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Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_002960

July 12, 2010

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-26 R3

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,

A handwritten signature in black ink, appearing to read "Robert Sisk".

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

/Enclosure

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

DOB 3  
NRD

cc:	D. Jaffe	- U.S. NRC	1E
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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 18

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP18-COLP-26  
Revision: 3

### **Question:**

WCAP-15860, Sec. 4.9, Subjects, states that "validation crews will consist of currently qualified operating crews, as adjusted in number to man the AP1000 control room for conditions of minimum and maximum staffing." TR-52, AP1000 MCR Staff Roles and Responsibilities, defines the minimal and maximum crews, but the crew size in the ISV does not fully agree with that of TR-52. TR-52 states the minimal crew size will be 1 RO, 2 SROs, and 2 AOs. Also it notes that the STA role will be filled by one of the available SROs, not by a dedicated individual. TR-52 also defines two other staffing levels, one with an added unit supervisor and a maximum staff level. Most of the ISV scenarios (1 to 19) will be done with a staff of 2 ROs, 1 SRO, and 1 STA, while other scenarios (20 to 29) will be done with 2 ROs and 1 SRO. The ISV does not address at all the maximum crew as defined in TR-52. Please address the apparent conflicts in staffing levels between the various Westinghouse documents.

### **Westinghouse Response:**

It is noted that most ISV scenarios are performed with a MCR staffing complement that is representative of utilities' expected minimum complements. This comprises two Reactor Operators, one Senior Reactor Operator, with one Shift Technical Advisor (for selected scenarios). It is also assumed that there are two Auxiliary Operators elsewhere in the plant. The number of Auxiliary Operator on shift does not impact the MCR design; therefore test staff (rather than test subjects) will fulfill the Auxiliary Operators' responsibilities in ISV by scripted role play. It is recognized that this expected minimum MCR staffing complement differs from the information provided in Reference 1, Section 4.1.2. However it was considered to be appropriate (and more realistic) to implement ISV with the crew size that the utilities are planning to adopt than use an alternative minimum crew size.

Reference 1 Section 5.3 specifies the operating staff for a large complement of staff and visitors in the MCR. This equates to the maximum capacity of the emergency habitability system for the MCR, and comprises the following:

#### **In the access controlled area within the MCA section of the MCR:**

- One MCA RO (licensed RO)
- One MCR Supervisor (licensed SRO)
- First additional licensed RO (normally non-designated elsewhere in the MCR)
- Second additional licensed RO (normally elsewhere in the plant)
- One Unit Supervisor (licensed SRO)
- One STA

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## Response to Request For Additional Information (RAI)

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### **Elsewhere in the MCA section of the MCR**

- One Shift Manager (licensed SRO)
- One Communicator (for communications external to the MCR)
- One NRC Observer
- One Plant Management Observer
- One additional member of the operations staff

WEC confirms that ISV will address the maximum staffing levels in the MCR. This will be addressed by means of scripted complications in one or more scenarios. The completed detailed scenario descriptions will be included in Revision C of the ISV Plan to be issued by January 31, 2010. Due to the ongoing development of the detailed scenario descriptions, further information can not be provided at this time. WEC would welcome a discussion with the NRC to address any concerns.

### ***Question Rev 1:***

In the response WEC states that it was considered to be appropriate (and more realistic) to implement ISV with the crew size that the utilities are planning to adopt than use an alternative minimum crew size. WEC also provides an approach to validate the maximum crew size. These seem to be reasonable approaches, but do not agree with the staffing specified in TR-52.

Please clearly define the max and min crew sizes and update TR-52 to reflect these revised values.

### ***Westinghouse Response Rev 1:***

The minimum and maximum crew sizes will be clearly specified in the ISV Plan, Rev C. The minimum crew size comprises two Reactor Operators, one Senior Reactor Operator, with one Shift Technical Advisor. The maximum crew size (and maximum number of people in the MCR) is the 11 people listed above. The detailed scenario descriptions will state the staffing per individual scenario.

TR-52 (Reference 1) and the supporting APP-OCS-GJR-003 "AP1000 Main Control Room Staff Roles and Responsibilities" (Reference 2) will be updated to reflected the utilities minimum staffing levels of two Reactor Operators, one Senior Reactor Operator, with one Shift Technical Advisor. Note, the maximum crew size remains unchanged.

### ***Question Rev 2:***

Evaluation based on W response letter dated 2/2/10: The response to the RAI and 320, Rev. C, Section 4.1.2, both define the min and max crew size. Validation scenarios will be run for both of

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these cases as specified in ISV documents 320 and 321. This is acceptable and this portion of the RAI is closed. The response also commits to updating TR-52 (and a related document) to make them consistent with these new values. This is acceptable and confirmatory.

### ***Westinghouse Response Rev 2:***

As discussed during the 4/16/10 telecon, the TR-52 (Reference 1) and the MCR staff roles and responsibilities document (APP-OCS-GJR-003, Reference 2) are largely replicate documents. TR-52 (Reference 1) was issued to support the revision of the DCD from Revision 16 to Revision 17. To avoid any future confusion, it was agreed only one document requires updating. Therefore, APP-OCS-GJR-003 (Reference 2) will be updated and the DCD will be modified to delete the reference to TR-52 (Reference 1) and replace it with Reference 2.

APP-OCS-GJR-003 (Reference 2) will be updated (from Revision 1 to Revision 2) to reflect the utilities minimum staffing levels of two Reactor Operators, one Senior Reactor Operator, with one Shift Technical Advisor.

