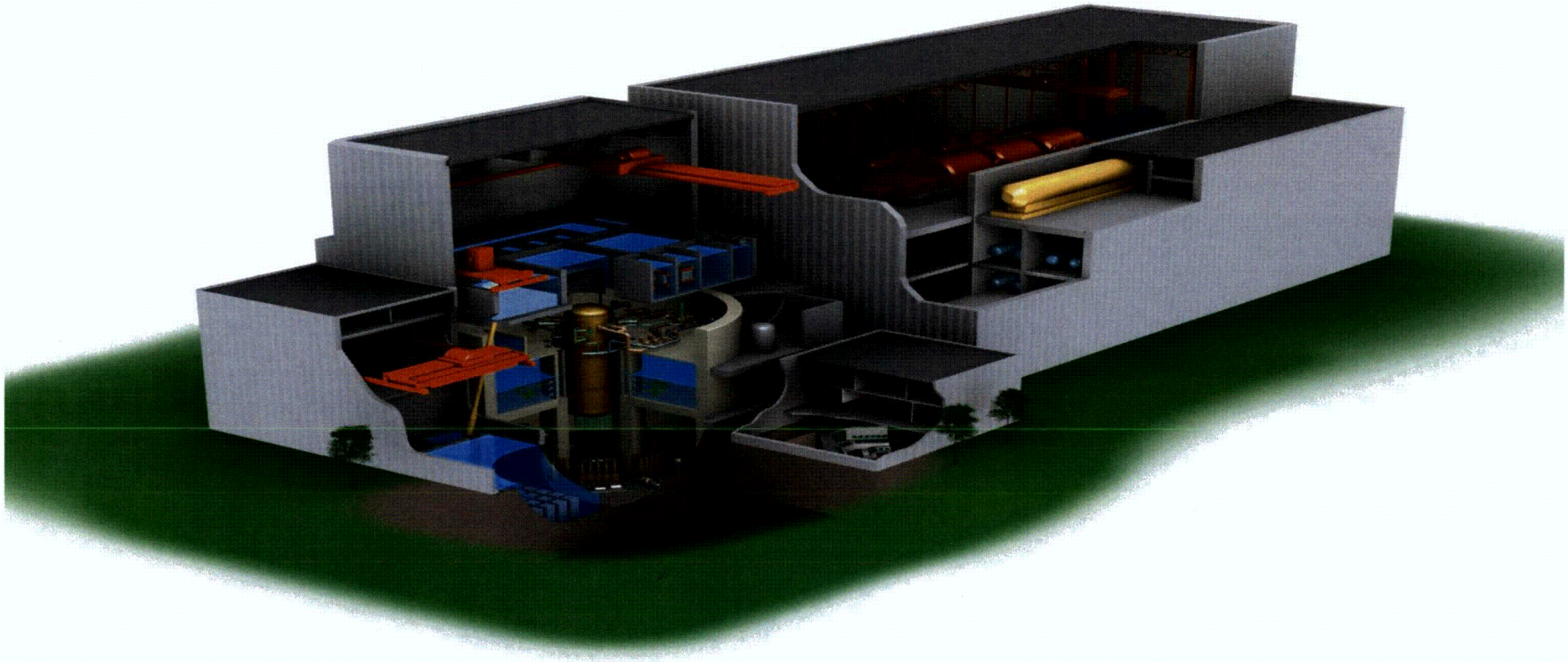
Enclosure 2

MFN 07-502

Presentation Slides from NRC Audit of HFE

(Non-Proprietary Version)

ESBWR
Human Factors Engineering
NRC Audit
July 25, 2007



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GE Hitachi Nuclear Energy
July 2007

ESBWR Human Factors Engineering
NRC Audit July 2007

Introductions

GE & NRC

Meeting Agenda
July 25-27, 2007

GE Hitachi Nuclear Energy
July 2007

Agenda - Wednesday

Wednesday, July 25, 2007: 12:30 p.m. - 4:00 p.m.

1:00 p.m. – 1:30 p.m.	**Welcome by Management/ NRC Opening Remarks**	**GEH/NRC**
1:30 p.m. – 1:45 p.m.	**Meeting Agenda**	
1:45 p.m. – 2:30 p.m	**ESBWR HFE Overview**	
2:45 p.m. - 4:45 p.m	**Chapter 18 RAI Status and Roadmap**	

Agenda - Thursday

Thursday, July 26, 2007: 8:30 a.m. - 4:00 p.m.

