



Westinghouse Electric Company  
Nuclear Power Plants  
P.O. Box 355  
Pittsburgh, Pennsylvania 15230-0355  
USA

U.S. Nuclear Regulatory Commission  
ATTENTION: Document Control Desk  
Washington, D.C. 20555

Direct tel: 412-374-6206  
Direct fax: 412-374-5005  
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_002526

June 9, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 18)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 18. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following RAI(s):

RAI-SRP18-COLP-03 R1

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

  
Robert Sisk, Manager  
Licensing and Customer Interface  
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 18

cc:	D. Jaffe	- U.S. NRC	1E
	E. McKenna	- U.S. NRC	1E
	P. Donnelly	- U.S. NRC	1E
	T. Spink	- TVA	1E
	P. Hastings	- Duke Power	1E
	R. Kitchen	- Progress Energy	1E
	A. Monroe	- SCANA	1E
	P. Jacobs	- Florida Power & Light	1E
	C. Pierce	- Southern Company	1E
	E. Schmiech	- Westinghouse	1E
	G. Zinke	- NuStart/Entergy	1E
	R. Grumbir	- NuStart	1E
	B. Seelman	- Westinghouse	1E

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 18

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

RAI Response Number: RAI-SRP18-COLP-03  
Revision: 1

### **Question (Revision 0):**

The NRC staff noted a well structured and disciplined assessment of the HFE requirements applicable to the EOF and TSC. The following examples demonstrate how the HFE program plan and appropriate regulation were used to identify EOF/TSC HFE design requirements:

- Westinghouse and utility personnel worked together to identify the functional requirements for the TSC/EOF. The diverse experience in this group supported a thorough evaluation
- Specific requirements were extracted from the AP1000 DCD, the HFE program Plan, NUREG -0711 rev 2 (Human Factors Engineering Program Review Model), NUREG-0696 (Functional Criteria for Emergency Response Facilities), and NUREG-0654 rev 1 (Criteria for Emergency Response Facilities). These documents served as the basis for identifying the EOF/TSC functional requirements. Identification of functional requirements is one of the basic steps required in the HFE program plan and NUREG-0711. Document APP-OCS-GGR-110-P provides complete documentation of how applicable functions were identified.
- An operating experience review will be conducted. Application of lessons learned from operating experience is one of the basic steps required in the HFE program plan and NUREG-0711.
- A task analysis will be conducted. In TR-136, the applicant states the requirement for this task analysis will be captured in the Operational Sequence Analysis -2 (OSA-2) implementation plan. A task analysis is one of the basic steps required in the HFE program plan and NUREG-0711 and the OSA-2 incorporates accepted methods for performing task analyses.
- In TR-136 section 2.4.4, the applicant indicates Westinghouse will identify applicable HSI design guidelines from the AP1000 HSI Design Guidelines (APP-OCS-J1-002 rev 0) to promote the human factors design adequacy of the TSC/EOF design. This implements appropriate elements of HSI design and design implementation required in the HFE program plan and NUREG-0711.

Based on the activities outlined above the applicant determined that the HFE program for the TSC/EOF will be a graded application of the AP1000 HFE program with specific focus on the provision of data and display design.

The staff requests the following additional information on specific elements of the process to assist in its evaluation of changes proposed for COL Action Item 18.2-2

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

1. NUREG-0800 states, "The applicant has an HFE design team with the responsibility, authority, placement within the organization, and composition to ensure that the design commitment to HFE is achieved." The first bullet in the paragraph above addresses how the majority of these attributes are met. Additional information is requested on team composition. Specifically, for each team member participating in the analysis of EOF/TSC functions, describe the experience that directly relates to EOF/TSC HFE program analysis. The following areas are of particular interest: HFE experience, TSC experience, EOF experience, and Operational Experience.
2. The Task Analysis described in TR-136 section 2.4.2 states, "This task analysis will cover all of the identified areas where the data and display **available in the main control room** may be utilized in TSC and/or EOF functions." A subsequent sentence in the same section states that for completeness all task steps will be documented but those not associated with the display or provision of plant data will not be considered.

APS-OCS-GGR-110-P section 3.3, 4<sup>th</sup> paragraph states, "The development [by Westinghouse?] of additional displays is restricted to those that are required or useful in the MCR. If a potential display is deemed to be only required or useful in the TSC and/or EOF, the HFE scope is restricted to ensuring the data is made available to the TSC and EOF, and it **does not include the display design.**"

Subsequent sentences state the COL applicant is best able to design these indications.

