Response to

Request for Additional Information No. 79 (898), Revision 0

10/2/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.03.09 - Human Factors Engineering - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: FSAR Ch 14
COLP Branch

Question 14.03.09-1:

SRP Chapter 18 provides guidance for the NRC staff to use in determining whether an applicant has proposed an acceptable HFE design. The applicant's HFE program will be evaluated in accordance with the review criteria of SRP Chapter 18 and NUREG-0711, "Human Factors Engineering Program Review Model." As indicated in Chapter 18, the HFE program technical information for the DC or COL review may be based on a design and implementation process plan. Therefore, the DC or COL ITAAC may be based on a design and implementation process plan. For example, acceptance 14.3.9-5 March 2007criteria for the task analysis program element may be stated as "a report exists and concludes that function-based task analyses were conducted in conformance with the task analysis implementation plan and include the following functions . . ."

Evaluation: In general, the AREVA ITAAC for HFE (contained in FSAR Tier 1, Table 3.4-1),does not meet the above criterion of identifying that "a report exists and concludes…" AREVA has used an alternative, in most cases, "an output summary includes..." This may be an acceptable alternative but clarification and further explanation is needed as to what constitutes an "output summary."

Response to Question 14.03.09-1:

The term "output summary" described in U.S. EPR FSAR Tier 1, Section 3.4 is synonymous with the term "report". AREVA NP understands that a report with the appropriate conclusion is required to close the ITAAC.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 14.03.09-2:

AREVA did not provide implementation plans as part of its FSAR submittal (Rev 0). The AREVA ITAAC does not address either developing implementation plans or providing completed products that result from carrying out the implementation plans.

Please provide implementation plans for the elements of AREVA's Human Factors Engineering (HFE) Program.

Please provide completed products for HFE Program elements, if available. Of particular importance to the staff are those items that are identified in the Planning and Analysis phase described in NUREG-0711. These items contribute to the basis for HFE design and are fundamental to the staff's safety determination. If products are not available, please provide HFE ITAAC following current NRC ITAAC development guidance. Please also provide a COL action item indicating that the COL will provide a schedule for completing any items that are identified in FSAR as Design Acceptance Criteria (DAC).

Response to Question 14.03.09-2:

ANP-10279, "U.S. EPR Human Factors Engineering Program," Section 5.4 describes how the HFE program is organized and integrated into the detail design process. This section also describes the responsibility and authority that the HFE organization has with respect to the plant design, development, and construction. Also, this section describes the team members of the HFE group and the qualification that are necessary. The HFE program plan described in ANP-10279, Section 5.4 is integrated into U.S. EPR detail design procedures and thus is imposed on the entire design and development project. ANP-10279, Section 5.4 supplies details on HFE program management and the HFE team's qualification to meet the intent of the planning and analysis phase described in NUREG-0711, "Human Factors Engineering Program Review Model."

An implementation plan (IP) describing functional allocation is available for inspection at AREVA NP offices. It contains the automation criteria applied to functions to provide a go no-go test for allocation of that function to a machine. Guidance is also given for allocation of a function to a combination of machine and human elements. All functions not included in either category are allocated to a human operator.

An IP describing integration of human reliability analysis with human system interface design (HSI) is also available for inspection at AREVA NP offices.

An IP describing the staffing assumption (which is used in conjunction with the concept of operations) provides a starting point for definition of basic human machine interface (HMI) features and the amount of automation needed. Both the staffing assumption IP and the concept of operations document are available for inspection in AREVA NP offices.

An inheritance IP is under development for the U.S. EPR HFE program and will be available for inspection at AREVA NP offices early in the second quarter, 2009. The inheritance IP describes use of predecessor/reference plant planning and analysis activity results in the U.S. EPR design. The inheritance IP will specifically discuss the HFE program elements operating experience review, functional requirements analysis, and task analysis. Analysis performed in the development of HMI for U.S. EPR predecessors is applicable and is used as a starting point.

The inheritance IP will also describe the format of the expected results to be made available for staff review.

A generic schedule for the U.S. EPR HFE program is located in U.S. EPR FSAR Tier 2, Figure 18.1.1—HFE Program Milestones. This schedule shows the relative timeline COL action items and associated deliverables are expected to be complete.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 14.03.09-3:

SRP 14.3.9, acceptance criteria no. 4 states "the reviewer will verify that HFE-related ITAAC information is provided based on accepted HFE principles and program elements as discussed in SRP Chapter 18 and Incorporated into the plant's design."

Evaluation:
FSAR Tier 1, Table 3.4-1, Human Factors Engineering Inspections,Tests, Analyses, and Acceptance Criteria, item 2, p.3.4-4 states as a commitment that, "functional requirements are translated from the predecessor design engineering documentation." However, there is no commitment/ITAAC associated with first determining the acceptability of the process used to determine the functional requirements for the predecessor design which are directly related to the US EPR design. If a predecessor design is being used as basis for the US EPR, the predecessor design's functional requirements first must be determined acceptable.

Please explain how AREVA will credit its predecessor design functional requirements for the US EPR.

Response to Question 14.03.09-3:

The inheritance implementation plan (IP) described in the Response to Question 14.03.09-2 explains how AREVA NP will credit predecessor design functional requirements for the U.S. EPR.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 14.03.09-4:

FSAR Tier 1, Table 3.4-1, Human Factors Engineering Inspections, Tests, Analyses, and Acceptance Criteria, item 4, p.3.4-5 states, " A task analysis is documented by validation of operating procedure guidelines containing HAs that the PRA found to be risk significant. From this commitment statement, it appears that the Task Analysis for the US EPR is limited to those tasks that are risk-important only. Please explain.

Also, please explain what is meant by "operating procedure guidelines." Are these procedures or underlying technical basis-type documents?

Response to Question 14.03.09-4:

The task analysis (TA) is not limited to risk-important human actions (HAs). However, risk-important HAs are, by definition, more critical to plant safety. Therefore, risk-important HAs receive rigorous treatment regarding the analysis of associated tasks. AREVA NP will meet the review criteria describe in NUREG-0711, "Human Factors Engineering Program Review Model," Section 5.4, which describes additional scope for TA. The inheritance implementation plan (IP) will describe more specifically how the U.S. EPR will meet NUREG-0711, Section 5.4 requirements.

AREVA NP generic guidelines for the U.S. EPR comprise four volumes, collectively titled the "Emergency Operating Procedures Technical Bases Document "(TBD). Volume 1, "Generic Emergency Operating Guidelines," (GEOG) contains the emergency procedure guideline (EPG) required to support the procedures generation package (PGP) required by NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 13.5.2.1.

Volume 2, "GEOG Bases," is an annotated version of Volume 1 that provides step-by-step bases and corresponding references to the main bases document in Volume 3.

Volume 3, "Technical Bases," provides the bases behind the development of the EPG, including optional mitigation strategies where appropriate. Volume 3 also contains background philosophy and equipment operating guidance.

Volume 4, "GEOG Implementation Guide," provides specific information on GEOG usage, such as positions on related issues, requirements for identifying and justifying deviations from the EPG, and verification and validation (V&V) requirements.

While Volume 1 corresponds to the EPG referred to by NUREG-0800 and central to the NRC guideline approval, the entire four-volume set constitutes the generic guidance and must be implemented in its entirety.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.