Westinghouse

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/NRC2312

December 5, 2008

Subject: AP1000 Responses to Requests for Additional Information (SRP18)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 7. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the responses 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 RAIs:

RAI-SRP18-COLP-08

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,

John DeBlasio /for

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

/Enclosure

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

D063
NRO

cc:	D. Jaffe	-	U.S. NRC	1E
	E. McKenna	-	U.S. NRC	1E
	S. K. Mitra	-	U.S. NRC	1E
	P. Ray	-	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
	R. 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-08
Revision: 0

Question:

1. Technical Reports contain significant numbers of secondary references. The staff requested these references to validate they had been completed in accordance with implementation plans and to verify regulatory guidance was implemented. Based on this usage, the staff requested that Westinghouse docket the information. In a phone call with Westinghouse the suggestion was made that the staff submit the questions they were trying to answer via a "Request for additional information" verses requesting the documents. This allows Westinghouse to decide whether they should excerpt the relevant information or submit the complete document on the docket. The information provided below provides the original document request followed by the associated questions that the NRC staff reviewers were trying to answer.

   Please provide Document APP-OCS-J1-002, AP1000 Human System Interface Design Guidelines.

   OR

   In accordance with NUREG-0711 section 8.4.5 first bullet,
   Explain how generic HFE guidance was applied to APP-OCS-J1-002 . Provide references and examples of how this generic HFE guidance was used.
   Explain how Westinghouse used their own design-related analyses and experience to develop the design guidelines. Provide examples.
   Provide evidence that guidelines not derived from generic HFE guidelines are justified.
   Explain how these guidelines were justified. Provide examples.
   Explain how the document has been tailored to reflect specific AP1000 design decisions so it addresses specific goals and needs of the HSI design. Provide examples.

   In accordance with NUREG-0711 section 8.4.5 second bullet
   Demonstrate that the Design Guidelines address the scope of HSIs included in the design.
   Explain how the guidelines address the form, function, and operation of the HSIs as well as environmental characteristics relevant to human performance. Provide examples.

   In accordance with NUREG-0711 section 8.4.5 third bullet
   Demonstrate the individual guidelines have been expressed in concrete, easily observable terms. List the 3 most abstract guidelines and provide evidence that the degree of abstractness does not challenge consistent implementation of the guideline.
   Provide evidence that the guidelines are detailed enough to permit their use by design personnel to achieve a consistent and verifiable design.

   In accordance with NUREG-0711 section 8.4.5 fourth bullet

How does the style guide user determine where and how HFE guidance is to be used in the overall design process?
Demonstrate how supplemental text such as graphical examples, figures, and tables are used to support the interpretation and comprehension of the design guidelines. Provide examples.
Provide evidence that the design guidelines can be easily understood by designers.

In accordance with NUREG-0711 section 8.4.5 fifth bullet
Explain how the form of the guidance ensures it is readily accessible and useable by designers.
Explain how the form of the guidance ensures the contents can be updated as the design matures.
Explain the use of basis documentation for the guidelines. How consistently is it used?

In accordance with NUREG-0711 section 8.4.5 sixth bullet
Explain how the style guide addresses future HSI modifications.

2. Please provide the following documents: APP-OCS-J1R-120, APP-OCS-J1R-100, APP-OCS-J1A-030, APP-OCS-J1R-110

   OR

   In AP1000 DCD Rev 16, the applicant made substantial changes to the Operational Sequence Analysis (OAS)-2 description. Please compare the new plan to the 7 criteria in NUREG-0711 section 5.4 and illustrate how each criterion is met.
   AP1000 DCD Rev 16 deletes the detailed description of how work load analysis will be completed. Explain how workload analysis will be conducted within the OAS-2 methodology. Describe the methods used for analyzing the collected sequence information associated with the following issues identified in the DCD: 1) completeness of available information, 2) Time to perform tasks, 3) operator workload analysis, and 4) operational crew staffing
   In the AP1000 FSER (NUREG-1793) section 18.5.4, the staff identified COL action item 18.5-1 (FSER item 18.5.3-3) which states:

   "The staff reviewed the applicant's task analysis at an implementation plan level of detail; finished products to complete the element were not available for review, but the methodology for conducting a complete task analysis was evaluated. The COL applicant will use this methodology to conduct a complete HFE task analysis after design certification."

   Having completed the function based task analysis, please confirm no additional site specific activities are required.
   Demonstrate that the methodology used to perform the Function-based Task Analysis effectively implemented the Function-Based Task Analyses description contained in AP1000 section 18.5.2.1.

Provide examples of how the Function-based Task Analysis fulfilled the purpose of obtaining:

A completeness check on the availability of needed indications, parameters, and controls and,

Input to the specification and layout of functional displays

3. Procedure Development: Please provide WCAP-14645-NP, Rev. 3 "Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant" and APP-OCS-T2R-020, Rev. 0 "AP1000 Engineering Tests Phase 1 Test Report."