8:30 a.m. - 9:00 a.m	Introductions / Agenda	
9:00 a.m. – 9:30 a.m	Tier 1 / Tier 2* Discussions	Licensing
9:30 a.m. - 10:00 a.m	MMIS and HFE Implementation Plan – Progress/Status	
	HFE Implementation Plans – Status/Progress	
10:00 a.m. - 10:15 a.m.	Operating Experience Review	
10:15 a.m. – 10:45 a.m.	Human Reliability Analysis	
10:45 a.m. – 11:00 a.m.	Functional Requirements Analysis – PFRA	
11:00 a.m. – 11:20 a.m.	Operations Analysis – SFRA, AOF, TA, Procedures	
11:20 a.m. - 11:40 a.m.	HSI Design	
11:40 a.m. – 12:00 p.m.	RAI Status Review	
	Software Implementation Plans – Status/Progress	
10:00 a.m. - 12:00 p.m.	SMP and SQAP- Status/Progress	
12:00 p.m. – 1:00 p.m.	Lunch	
	HFE Product Review and Demonstrations	
1:00 p.m. - 1:20 p.m.	HSI Conceptual Development Design	
1:20 p.m. – 1:50 p.m.	Operations Analysis – FRA, AOF	
1:50 p.m. – 2:20 p.m.	Operations Analysis – TA, Procedures	
2:20 a.m. – 2:40 p.m.	SAE Status	
2:40 p.m. – 3:20 p.m.	RWCU Simulation	
3:40 p.m. - 4:30 p.m	Software Implementation Plans Follow-up (if needed)	
3:20 p.m. – 3:40 p.m.	RAI Status Review	
3:40 p.m. - 4:45 p.m.	Review Draft HFE Documents	NRC

Agenda - Friday

Friday, July 27, 2007: 8:30 a.m. - 1:00 p.m.

8:30 a.m. - 9:00 a.m.	**Introductions / Agenda**	
9:00 a.m. - 10:00 a.m.	**RAI Closure Status**	
10:00 a.m. - 10:30 a.m.	**MMIS and HFE Schedule and Activity Preview**	
10:30 a.m. - 12:00 p.m.	**Lunch and NRC Caucus**	**NRC**
12:00 p.m. - 1:00 p.m.	**Closing NRC Remarks**	**NRC**

HFE ESBWR Overview

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Chapter 18 RAI Status and Roadmap

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ESBWR Human Factors Engineering
NRC Audit July 2007

Introductions and Agenda

Agenda - Thursday

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Tier 1/Tier 2 Discussions

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MMIS and HFE Implementation Plan Progress and Status

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RAI Status Review

RAI Road Map

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MMIS and HFE - RAIs

18.2-3	DCD Tier 2 Identify the assumptions and constraints that apply to the ESBWR design	33217	1.2(1)	Addressed in 33217 Section 1.2(1)
18.2-10	Provide detail information or reference specific items regarding the general process management tools??	33217	3.1.4.2	General process tools are contained in GE internal engineering procedures (EOPs, ESIs,). Some of these titles are provided, the detailed procedures are available for NRC review.
19.2-37	DCD Tier 2 Follow up RAI to 19.2-2 regarding the accident management program	DCD 2 33217	18.1 3.2.4.5	DCD Rev 4 states "The standard guidance and EPGs are used to develop and validate site-specific severe accident mitigation guidelines and procedures that satisfy NEI 91-04 Rev 1." A detailed description of this process is addressed in 33217, section 3.2.4.5.

MMIS and HFE - RAIs

18.4-17	LTR NEDO-33219	33217	3.1.4.2(15)	Life cycle maintenance provided. (see 33217:3.1.4.2(15)). Plans re-written with a consistent operations analysis approach.	MMIS and HFE
18.4-17	LTR NEDO-33220	33220		Plans re-written with a consistent operations analysis approach.	MMIS and HFE
18.4-17	Clarify inconsistencies between FRA and FA	33220 33219		An integrated top down approach termed operations analysis was presented at the audit. The operations analysis is a combination of the FRA, AOF, and TA. As pointed out in the RAI, these activities are interrelated, and the plan revisions were accomplish	MMIS and HFE

Operating Experience Review

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Operating Experience Review

- OER Activities
  - BRR/OER database
  - HSI technology review
  - Lessons Learned document review
  - Operations feedback
  - Prepare summary report

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RAI Status Review

RAI Road Map

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OER - RAIs

18.3-20	LTR NEDO-33217 See Discussion Points	33217	3.1.4.3 App A	Admin procedure provided in Appendix A. Details of what will be entered into HFEITS is described in section 3.1.4.3 and Fig 3.1.4-2
	LTR NEDO-33262	33262	4.1.3.3	Added the criteria for establishing issues in the HFE Issue Tracking System.