### ***Westinghouse Response Rev 3:***

In response to the NRC's email question (6/23/10), a mark-up of APP-OCS-GJR-003, "AP1000 Main Control Room Staff Roles and Responsibilities," Section 3.1.2 "Staffing Assumption" is provided below. This revised section describes the utilities minimum staffing levels of two Reactor Operators, one Senior Reactor Operator and one Shift Technical Advisor. This is consistent with the minimum MCR staffing level described in the ISV Plan. This information will be included in Revision 2 of APP-OCS-GJR-003, to be issued by July 31<sup>st</sup>, 2010.

Note, the section below is the main section addressing the minimum staffing levels. The document includes other references to the minimum staffing level, such as Figure 3.1-1 and Figure 3.1-2. These will also be modified accordingly in Revision 2 of APP-OCS-GJR-003.

### **3.1.2 Staffing Assumption:**

#### **In the MCA section of the MCR**

~~One~~ Two MCA ROs (a licensed ROs)

#### **In the MCR**

One MCR Supervisor (a licensed Senior Reactor Operator [SRO])

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### Elsewhere in the Plant (but available to the MCR, when necessary)

One Operations Shift Manager (~~same as "Shift Supervisor" in Reference Error!~~  
~~Reference source not found, Section 4.2~~); (licensed SRO, also qualified as a STA)

Two Equipment Operators (non-licensed)

In Subsections 3.2 through 3.6, role-specific responsibilities are identified for each of the above staff positions. The responsibilities of the STA are listed as a separate role, however it is assumed that these responsibilities would be performed by the Operations Shift Manager, who is assumed to be qualified as an STA. The STA role is listed separately because it has a specific and unique scope and is therefore a distinct job. STA interfaces to staff members and the OCS HSI are also specific for that role. For this staffing scenario, it is assumed that this additional job is taken on by the Operations Shift Manager.

### References:

1. APP-GW-GLR-010, Rev. 2, "AP1000 Main Control Room Staff Roles and Responsibilities," Westinghouse Electric Company LLC.
2. APP-OCS-GJR-003, Rev 1, "AP1000 Main Control Room Staff Roles and Responsibilities," Westinghouse Electric Company LLC.

### Design Control Document (DCD) Revision:

#### 18.5.4.2 Main Control Room Position Scope and Responsibilities

The Combined License information requested in this subsection has been fully addressed in ~~APP-GW-GLR-010~~ APP-OCS-GJR-003 (Reference 15), and the applicable changes are incorporated into the DCD. No additional work is required by the Combined License applicant to address the Combined License information requested in this subsection.

The following words represent the original Combined License Information Item commitment, which has been addressed as discussed above:

Combined License applicants referencing the AP1000 certified design will document the scope and responsibilities of each main control room position, considering the assumptions and results of the task analysis.

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#### 18.5.5 References

- [1. NUREG-0711, "Human Factors Engineering Program Review Model," U.S. NRC, July 1994.]\*
2. U.S. NRC Guidance, NUREG/CR-3371, "Task Analysis of Nuclear Power Plant Control Room Crews."
3. IEC-964, "Design for Control Rooms of Nuclear Power Plants."
4. Department of Defense Documents: DI-H-7055, "Critical Task Analysis Report," and MIL-STD-1478, "Task Performance Analysis."
5. NATO Document, "Applications of Human Performance Models to System Design," edited by McMillan, Beevis, Salas, Strub, Sutton, & van Breda, New York: Plenum Press, 1989.
6. Rasmussen, J., "Information Processing and Human-Machine Interaction, An Approach to Cognitive Engineering," New York: North-Holland, 1986.
7. Hollnagel, E. and Woods, D. D., "Cognitive Systems Engineering: New Wine in New Bottles," International Journal of Man-Machine Studies, Volume 18, 1983, pages 583-600.
8. Roth, E. and Mumaw, R., "Using Cognitive Task Analysis to Define Human Interface Requirements for First-of-a-Kind Systems," Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, Ca., 1995, pp. 520-524.
9. Vicente, K. J., "Task Analysis, Cognitive Task Analysis, Cognitive Work Analysis: What=s the Difference?" Proceedings of the Human Factors and Ergonomics Society 39th Annual Meeting, San Diego, Ca., 1995, pp. 534-537.
10. Drury, C. G., Paramour, B., Van Cott, H. P., Grey, S. N., and Corlett, E. N., "Task Analysis," Handbook of Human Factors, Salvendy, G. (ed.), New York: John Wiley & Sons, 1987.
11. Woods, D. D., "Application of Safety Parameter Display Evaluation Project to Design of Westinghouse SPDS," Appendix E to "Emergency Response Facilities Design and V & V Process," WCAP-10170, submitted to the U.S. Nuclear Regulatory Commission in support of their review of the Westinghouse Generic Safety Parameter Display System (Non-Proprietary) (Pittsburgh, PA, Westinghouse Electric Corp.), April 1982.
- [12. WCAP-14695, "Description of the Westinghouse Operator Decision Making Model and Function Based Task Analysis Methodology," Revision 0, July 1996.]\*



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- [13. *WCAP-14651, "Integration of Human Reliability Analysis and Human Factors Engineering Design Implementation Plan," Revision 2, May 1997.*]\*
- 14. APP-GW-GLR-081, "Closure of COL Information Item 18.5-1, Task Analysis," Westinghouse Electric Company LLC.
- 15. ~~APP-GW-GLR-010~~ APP-OCS-GJR-003, "AP1000 Main Control Room Staff Roles and Responsibilities," Westinghouse Electric Company LLC.

#### PRA Revision:

None.

#### Technical Report (TR) Revision:

APP-GW-GLR-010, Rev. 2, "AP1000 Main Control Room Staff Roles and Responsibilities," Westinghouse Electric Company LLC will be marked as superseded by APP-OCS-GJR-003, "AP1000 Main Control Room Staff Roles and Responsibilities" (Reference 2)