   OR

   In accordance with NUREG-0711, Section 9.4, Criteria (7):
   Provide a description of the analysis that was done to determine the impact of providing computer-based procedures (CBPs). Please give all justifications considered.
   Specify how using a computer-based procedures approach would improve procedure utilization and reduce operating crew errors as opposed to using a paper based procedure approach. Please give all justifications considered.
   Provide the analysis of alternatives to the CBPs that was done for the event of loss of CBPs. Please give all alternatives identified.

   In accordance with NUREG-0711, Section 9.4, Criteria (9):
   Provide a description (or descriptions) of the process by which the operators, by physical means, access and use the CBPs during operational events. Please include an explanation of the ease by which the operator can access the correct procedures within the CBP system.
   Provide a description (or descriptions) of the process by which the operators, by physical means, access and use the paper-based procedures during operational events. The process should address how the procedures are stored, the ease of operator access to the correct procedures, and laydown of hard-copy procedures for use in the control room, remote shutdown facility, and local control stations.
   Provide a description of how the HFE design process was evaluated, with regards to the physical means by which the operators access and use the CBPs.

4. NUREG-0711, Section 9.4, Criteria (3), states that a writer's guide should be developed to establish the process for developing technical procedures within the scope of the Procedures Development element. **Q1)** Does the writer's guide for Two-Column Format Procedures (APP-GW-GJP-200), describe the process to create both the paper-based procedures and the computer-based procedures?

Q2) If the Two-Column Format writer's guide is not the same process used to develop the computer-based procedures, please explain what process was used.

5. Please provide an explanation of the computer-based procedure system using the following seven criteria:
    a. Interaction between the operator and the computer-based procedure;
    b. Interaction between the computer-based procedure system and the control and process systems;
    c. The use of plant data, if any, in the computer-based procedure system;
    d. The use of automation, if any, in the computer-based procedure system;
    e. The use of operating controls, if any, in the computer-based procedure system;
    f. Presentation of procedures on the computer-based procedure system, and
    g. Implementation of a backup system to the computer-based procedure system

Westinghouse Response:

Westinghouse provides the following responses to the questions in this RAI. In addition, as an aide to the reviewer, Westinghouse submitted the documents listed in Attachment A of this RAI to the Westinghouse Rockville Office for NRC review.

1. APP-OCS-J1-002, Rev. 0, AP1000 Human Systems Interface Design Guidelines was submitted to the Westinghouse Rockville office the first week of November 2008 for NRC review.

2. The following documents were submitted to the Westinghouse Rockville office the first week of November 2008 for NRC review:

    a. APP-OCS-J1R-120, AP1000 Operational Sequence Analysis (OSA-1)
    b. APP-OCS-J1R-100, Functional Based Task Analysis Methodology and Implementation for AP1000
    c. APP-OCS-J1A-030, Functional-Based Task Analysis Summary Report
    d. APP-OCS-J1R-110, Operational Sequence Analysis Methodology

3. The following documents were submitted to the Westinghouse Rockville office the first week of November 2008 for NRC review:
    a. WCAP-14645-NP, Rev. 3, Human Factors Engineering operating Experience Review Report for the AP1000 Nuclear Power Plant
    b. APP-OCS-T2R-020, Rev. 0, AP1000 Engineering Test Phase 1 test Report

4. **Q1** The AP1000 Writer's Guideline for Two Column Procedures, APP-GW-GJP-200, was submitted to the Westinghouse Rockville office the first week of November 2008 for NRC

review. This document was also previously been reviewed by the NRC. This document constitutes the writer's guide that has been developed to establish the process for developing technical procedures which are within the scope of the Procedures Development element for Emergency and Abnormal Operating Procedures as delineated in NUREG-0711, Section 9.4. The details of this are further addressed in Sections 2.5 through 2.8 of Technical Report 70, APP-GW-GLR-040.

Q2 The paper-based procedures serve as the input to the computer-based procedures system. The wording of the procedures as it appears in the computerized procedures system is exactly the same, word for word, as the paper. The layout of the computerized procedures system has been developed to be compatible and consistent with the paper while at the same time leveraging the advantages that a computer brings to the procedure execution tasks. Providing the logic processing of the current procedure step and the tracking of parallel information such as notes, cautions, critical safety functions, and continuously monitored parameters are the prime examples of the effective integration of computerization with the static paper presentation of the procedures.