Human Reliability Analysis

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Importance Measures

- The following definitions are used for three Importance measures
  - P_R = The Probability of the Reference Equation (e.g. CDF, CCDP, LERF)
  - P_0 = The Probability of the Same Equation recalculated with probability of basic event(s) set to 0 (e.g., this BE or set never fails)
  - P_1 = The Probability of the Same Equation recalculated with probability of basic event(s) set to 1 (e.g., this BE or set has failed)

- Importance Measure equations are
  - Fussell-Vesely (FV) for a BE is $FV(BE) = (P_R - P_0)/P_R$ where range is $0 \leq FV \leq 1.0$.
  - Risk Reduction Worth is $RRW(BE) = P_R/P_0$ where the range is $1 \leq RRW \leq$ infinity.
  - Risk Achievement Worth is $RAW(BE) = P_1/P_R$ where the range is $1 \leq RAW$.

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Discussion of potential risk important actions during low power modes

- Loss of RHRs function
- Loss of off-site power
- Loss of RCS inventory
- Loss of fuel pool or reactor cavity inventory
- Reduced reactivity shutdown margin
- Fuel handling

Comparison of 27 IPE HRA modeling[1]

Actions in 50% of studies

- Initiate standby liquid control
- Perform manual depressurization
- Align containment or cool suppression pool
- Vent containment

Human actions in 25%

- Adjust level control in anticipated transient without scram
- Align/initiate alternative injection.

HEPs ranged from ~1 E-5 to 3 E-1

- Depressurizing by nonstandard means
- Recovery of a failed automatic depressurization, complicated by secondary failures
- Number of SRVs available
- In-sequence human failure dependencies
- Initiator- and sequence-specific factors

1 INEEL/EXT-01-01166, 2001

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RAI Status Review

RAI Road Map

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HRA - RAIs

18.0-4	LTR NEDO-33217	33217	4.1.6	Role of RG 1.174 described in detail in section 4.1.6.2 and 4.1.6.4. More detail provided in HRA plan 33267. Defense in Depth updated in section 1.1.3(3). Risk important HA described in Fig 4.1.1-2 in 33217 and further detail provided in OER 33262.
18.5-1	LTR NEDO-33221	33221	1.2	New scope stated and does not include screening or use of ABWR analyses
18.5-1	Integration of Addendum into NEDO 33221	33221	4.1.2 3.2.4	The DCD has been revised to incorporate the top down operations analysis described in the NRC audit. The audit answered all of these clarifying questions, but each is briefly addressed: The NEDO 33221 is completely revised along with 33219 and 3320 to provide a consistent approach to FRA including a plant level function analysis addressing
18.5-19	LTR NEDO-33221	33221 33267	1.2 3.1.4 4.1 4.1	Risk important HAs are input to the TA from the HRA/PRA and used to establish priority. Answer to RAI is addressed in HRA (33267:4.1)

HRA - RAIs

18.5-20	LTR NEDO-33221	33221 33267	1.2 3.1.4 4.1 4.1	New approach does not use the term critical tasks. Critical actions to plant safety will be developed in top down approach
18.5-20	Identification of Critical Tasks	33221 33267	1.2 3.1.4 4.1 4.1	The reference to critical task identification is deleted from the revised Task Analysis Implementation plan. The proper use of this concept should be risk important Human Actions (HA) which are identified in the HRA/PRA to the response and communicated to SFRA, AOE, Task Analysis, HSI, and all activities for special
18.7-7	LTR NEDO-33267	33267	4.2	Para change per RAI
18.7-7	Risk-important (R-I) Human Actions (HAs)	33267	3.2.1 4.2	The initial list of human actions with a potential for risk contribution will be in the phase 0 HRA summary report. The criteria and approach for determining risk important human actions are provided in section 3.2.1 and the process for identifying additional actions through interaction with the HFE tasks is addressed in the third paragraph of section 4.2.
18.7-7	Issue 1- manual v. auto actions	33267	3.1, 4.2	The allocation of functions activity in the operations analysis will establish the manual actions. In the case of the ESBWR the passive features and automation of the safety-related systems virtually eliminate the need for the safety-related human actions required for design basis events (e.g., manually start a safety system). These