Please clarify the intent of these paragraphs. **Q1** Are they only meant to define responsibilities between Westinghouse and the license applicant? **Q2** Will the HFE program plan still be applied to indications that are not available in the control room? **Q3** If not, please explain specifically why a task identified via the task analysis would not receive such treatment. (note: bolded words are key points of confusion)

3. Section 2.4.2 states that the task analysis will be based on "**available existing** TSC and EOF procedures? Please describe what measures will be taken to ensure there are sufficient procedures available so all pertinent tasks are identified.
4. APP-OCS-GGR-110 rev 1 section 3.2.2 states, "Compliance to the guidelines will be checked as part of the design verification assessment of the MCR, although the TSC and EOF presentation is not within the scope of Westinghouse design verification assessment."

How will this V&V be accomplished? Who has responsibility for performing it?

5. APP-OCS-GGR-110 section 3.3 lists design activities that must be accomplished by the COL applicant. TR-134 section 18.2.6.2 appears contradictory in that it deletes the

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

phrase, "COL applicants...are responsible for designing the emergency operations facility."

Please provide additional basis for why this change should be included in the DCD revision 16 given the additional work required by the COL applicant.

### Westinghouse Response (Revision 0):

The numbering of these responses is in accordance with the numbering used in the Question section above.

1. It is assumed that the question is referring to the team that undertakes the HFE analysis, and not the team that participated in the TSC and EOF Workshop. A complete listing of the workshop participants is provided in Appendix A of APP-OCS-GGR-110.

The HFE analyses for the TSC and EOF has recently been initiated. Due to overall schedule demands, priorities, and the need to effectively utilize resources and expertise, it is not prudent to identify specific HFE Specialists (because the personnel may change). However, it can be assured that the HFE Program Plan (APP-OCS-GBH-001) is being implemented as intended. Section 4.1.1.2 'Human Factors Engineering Function' details the roles and responsibilities of the HFE team, project organization, the responsibilities of the HFE Lead and the responsibilities, qualifications and experience of the HFE Specialists. Organizationally, the HFE Specialists work alongside the system engineers and display developers.

The HFE Specialists do not currently possess extensive TSC and EOF experience. However, other groups within Westinghouse do have personnel with TSC and EOF experience. For example, the Nuclear Power Plant (NPP) group includes personnel with qualifications in plant operations, and they are responsible for the development of procedures, training programs and emergency planning. Westinghouse has good and open communications policy between different groups based on the overall objective of ensuring that AP1000 is a safe and successful plant. Furthermore, the HFE Specialists have developed a good working relationship with the license applicants. For HFE matters, this comprises the utilities (license applicants) listed in Section 1 of APP-OCS-GGR-001. This readily enables the HFE Specialists to obtain and incorporate the required and valued TSC, EOF and operations input.

2. **Q1** The scope of work described in the 4<sup>th</sup> paragraph of Section 3.3 of APP-OCS-GGR-110 is to define the display development work for the TSC and EOF that falls within the AP1000 HFE Program Plan. It does not attempt to define divisions of responsibility.

**Q2** In defining the scope of the HFE Program Plan for the TSC and EOF, a review of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

Response Plans and Preparedness in Support of Nuclear Power Plants”, was undertaken. The purpose of this was to identify the tasks/functions that need to be included in the AP1000 HFE Program Plan. The displays and data for the tasks/functions common to the MCR, TSC and EOF (per NUREG-0654) were considered as being appropriate for inclusion in the AP1000 HFE Program Plan.

**Q3** As stated in Section 2.4.2 of TR-136, it was concluded that only the display functions common to the MCR, TSC and EOF are within the scope of the AP1000 HFE Program Plan. Tasks identified in the task analysis that are not common to the MCR, TSC and EOF will be noted for completeness, but the task analysis will not provide detailed information on, for example, the equipment to be used, displays, actions, feedback and communications.

In addition, it is recognized that the TSC and EOF functions and tasks that are not within the scope of the AP1000 HFE Program Plan will be subject to HFE principles and practice as described in NUREG-0737.

3. An action was placed on the utility representatives that participated in the workshop to provide Westinghouse with the TSC and EOF procedures associated with the tasks identified in Section 4.2 of APP-OCS-GGR-110. This Action is recorded in APP-OCS-GGR-110. Appendix B, Action number 3. This Action has been completed. All of the utilities provided copies of the requested procedures.

The task analysis has yet to be conducted. Therefore, it is not possible to confirm that all of the procedures, identifying all of the pertinent tasks, are on hand. During the task analysis process, the HFE Specialist will confirm that these procedure documents adequately address the tasks identified in Section 4.2 of APP-OCS-GGR-110. If further information is required, the HFE Specialist will work with the utilities to ensure that the task analysis is complete and sufficiently detailed.

4. It is confirmed that the license applicants possess the responsibility for the design verification of the presentation of displays outside of the MCR. This will cover the displays that are within the scope of the AP1000 HFE Program Plan (as identified in Section 3.2.2 of APP-OCS-GGR-110).
5. The change in the DCD (as described in Section 2.5 in APP-GW-GLR-136) does not mean that additional work is required by the COL applicant. The rewording was primarily to clarify the AP1000 HFE Program Plan scope of work for the TSC and EOF.

