

## ArevaEPRDCPEm Resource

---

**From:** WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]  
**Sent:** Friday, March 09, 2012 1:37 PM  
**To:** Tesfaye, Getachew  
**Cc:** BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); NOXON David (AREVA)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14, Supplement 4  
**Attachments:** RAI 516 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP provided a schedule for a technically correct and complete response to the three questions in RAI 516 on November 9, 2011. Supplement 1 sent on December 1, 2011, Supplement 2 sent on January 24, 2012, and Supplement 3 sent on February 26, 2012 provided a revised schedule for a response to these three questions.

The attached file, "RAI 516 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete final responses to the 3 questions. Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the responses to RAI 516 Questions 14.03.09-17, 14.03.09-18 and 14.03.09-19.

The following table indicates the respective pages in the response document, RAI 516 Supplement 4 Response US EPR DC.pdf," that contains AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 516 — 14.03.09-17	2	2
RAI 516 — 14.03.09-18	3	3
RAI 516 — 14.03.09-19	4	4

This concludes the formal AREVA NP response to RAI 516, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Sunday, February 26, 2012 7:25 PM  
**To:** Getachew.Tesfaye@nrc.gov  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony

(External RS/NB)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14, Supplement 3

Getachew,

AREVA NP provided a schedule for a technically correct and complete response to the three questions in RAI 516 on November 9, 2011. Supplement 1 sent on December 1, 2011 and Supplement 2 sent on January 24, 2012 provided a revised schedule for a response to these three questions.

The schedule for a technically correct and complete response to the remaining three questions has been changed as provided below. This schedule was transmitted to the NRC in AREVA NP letter NRC:12:008 dated February 21, 2012.

Question #	Response Date
RAI 516 — 14.03.09-17	<b>April 25, 2012</b>
RAI 516 — 14.03.09-18	<b>April 25, 2012</b>
RAI 516 — 14.03.09-19	<b>April 25, 2012</b>

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B

Charlotte, NC 28262

Phone: 704-805-2223

Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)

**Sent:** Tuesday, January 24, 2012 5:36 PM

**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)

**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB); [Michael.Miernicki@nrc.gov](mailto:Michael.Miernicki@nrc.gov); Jaffe, David

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14, Supplement 2

Getachew,

AREVA NP provided a schedule for a technically correct and complete response to the three questions in RAI 516 on November 9, 2011. Supplement 1 response was submitted on December 1, 2011 to provide a revised schedule for a response to these three questions.

A preliminary revised schedule for technically correct and complete responses to the remaining 3 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by February 21, 2012.

Question #	Response Date
RAI 516 — 14.03.09-17	<b>February 21, 2012</b>
RAI 516 — 14.03.09-18	<b>February 21, 2012</b>
RAI 516 — 14.03.09-19	<b>February 21, 2012</b>

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Thursday, December 01, 2011 3:14 PM  
**To:** [Getachew.Tesfaye@nrc.gov](mailto:Getachew.Tesfaye@nrc.gov)  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14, Supplement 1

Getachew,

AREVA NP provided a schedule for a technically correct and complete response to the three questions in RAI 516 on November 9, 2011.

The schedule for a technically correct and complete response to these questions has been revised as provided below.

<b>Question #</b>	<b>Response Date</b>
RAI 516 — 14.03.09-17	<b>January 26, 2012</b>
RAI 516 — 14.03.09-18	<b>January 26, 2012</b>
RAI 516 — 14.03.09-19	<b>January 26, 2012</b>

Sincerely,

***Dennis Williford, P.E.***  
***U.S. EPR Design Certification Licensing Manager***  
***AREVA NP Inc.***

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** WILLIFORD Dennis (RS/NB)  
**Sent:** Wednesday, November 09, 2011 11:51 AM  
**To:** Tesfaye, Getachew  
**Cc:** BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); LENTZ Tony (External RS/NB)  
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 516 Response US EPR DC.pdf" provides a schedule since technically correct and complete responses to the 3 questions cannot be provided at this time.