HRA - RAIs

18.7-7	Issue 2-Table 19.1-3 is not discussed and does not list values or criteria	33267	3.2	These will be provided in the HRA initial results summary report for rev 1 of the PRA. Summary: To evaluate the risk impact of the HIs for the beyond design basis events a relative risk approach is used. First, risk sensitive actions that support ESBWR safety for beyond design basis events are identified in both the PRA and through the top down HFE operational analysis. Sensitivity analyses using the FV, RAW and RRW described above on the to basic events related to HIs human action tasks in are used to create a listing of the top risk contributors on a relative basis. This listing is generated in the PRA and is compared with the top down operational analysis to identify gaps and support requantification for the PRA. On a relative scale the HIs with a FV greater than 0.1 and RAW of 2.0 for CDF and LERF are subjected to the greatest detail in the HFE tasks, even though the absolute risk values are far below regions I and II described in NUREG-1764 (NRC, 2004).
18.7-7	Issue 3-operator actions not clearly identified in Table 19.1-3	33267	3.2 4.2	The operating assumption is that these will be automated actions with the operator in a monitoring role with manual backup in the case of automation failure. The allocation of function will complete the determination of manual actions. The approach described in issue 2 is followed for these actions

HRA - RAIs

18.7-7	Issue 4-with justifying incomplete PRA status, insights related to functional allocation may be lost	33267	Figure 3 4.2.2 4.2.3 4.2.4	The functional allocation and detailed task information from the operation analysis are key inputs to the refinement of both the HRA and the PRA. After the initial listing of risk-important human actions from the PRA (labeled PRA/HRA probabilistic importance evaluation in Fig 3), the allocation and task details are used to expand the risk important actions (HRA qualitative evaluation for HFE tasks in Fig 3). This re-analysis is used to update the HRA and PRA (iteration loop).
18.7-7	It is not clear if actions are manual or automatic in CD sequences in 19.2.3.1.1	33267	3.2 4.2	See answer to issues 1, 3, and 4.

HRA - RAIs

18.7-7	It is not clear from Table 19.2-3 which items are risk-important Human Actions and it seems not to include all activities called for in the HRA implementation plan	33267	4.2	The Risk Important actions modeled in the PRA are listed and screened in the HRA initial results summary report. From the ESBWR PRA model as described in DCD Tier 2 Chapter 19 Rev 1, September 2006, Tables 19.1-3, 19.2-1 and 19.2-3 list important components, systems functions, tasks and event initiators considered in the ESBWR PRA model and PRA models of previous BWR designs. Table 19.1-3 lists hardware elements that are important. The human interactions for these hardware elements including manual operation (if assigned in the allocation of functions), maintenance, repair, and backup to automatic functions are defined during the operational analysis by the HFE team. These results are then employed as described in item 18.7-7(4).
18.7-7	Table 19.2-3 incomplete	33267	4.2	The human actions in these events will be identified in the operations analysis. See response to 18.7-7(4).

HRA - RAIs

18.7-7	No operator actions for first 72 hrs - Is this from PRA? Are human actions in PRA from the pre-72 hrs	33267	4.2	The initial baseline ESBWR PRA study is used as the starting point for defining risk-important HA tasks. The ESBWR design objective is to avoid the need for operator actions for the first 72 hours following an initiating event for the design basis events. The types of human actions from the initial PRA are actions such as misposition valve (either latent Type A, or commission type C). These are addressed in initial HRA and are described in the HRA results summary report. The operations analysis will identify and analyze human actions supporting these events. See response for 18.7-7(4).
18.7-7	Was error of commission modeled in PRA?	33267	3.2.3	Errors of commission are addressed as follows: The Risk Important actions modeled in the PRA, are compared with other PRA studies and with important OER events. Data from the OER provide error modes, including potential examples of errors of commission (EOC). The results are listed and screened In the HRA and documented in the HRA results summary report. Errors of commission from the initial results include premature depressurization.

HRA - RAIs

18.7-8	LTR NEDO-33267	33267	3.2	Para change per RAI
18.7-8	Use of Risk Measures	33267	3.2.1	Addressed in last paragraph of 3.2.1
18.7-10	LTR NEDO-33267	33267	1.1 A1.2 4.2.3 4.3	Change per RAI Editorial change per RAI Modified per RAI
18.7-10	Methodology Clarification	33267	4.2.1	Language changed to indicate that we will develop a PRA/HRA suitable for risk monitoring. (Last line in 4.2.1)
18.7-10	Methodology Clarification	33267	4.3	All assumptions were reviewed and GE commits in the NEDO to the process assumptions. Assumptions are verified during the early part task simulations or the final V&V .(see last paragraph of 4.3)

