG pressure, specific controls like Rx trip, etc.) that should be on the minimum inventory list, and the information that can be used to determine this
  - The figure references the table

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Questions received from the staff (cont'd)

- Figure 3-4 (and Table 4-1), includes the category of "continuing plant operation under conditions of failure or degradation of normally-used HSIs." Using the "new" definition for minimum inventory (focused on reactor shutdown), does this category still apply? Please explain rationale for keeping it for minimum inventory
  - This was included based on our understanding of the staff's definition of MI – HSIs needed to safely shutdown when the normally-used HSIs are lost during normal as well as emergency operations
  - We propose removing HSIs for "continued plant operation" from MI
  - This also needs correction or clarification in the ISG

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Additional questions?

- Discuss any additional questions on the materials provided for identifying minimum inventory for new plants

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Identifying MI for Operating Plants

- Part 52, DCD, Tier 1, Tier 2*, etc., do not apply
- However, a similar two-step process can be used
  - Initial identification of MI based on early design concepts for the modernized control room
    - Control room “endpoint” design
  - Verified when the control room modifications are implemented
- Can update the text and provide updated flowcharts for operating plant MI process
- Table 4-1 already covers operating plants as well as new plants so it is ready to go

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Next Steps

- Staff is continuing development of revision to the SRP
  - What specific information from industry white paper will be included?
  - What additional information is needed from industry?
- Schedule for providing the information, and schedule for SRP update
- Any other action items

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Questions?

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