5. The use of computer-based procedures was discussed and demonstrated in the April 2007 meetings on procedures between Westinghouse and the NRC (see ML071160237).

    a. The Westinghouse computerized procedures system is user paced. Navigation to a step within the current procedure or to another procedure from the current step is accomplished solely by operator action. The computerized procedures system provides alerts to the operator when continuously monitored parameters related to cautions, notes, and criticality safety functions, for example, move outside of predefined boundaries; however, navigation to a different step and/or procedure is done only by the operator.
    b. The computerized procedures system receives dynamic data from the distributed control system, enabling the evaluation of step logic and parallel information processing. The computerized procedures system does not send any information and/or control commands to the distributed control system.
    c. Please see the response above.
    d. The computerized procedures system is wholly user paced.
    e. The computerized procedures system does not send commands to control systems within the distributed control system.
    f. Please see the previous responses.
    g. Westinghouse will employ paper procedures in the event that the computerized procedures system is not available.

References:

1. APP-GW-GJP-200, Rev. D, "AP1000 Writer's Guideline for Two Column Procedures"

2. APP-GW-GLR-040, Rev. 1, Technical Report 70, "Plant Operations, Surveillance, and Maintenance Procedures"

3. "Summary of the April 11 and 12, 2007 meeting to discuss AP1000 Plant Operating Procedures," dated May 11, 2007 (ML071160237)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

Attachment 1 – Documents Submitted to Westinghouse Rockville for Technical Review	
Supporting Document	**Referencing Document**
APP-OCS-J7-001 rev B (AP1000 operation and Control Centers System System Specification)	TR-82, "Execution and Documentation of the Human System Interface Design Implementation Plan"
APP-OCS-GJR-002 rev. B, (Concept of Operations)	TR-82
APP-OCS-J1-009 rev A (AP1000 Operations and Control Centers System Functional Requirements)	TR-82
APP-OCS-J1-001 rev B (AP1000 Alarm System Functional Requirements)	TR-82
APP-OCS-J1-020 rev 0 (Computerized Procedures System Functional Requirements)	TR-82
APP-OCS-J1-010 rev C (AP1000 Display Functional Requirements)	TR-82
APP-OCS-J1-007 rev C (Wall Panel Information System Functional requirements)	TR-82
APP-PMS-J4-001 rev F (Post Accident Monitoring System Functional requirements)	TR-82
APP-OCS-J1-002 rev 0 (AP1000 Human System Interface Design Guidelines)	TR-82
APP-DDS-J4V-001 rev C (AP1000 Display Design Specification)	TR-82
APP-DDS-J4V-002 rev D (AP1000 Specification of Static and Dynamic Symbols)	TR-82
APP-OCS-J1R-120, rev.0, (AP1000 Operational Sequence Analysis (OSA-1) Summary Report)	TR-81
APP-OCS-J1R-100, Rev. 0, (Function-Based Task Analysis Methodology and Implementation for AP1000)	TR-81
APP-OCS-J1A-030, Rev. A, (Function-Based Task Analysis Summary Report)	TR-81, "Closure of COL Information Item 18.5-1, Task Analysis"
APP-OCS-J1R-110, Rev.0, (Operational Sequence Analysis Methodology)	TR-81
APP-OCS-T2R-020 rev 0 (AP1000 Engineering Test Phase I Test Report)	TR-82
APP-OCS-GBH-001 rev 0 (AP1000 Human	TR-82 and RAI-SRP-COLP-01

Attachment 1 – Documents Submitted to Westinghouse Rockville for Technical Review	
Supporting Document	**Referencing Document**
Factors Engineering Program Plan)	
APP-OCS-T2R-022 rev 0 (AP1000 Engineering Test Phase II Test Report)	TR-82
APP-GW-GJP-100, Rev. G, (Normal Operating Procedure (NOP) Writer's Guidelines)	TR 70, "Plant Operations, Surveillance, and Maintenance Procedures"
APP-GW-GJP-200, Rev. D, (AP1000 Writer's Guideline for Two-Column Procedures)	TR 70
WCAP-14645, Rev. 3, (Human Factors Engineering Operating Experience Review Report for the AP1000 Nuclear Power Plant)	TR 70
Westinghouse Owner's Group Writer's Guide for Emergency response Guidelines, HP/LP, Rev 2	TR-70
APP-OCS-GGR-110, AP1000 Technical Support Center and Emergency Operations Facility Workshop.	RAI-SRP18-COLP-01 (added 10/2/08)
APP-OCS-GEH-120, "AP1000 Human Factors Engineering Design Verification Plan", Rev A	TR-84
APP-OCS-GEH-220, "AP1000 Human Factors Engineering Task Support Verification Plan", Rev A	TR-84
APP-OCS-GEH-320, "AP1000 Human Factors Engineering Integrated System Validation Plan", Rev A	TR-84
APP-OCS-GEH-420, "AP1000 Human Factors Engineering Discrepancy Resolution Process", Rev A	TR-84
APP-OCS-J1R-210, Rev. 0, "Operational Sequence Analysis 2 (OSA-2) Implementation Plan"	AP1000 Response to Request for Additional Information (August 4, 2008)