Functional Requirements Analysis

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RAI Status Review

RAI Road Map

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PFRA - RAIs

18.4-1	LTR NEDO-33219 See Discussion Points	33219		Plan rewritten to illustrate the change to a top-down analysis of plant and system functions (all figures replaced).
18.4-1	LTR NEDO-33220 Please discuss how the plan ensures that all high level functions for ESBWR necessary for the achievement of safe operation are identified, and that all requirements of each high level function are identified.	33220		Plan rewritten to illustrate the change to a top-down analysis of plant and system functions (all figures replaced).
18.4-4	LTR NEDO-33219 Clarify statements on section 5.1 of NEDO 33219, regarding safety related plant critical functions. It is not clear if RAI response is still pertinent. Please clarify.	33219	4.1.3.5	Plan rewritten to illustrate that a high-level analysis will be performed to identify critical safety functions and their supporting system functions.

PFRA - RAIs

18.4-5 & 18.4-6	Update or clarify safety goals and sub-goals See NRC Discussion Points	33219	4.1.3.2	The response concerning the BRR is no longer applicable. With the new operations analysis approach presented at the audit, the plant level safety goals will be the foundation of the plant level analysis. This will establish the functions which support emergency planning activities and availability-related subgoals including AG-4, Shutdown and Refueling.
18.4-18	LTR NEDO-33219	MFN 06-401	Enclosure 2	The referenced section was omitted in the revision. The plant goals included in the plant level analysis is defined as a process in section 4.1.3, was provided in the Task Analysis RAI response enclosure 2 (MFN 06-401), and was presented in the audit.
18.4-18	Complete details regarding safety related sub-goals	33220	4.1.3	

PFRA - RAIs

18.4-26	LTR NEDO-33219			Detailed guidance for the conduct of the Plant Functional Requirements Analysis (PFRA) is contained in the PFRA Work Instruction that has been drafted to implement NEDO-33219, Revision 1. The work instruction requires that the information specified in NU

Operational Analysis

Operational Analysis

- Operational Analysis and Procedures
  - System Functional Requirements Analysis (SFRA)
  - Allocation of Function (AOF)
  - Task Analysis (TA)
  - Procedure Development

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HSI Design

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Benchmarking and OER Reviews Including...

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Adapting Best Practices of Style Guides for Screens to ESBWR

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Human System Interface

Planned Activities

Work Instructions

- For online screens including
  1. Information Architecture
  2. Navigation Design
  3. Prototyping
  4. Usability Testing
- For control room configuration including
  1. Workstations
  2. Group-View Displays
  3. Workplace

Human System Interface Concept Design

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HFE Product Review and Demonstrations

HSI Concept Design

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RAI Status Review

RAI Road Map

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HSI - RAIs

18.8-2	LTR NEDO-33268	33268 33217	3.2 1.4.2(4)	The style guide providing specific criteria will be provided in July. Plan provides a process. Step by step is developed in a work plan for each activity per guidance in MMIS and HFE Imp plan (33217:1.4.2(4))
18.8-4	LTR NEDO-33268	32368	3.2	Style guide to provide specifics
18.8-10	LTR NEDO-33268	32368	3.2	Appendix maintained as a reference for operating experience. Commitment to style guide for criteria
18.8-10	Use of HF principles	DCD 2	18.1.2 18.8.1	The HF Style Guide (HF Manual) draft will be delivered to the NRC in July. The style guide is in the revised DCD.
18.8-15	LTR NEDO-33268	33268	3.2	The style guide providing specific criteria will be provided in July. Plan provides a process.
18.8-15	Style guide status			See first response
18.8-16	LTR NEDO-33268	33268	4.1.4	Guidance for Computer-based procedures is included in style guide and the output from concept
18.8-16	Alarm design			See first response

HSI - RAIs

18.8-17	LTR NEDO-33268	33268	4.1.3 4.3.4.8 4.3.4.10 4.3.4.12 3.2	Anthropometric considerations added and style guide added to establish criteria
18.8-17	Use of an anthropometric database			See first response
18.8-18	LTR NEDO-33268	33268	3.3.5.1	Style guide provides placement and form of control principles
18.8-18	Design of Controls			See first response
18.8-19	LTR NEDO-33268	33268	4 3.2	MCC removed from text. WDP will be in the Main Control Room and control and display requirements (minimum inventory) is established by operations analysis input. Guidance for placement of controls in style guide.
18.8-19	Fixed position controls and displays			See first response
	LTR NEDO-33268	33268	3.2	Style guide will include guidance on alarms
18.8-22	Alarm suppression			See first response
18.8-33	LTR NEDO-33268	33268	Figure 5 3.3.5.6	Figure is still included, because it has basic methods.
18.8-33	Display design constraints	33217	1.4.2(4)	Additional description of evaluation methods will be established in team work plans per MMIS and HFE Implementation plan guidance (33217:1.4.2(4)) and will be input to the style guide.