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

### **Question (Revision 1):**

In a March 9, 2009 email, the NRC issued the below statement as an addendum to this RAI. This subject also has been included in the draft SER as an Open Item.

“The following discussion points derive from areas needing additional clarification in the Westinghouse response to RAI-SRP18-COLP-03. Numbering corresponds to the original sequence of questions and answers.

1. NUREG-0711 specifies membership for a design review team to ensure appropriate technical disciplines evaluate HFE program development and implementation. What disciplines will be applied to development of the task analysis for the EOF/TSC under the graded approach proposal? The staff understands that the utilities and members of the Westinghouse staff have emergency response experience. We are interested in how this experience will be applied during the task analysis.
2. How will tasks that are NOT common to the MCR/TSC/EOF be managed? If this is the COL applicant's responsibility, how is this reflected in the revised COL action item in TR-136?
3. The staff understands that all of the utilities have provided copies of procedures. Is this 6 different sets of procedures? Why is this sufficient given that TR-136 indicates, “The task analysis will be *based on* available existing TSC and EOF procedures...?”

The second paragraph of the response outlines the classic application of a task analysis – the task analysis is used as input to developing procedures or verifying the existing procedures are complete. The fact that this is introduced in the response reinforces the need to understanding the methods being used to complete the task analysis.

- 4/5. The response states that the applicant has responsibility for design verification of displays outside the control room. How is this reflected in the revised COL action item in TR-136?”

### **Westinghouse Response (Revision 1):**

The below response was presented to the NRC in a conference call held March 9, 2009 and provides a summary of the work performed to-date to support the TSC/EOF analysis.

TSC/EOF Information Collection to Support HFE Analysis

1. Westinghouse is conducting human factors engineering (HFE) analyses to support the design of the Technical Support Center (TSC) and Emergency Operations Facility (EOF). The HFE



# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

analyses includes an operating experience review (OER) and a task analysis. This is being documented in APP-OCS-J0A-001, HFE Analysis to Support Technical Support Center and Emergency Operations Facility Design. Westinghouse personnel with operating experience plus representatives from the Utilities have worked with the Westinghouse HFE experts on this project. The report will be complete in June 2009 following a review by Westinghouse and the Utilities.

2. The tasks not common to the MCR/TSC/EOF will be managed by the COL Applicant. It is not reflected in TR-136. It is to be addressed by the utilities in their corresponding section of the FSAR. To facilitate the information collection for the OER, the Utilities identified operating experience documentation (e.g., from drills, exercises and actual events) applicable to the display and provision of plant data in the TSC and EOF. Four Utilities provided information (i.e. SCANA, Duke, Progress and SNL). Westinghouse also checked any related operating experience information from the INPO website. The identified operating experience information has been incorporated into the TSC/EOF HFE analysis report.
3. The results of the workshop between Westinghouse and the Builder's Group identified four tasks where the data and displays in the Main Control Room will be utilized to support TSC and/or EOF functions (for details, see APP-OCS-GGR-110, AP1000 Technical Support Center and Emergency Operations Facility Workshop, submitted to the NRC via DCP/NRC2473 dated May 14, 2009). A task analysis has been conducted for each of the four tasks. The initial input to the task analysis was a total of 30 procedure documents provided by the four Utilities. During the process of developing the task analysis, the Utilities provided additional information and clarifications as requested by Westinghouse. Again, the results have been incorporated into the TSC/EOF HFE analysis report.
- 4/5. The applicant does have the responsibility for design verification of displays outside the control room. This information is not reflected in TR-136 but is to be addressed by the applicant in their FSAR. Westinghouse HFE personnel attended TSC and EOF drills at the Harris Site (Progress Energy) and at the VC Summer Site (SCANA) on January 27 and March 4, 2009, respectively. The observations and interviews with plant personnel from the drills provided valuable input to the OER and the task analysis. In addition, the Utilities personnel and Westinghouse employees who have commercial nuclear power operation experience have reviewed the task analysis, and changes were made accordingly. Both the OER and task analysis process benefited from the participating in the drills.

The results of the OER and task analysis are currently being used in the development of the displays that are specifically required to support the design of the TSC and EOF. In addition, the applicable HSI design guidelines from APP-OCS-J1-002 (AP1000 HSI Design Guidelines) have been identified to promote the human factors design adequacy of the TSC and EOF. This document will be submitted to the NRC by June 30, 2009. All these results are incorporated in the TSC/EOF HFE analysis report.

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

---

Reference:

1. APP-OCS-GBH-001, AP1000 Human Factors Engineering Program Plan.

**Design Control Document (DCD) Revision:**

None.

**PRA Revision:**

None.

**Technical Report (TR) Revision:**

None.