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: 724-940-8505
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP_NRC_002638

September 28, 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-28
RAI-SRP18-COLP-30

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

0296ljb.doc

D063
NRO

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

RAI Response Number: RAI-SRP18-COLP-28
Revision: 0

Question:

According to the ISV plan, if a failure on Pass/Fail criteria is encountered on one (of the two) replications, then another (a 3rd) trial is run "to avoid an ambiguous result." If the added scenario trial is successful, the final outcome is not clearly specified in the plan. Is the design considered validated for that scenario? If so, the design may be validated with two out of three successful trials, e.g., if a risk-important human action can be accomplished two out of three times, it's acceptable. This is an unacceptably weak standard of acceptance. Please clarify actions when a scenario fails and how that scenario is eventually validated as successful.

Westinghouse Response:

WEC has reviewed the required number of repetitions per scenario, and has determined that each scenario will be run three times. This will be revised in the ISV Plan Rev C to be issued by January 31, 2010.

If a trial fails, then a Human Engineering Discrepancy (HED) will be generated. The HED resolution process will prioritize the failures based on the potential consequences, cause, the extent of the failure and the likelihood of recurrence. The HEDs that are assessed as being significant, important or related to safety, will receive the highest priority. The HED prioritization and evaluation process will consider several aspects, including possible commonalities with other HEDs across scenarios.

The basis for the HED prioritization (as detailed in APP-OCS-GEH-420, "AP1000 Human Factors Engineering Discrepancy Resolution Process", Reference 1) is as follows:

- Priority 1 – These HEDs have direct or indirect safety consequences. The HEDs with direct safety consequences are those that affect personnel performance where the consequences of human error could reduce the margin of plant safety below an acceptable level. The acceptable level is determined via indications such as violations of technical specification safety limits, operation limits or limiting conditions for operations. Priority 1 HEDs include discrepancies associated with safety-related HSI resources or critical human tasks (if any were to exist). The HEDs with indirect safety consequences are those that prevent normal plant operation (i.e., prevent the execution of tasks as required by the plant's operating procedures). They include (but are not limited to) discrepancies associated with defense-in-depth systems and risk-important tasks.

- Priority 2 – These HEDs substantially affect the plant's desired performance and efficiency, or other factors affecting overall plant operability. These may include discrepancies associated with the mandatory HFE guidelines (see APP-OCS-GEH-120, "AP1000 HFE Design Verification Plan", Reference 2), the availability of non-safety related

HSI resources, or other human performance issues that effect plant maintenance or productivity.

• Priority 3 – These HEDs are all other discrepancies.

WEC will determine the appropriate evaluation process for any changes resulting from the resolution of HEDs generated from the ISV on a case-by-case basis. A graded approach will be adopted, based on the complexity and impact of the changes. Independent verifiers will perform the evaluation of the HED resolution, and this may involve a retest, if necessary. The evaluation processes and associated results will be documented in APP-OCS-GER-420, "AP1000 Human Factors Engineering Resolution Verification Report" (Reference 3).

For HEDs that cannot be resolved until the plant is built and equipment is installed, the HFE verification at plant startup includes a mechanism to check and resolve any outstanding issues (Reference 4). All Priority 1 and Priority 2 HEDs are required to be resolved prior to plant startup.

References:

1. APP-OCS-GEH-420, Rev. B, "AP1000 Human Factors Engineering Discrepancy Resolution Process," Westinghouse Electric Company LLC.

2. APP-OCS-GEH-120, "AP1000 HFE Design Verification Plan," Westinghouse Electric Company LLC.

3. APP-OCS-GER-420, "AP1000 Human Factors Engineering Resolution Verification Report", Westinghouse Electric Company LLC.

4. APP-OCS-GEH-520, "AP1000 Plant Startup Human Factors Engineering Verification Plan", Westinghouse Electric Company LLC.

Design Control Document (DCD) Revision:

None.

PRA Revision:

None.

Technical Report (TR) Revision:

None.

RAI Response Number: RAI-SRP18-COLP-30
Revision: 0

Question:

Regarding the testbed, Section 2.1 of the ISV plan states that the completeness of the Facility HSI Design relative to the reference HSI Design may be limited to those items required by the scenario test set. This statement may be at variance with the Review Criterion 1 in NUREG-0711 Section 11.4.3.2.2, which states:

> "Interface Completeness - The testbed should completely represent the integrated system. This should include HSIs and procedures not specifically [provided for] in the test scenarios. For example, adjacent controls and displays may affect the ways in which personnel use those that are addressed by a particular validation scenario"

Please address this concern by justification or modification of the Plan.

Westinghouse Response:

It can be confirmed that the ISV facility will sufficiently represent the MCR HSI resources and the integrated plant for the purposes of ISV.