HSI
RAIs

18.8-34	LTR NEDO-33268	33268		Figure removed
18.8-34	Methods of evaluation 1	33217	1.4.2(4)	Additional description of evaluation methods will be established in team work plans per MMIS and HFE Implementation plan guidance (33217:1.4.2(4)) and will be input to the style guide.
18.8-35	LTR NEDO-33268	33217 33268	1.4.2(4) 3.3.5.6	Additional description of evaluation methods will be established in team work plans per MMIS and HFE Implementation plan guidance (33217:1.4.2(4)) and will be input to the style guide.
18.8-35	Methods of evaluation 2			See previous response
18.8-36	LTR NEDO-33268	33268	3.2 4.2	Style guide added to address criteria
18.8-36	NEDO guidance and style guide			See previous response
18.8-39	LTR NEDO-33268			See 18.8-1, style guide
18.8-39	Style guide level of detail			See previous response

Software Implementation Plans Status and Progress – Break Out Session

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BREAK FOR LUNCH

HFE Product Review and Demonstrations

HFE Team

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HSI Conceptual Development

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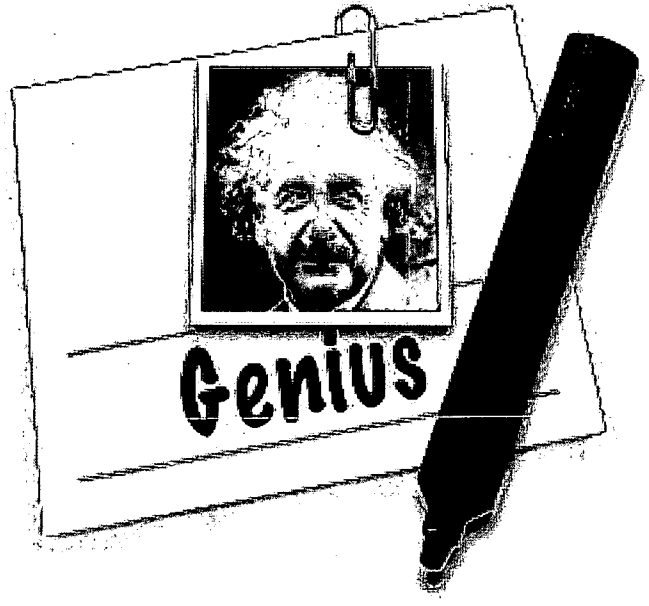
Trial and Error Model

- Risks long-term industry impact
- Highest total cost
- Highest schedule impact

- Operator workarounds

Genius Model

- Not enough geniuses
- Insufficient requirements and design bases tracking
- Lacks customer and operator input
- No process improvement



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WDP Technology Choices

- Mosaic/Flat Panel Displays with discrete components
- Plasma and LCD HD VDUs
- Digital Light Projection
  - Front Projection
  - Rear Projection

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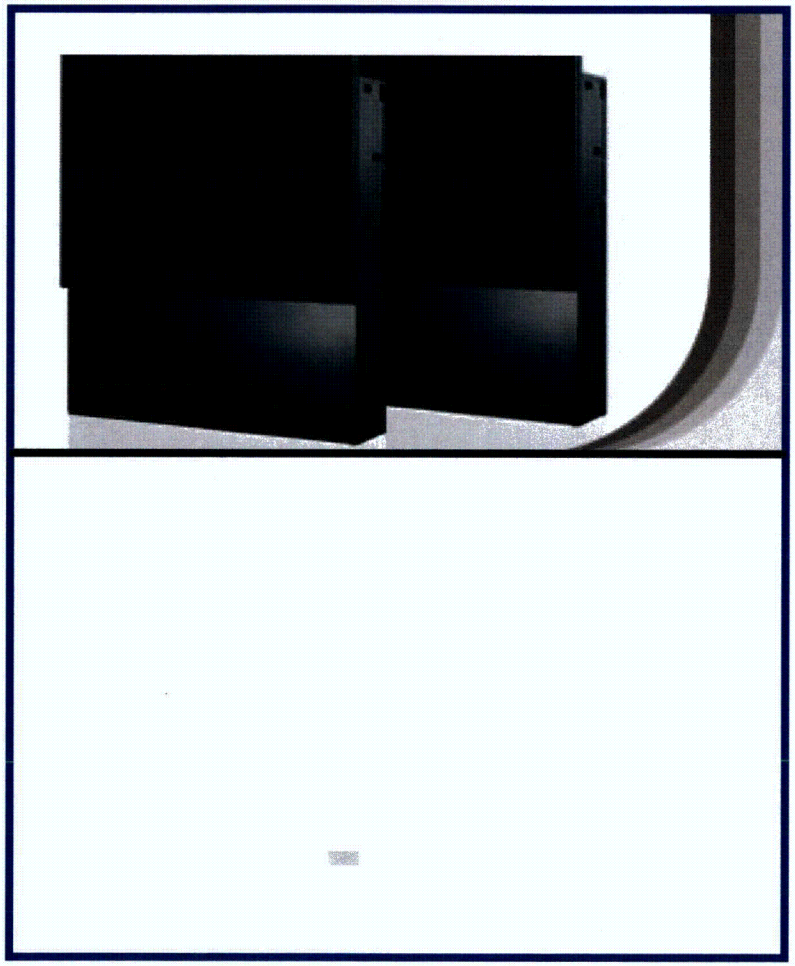
Large Plasma and LCD VDU

- Image burn in
- 2 to 5 year component life
- One failure impacts usability
- Loss of function during replacement
- Obsolescence of standard formats
- Flexible during design development phase
- Promotes good use of graphics and color

Front and Rear Projection

- No image burn in
- 2 to 5 year component life
- Single failure tolerant
- Minimal operator impact during maintenance
- Up-gradable as technology progresses
- Flexible during design development phase
- Promotes good use of graphics and color



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Operational Analysis

System Functional Requirements Analysis (SFRA)
Allocation of Function (AOF)
Task Analysis (TA)

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Simulator Assisted Engineering Procedure Development

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RWCU Simulation and Computerized Procedure Demonstration

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RAI Status Review

RAI Road Map

GE Hitachi Nuclear Energy
July 2007

Operations Analysis - RAIs

18.4-8	LTR NEDO-33220			Appendix with process for one system not provided - Flow charts provided which detail process. An example will be provided in the NRC audit scheduled for July 07
18.4-8	Appendix to NEDO 33220			A separate example was not included in the plan. An example will be provided in the NRC audit scheduled for July 24,2007
18.4-9	Commitment to the Methodology	33220	3.1.1.2 4.1	Plan is re-written with a defined process and a commitment to the process as exampled in 3.1.1.2 and 4.1
18.4-20	LTR NEDO-33220			New revision deleted this section and statement, however the results will be documented in an electronic database. The database is the XML product demonstrated to the NRC in the last audit. In the July 07 audit, a database example for a system will be p
18.4-20	Content of Function Allocation			No mention is made in the revised NEDO 33220 of the database. However, the FRA database uses an XML format, and the AOF will add its elements to the database. Likewise the task analysis will continue to add elements onto the database. The database was

Operations Analysis - RAIs

18.4-21	LTR NEDO-33220	33220	5	The statement in the revised plan is deleted.
		33220	5	Operations personnel are employed in the new approach. A chart with team personnel vs. activity involvement was provided in the audit. There is no equivalent position of a "chairperson" in the new plan. The team members and their backgrounds will be provided in the results summary report.
		33220	4.1.3.1	The procedure for the allocation decisions is provided in 4.1.3.1 and the flow chart Figures 3 and 4.
		33220		These considerations are deleted in the revised plan. Whereas these are important factors in job design and satisfaction, they are beyond the scope of the ESBWR standard plant design allocation of function activity. The physical environment will be a design consideration, but not in allocation of function.
		33220		These steps have been deleted in the revised plan. Cognitive support will be determined and evaluated in the task analysis. As stated in 18.4-21(4), the job satisfaction is beyond the scope of the ESBWR standard plant design allocation of function activity.
		33220		The tradeoff studies have been deleted from the revised plan.
		33221	4.2.3.5	Dynamic evaluations will be performed as soon as the training process begins with the simulator. The task analysis plan section 4.2.3.5 provides for task validations on the simulator.