Seventy-eight of a total of one hundred and one systems in the AP1000 standard design will be available to permit human-system and system-system interactions on the ISV facility/testbed. These systems represent all those that are required to provide a highly realistic, near full scope simulator, and include HSI resources that may not be exercised in the ISV scenarios. The testbed scope ensures that the look, feel, and overall complexity of both the integrated system and the human-system interface are well represented.

Based on the current information and ISV scenario descriptions, the following systems are included for ISV:

ASS – Auxiliary Steam Supply System
BDS – Steam Generator Blowdown System
CAS – Compressed and Instrument Air Systems
CCS – Component Cooling Water System
CDS – Condensate System
CFS – Turbine Island Chemical Feed System
CMS – Condenser Air Removal System
CNS – Containment System
CPS – Condensate Polishing System
CVS – Chemical and Volume Control System

CWS – Circulating Water System
DAS – Diverse Actuation System
DDS – Data Display and Processing System
DOS – Standby Diesel and Auxiliary Boiler Fuel Oil System
DTS – Demineralized Water Treatment System
DWS – Demineralized Water Transfer and Storage System
ECS – Main AC Power System
EDS – Non Class 1E DC and UPS System
EFS – Communication Systems
FPS – Fire Protection System
FWS – Main and Startup Feedwater System
GSS – Gland Seal System
HCS – Generator Hydrogen and CO2 Systems
HDS – Heater Drain System
HSS – Hydrogen Seal Oil System
IDS – Class 1E DC and UPS System
IIS – Incore Instrumentation System
LOS – Main Turbine and Generator Lube Oil System
MES – Meteorological and Environmental Monitoring System
MSS – Main Steam System
MTS – Main Turbine System
OCS – Operation and Control Centers
PCS – Passive Containment Cooling System
PGS – Plant Gas Systems
PLS – Plant Control System
PMS – Protection and Safety Monitoring System
PSS – Primary Sampling System
PWS – Potable Water System
PXS – Passive Core Cooling System
RCS – Reactor Coolant System
RMS – Radiation Monitoring System
RNS – Normal Residual Heat Removal System
RWS – Raw Water System
RXS – Reactor System
SFS – Spent Fuel Pool Cooling System
SGS – Steam Generator System
SJS – Seismic Monitoring System
SMS – Special Monitoring System
SSS – Secondary Sampling System
STS – Simulator Training System
SWS – Service Water System
TCS – Turbine Building Closed Cooling Water System
TDS – Turbine Island Vents, Drains and Relief System

TOS – Main Turbine Control and Diagnostics System
TVS – Closed Circuit TV System
VAS – Radiologically Controlled Area Ventilation System
VBS – Nuclear Island Nonradioactive Ventilation System
VCS – Containment Recirculation Cooling System
VES – Main Control Room Emergency Habitability System
VFS – Containment Air Filtration System
VHS – Health Physics and Hot Machine Shop HVAC System
VLS – Containment Hydrogen Control System
VRS – Radwaste Building HVAC System
VTS – Turbine Building Ventilation System
VWS – Central Chilled Water System
VXS – Annex/Aux Building Nonradioactive Ventilation System
VYS – Hot Water Heating System
VZS – Diesel Generator Building Heating and Ventilation System
WGS – Gaseous Radwaste System
WLS – Liquid Radwaste System
WRS – Radioactive Waste Drain System
WSS – Solid Radwaste System
WWS – Waste Water System
ZAS – Main Generation System
ZBS – Transmission Switchyard and Offsite Power System
ZOS – Onsite Standby Power System
ZRS – Offsite Retail Power System
ZVS – Excitation and Voltage Regulation System

The following systems are not included for ISV. While the exclusion of these systems reduces testbed completeness, their absence will not impact the ISV.

CES – Condenser Tube Cleaning System
DFS – Diesel Fuel Offloading System
DRS – Storm Drain System
EGS – Grounding and Lightning Protection System
EHS – Special Process Heat Tracing System
ELS – Plant Lighting System
EQS – Cathodic Protection System
FHS – Fuel Handling and Refueling System
MHS – Mechanical Handling System
OWS – Offsite Water Treatment System
RDS – Gravity and Roof Drain Collection System
SDS – Sanitary Drainage System
SES – Plant Security System
VDS – Demineralized Water Treatment Building HVAC System

VGS – Auxiliary Boiler Building Ventilation System
VIS – Transmission Switchyard Ventilation System
VNS – Switchyard Control Building HVAC System
VPS – Pump House Building Ventilation System
VQS – Chlorination Workshop HVAC System
VUS – Containment Leak Rate Test System
VVS – Waste Water Treatment Plant Ventilation System
WDS – Sea Water Desalinization System
YFS – Yard Fire Water System

This detail will be included in the Rev C of ISV plan, which is to be issued by January, 2010. Note that the list of system is based on the current information regarding the ISV scenarios and the scope of the simulator.

Design Control Document (DCD) Revision:

None.

PRA Revision:

None.

Technical Report (TR) Revision:

None.