Operations Analysis - RAIs

18.5-5	LTR NEDO-33221	33221	3.2.4 Figure 2 4.1, 4.2	Approach selected and described Fig 2 revised Step by step process established in new revision Example not provided, but a sample was delivered in audit. A full system example will be presented in the July 07 audit.
18.5-5	Clarification of Methodology Selection (Subquestion A)	33221	3.1.4 4.1.3	Operational sequence diagrams are not a chief product of the revised analysis. The primary use of these diagrams was to analyze the sequential elements of the tasks. This will be accomplished by providing time and workload estimates to the tasks and examining the serial tasks assigned to a particular operator for a specific event. In this way the task database can be used to analyze any event by serially linking the tasks associated with the mitigation response and the staffing assignments from the S&Q and AOF activities. To complete the event analysis, the informational tasks (decisions which will link the combinations of functions), and their time and workload assessment will be defined in the task analysis. The results are then analyzed to ensure that there is sufficient time and capacity (physical and cognitive workload) for the operator to complete assignments.

Operations Analysis - RAIs

18.5-5	Clarification of Figure 2 of NEDO 33221 (Subquestion B)	33221	Figure 2, 3	Figure was removed and replaced with figures describing the step-by-step analysis.
18.5-5	Provision of a step-by-step process (Subquestion C)	33221	3.1.4, 3.2.4 4.1, 4.2	Revised approach provides the step-by-step process that was presented and discussed in the NRC audit.
18.5-10	LTR NEDO-33221	33221	4.2	New top down approach using a plant level analysis and system analysis which assesses the RAI issue
18.5-16	LTR NEDO-33221			B. New approach does not begin with objectives of display system C. Table deleted

Operations Analysis - RAIs

18.5-16	Clarification on the use of task analysis results by HSI designers (Subquestion A)	33221	3.1.4, 4.1.2	The system design does not proceed independently from the HFE analysis. In fact, in the revised top down operations analysis, the system designers are the owners of the system functional requirements analysis. The designers work in cooperation with the HFE team, chiefly the team SROs, to establish the system functions and needs including the parameters and their characteristics. The task analysis then uses the system functions to describe tasks and the informational and control needs to accomplish the tasks. The specific needs are then compared to the system designs to ensure they will support the task needs. Since the HSI are digital, the list of parameters displayed and their characteristics are very flexible and easily revised. If a key parameter were to be missing, it would be added to the system design.
18.5-18 S01	LTR 33221 Workload Assessment			Task analysis screens tasks for workload and potential high workloads are assessed by HED

Operations Analysis - RAIs

18.5-21	LTR NEDO-33221	33221	4.2.4	These outputs are described in revised section
18.5-22	Identification of task requirements	33221	4.1.4 4.2.4 5.1	The revised plan discusses the output of the high-level task analysis and the detailed task descriptions, and the results summary report that will describe these.
18.5-22	LTR NEDO-33221	33221	4	Revision consistency applies top down approach and task analysis results rather than HSI design is the focus
18.5-24	Evaluation of Task Analysis Results	33221	4.1.3	The elements in question are not included in the new revision. The revised plan focuses on the process to be applied in the analysis of the tasks. This was presented and discussed at the audit.
18.5-24	LTR NEDO-33221	33217	3.1.4.2(4)(6)	Task data form deleted in new approach. New form to be established in work plan per (33217:3.1.4.2(4)(6)). Work plans will be available for review in July 07 audit.
18.5-24	LTR NEDO-33221			New approach does not use a subset of tasks so that all tasks associated with the functions defined are identified and analyzed

Operations Analysis - RAIs

18.5-28	LTR NEDO-33221	33217	3.1.4.2(4)(6)	Data form for TA has yet to be developed, but will include the elements of the form in the old appendix A. Alarm information will be included. New form to be established in work plan per (33217:3.1.4.2(4)(6)).
18.5-29	LTR NEDO-33221 Explain the role of task analysis as input to procedure development and modification.	33221	4.1.4 Figure 1	Description in response is correct. Figure 1 shows relationships.

Software Implementation Plans Follow-up

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RAI Status Review

RAI Road Map

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Review Draft of HFE Documents

NRC

GE Hitachi Nuclear Energy
July 2007

Introductions and Agenda
Friday, July 27

Agenda - Friday

Friday, July 27, 2007: 8:30 a.m. - 1:00 p.m.

8:30 a.m. - 9:00 a.m.	**Introductions / Agenda**	
9:00 a.m. - 10:00 a.m.	**RAI Closure Status**	
10:00 a.m. - 10:30 a.m.	**MMIS and HFE Schedule and Activity Preview**	
10:30 a.m. - 12:00 p.m.	**Lunch and NRC Caucus**	**NRC**
12:00 p.m. - 1:00 p.m.	**Closing NRC Remarks**	**NRC**

RAI Closure Status

MMIS and HFE Schedule and Activity Preview

GE Hitachi Nuclear Energy
July 2007

Lunch and NRC Caucus

NRC

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July 2007

Closing/NRC Remarks

NRC