The following table indicates the respective pages in the response document, "RAI 516 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 516 — 14.03.09-17	2	2
RAI 516 — 14.03.09-18	3	3
RAI 516 — 14.03.09-19	4	4

The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 516 — 14.03.09-17	December 16, 2011
RAI 516 — 14.03.09-18	December 16, 2011
RAI 516 — 14.03.09-19	December 16, 2011

Sincerely,

**Dennis Williford, P.E.**  
**U.S. EPR Design Certification Licensing Manager**  
**AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B  
Charlotte, NC 28262  
Phone: 704-805-2223  
Email: [Dennis.Williford@areva.com](mailto:Dennis.Williford@areva.com)

---

**From:** Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]  
**Sent:** Tuesday, October 11, 2011 6:19 PM  
**To:** ZZ-DL-A-USEPR-DL  
**Cc:** Bongarra, James; Pieringer, Paul; Junge, Michael; Jaffe, David; Ford, Tanya; Colaccino, Joseph; ArevaEPRDCPEM Resource  
**Subject:** U.S. EPR Design Certification Application RAI No. 516 (6044), FSAR Ch. 14

Attached please find the subject request for additional information (RAI). A draft of the RAI was provided to you on September 28, 2011, and on October 11, 2011, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,  
Getachew Tesfaye  
Sr. Project Manager

NRO/DNRL/NARP  
(301) 415-3361

**Hearing Identifier:** AREVA\_EPR\_DC\_RAIs  
**Email Number:** 3819

**Mail Envelope Properties** (2FBE1051AEB2E748A0F98DF9EEE5A5D4B70E99)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 516 (6044),  
FSAR Ch. 14, Supplement 4  
**Sent Date:** 3/9/2012 1:36:45 PM  
**Received Date:** 3/9/2012 4:10:25 PM  
**From:** WILLIFORD Dennis (AREVA)

**Created By:** Dennis.Williford@areva.com

**Recipients:**

"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>

Tracking Status: None

"DELANO Karen (AREVA)" <Karen.Delano@areva.com>

Tracking Status: None

"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>

Tracking Status: None

"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>

Tracking Status: None

"NOXON David (AREVA)" <David.Noxon@areva.com>

Tracking Status: None

"Tsfaye, Getachew" <Getachew.Tsfaye@nrc.gov>

Tracking Status: None

**Post Office:** auscharm02.adom.ad.corp

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	8072	3/9/2012 4:10:25 PM
RAI 516 Supplement 4 Response US EPR DC.pdf		601524

**Options**

**Priority:** Standard

**Return Notification:** No

**Reply Requested:** No

**Sensitivity:** Normal

**Expiration Date:**

**Recipients Received:**

**Response to**

**Request for Additional Information No. 516(6044), Revision 0,  
Supplement 4**

**10/11/2011**

**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: Tier 1, Section 3.4**

**QUESTIONS for Operating Licensing and Human Performance Branch  
(AP1000/EPR Projects) (COLP)**

**Question 14.03.09-17:**

Regulatory guidance:

Not applicable; this question deals with a clarification in wording

Evaluation:

The ITAAC in Table 3/4-1 appear to use "implementation Plan" and "prescribed process" interchangeably. The staff believes the prescribed process is the implementation plan but is concerned that using different words could lead to confusion over the long term.

Information request:

Consider replacing the term "prescribed process" with the term "implementation plan" or explain why different terms are used.

**Response to Question 14.03.09-17:**

The term "prescribed process" will be replaced with a reference to the appropriate implementation plan. Other revisions will be made for consistency as indicated in the markup.

**FSAR Impact:**

U.S. EPR FSAR Tier 1, Section 3.4 will be revised as described in the response and indicated on the enclosed markup.



**Question 14.03.09-18:**

Regulatory guidance:

If an implementation plan, rather than a completed HFE element, was accepted as part of the design certification process, then ITAAC should address the completion of the HFE program element

Evaluation:

The ITAAC associated with the Operating Experience program element does not verify the design process described in the implementation plan is followed.

Information Request:

Add an additional acceptance criterion (similar to other ITAAC) stating the output summary report includes documentation that shows the OER process was conducted in accordance with the implementation plan. (or explain why OER ITAAC does not need this acceptance criterion.)

**Response to Question 14.03.09-18:**

An additional acceptance criterion (similar to other ITAAC) stating the output summary report includes documentation that shows the Operating Experience Review (OER) process was conducted in accordance with the implementation plan will be added to U.S. EPR FSAR Tier 1, Section 3.4.

**FSAR Impact:**

U.S. EPR FSAR, Tier 1, Section 3.4 will be revised as described in the response and indicated on the enclosed markup.

**Question 14.03.09-19:**

Regulatory Guidance:

Ensure that all Tier 1 information is consistent with Tier 2 information.

Evaluation:

Tier 1, Section 3.4.1 is inconsistent with Tier 2, Chapter 18 information in that the Emergency Operations Facility is omitted from the scope description in Tier 1.

Information Request:

Adjust Tier 1, Section 3.4 so it is consistent with Tier 2, Chapter 18.

**Response to Question 14.03.09-19:**

Emergency Offsite Facility (EOF) is not discussed in Tier 1, Section 3.4 as the design of the EOF is not within the scope of the U.S. EPR design certification effort. Tier 1 will remain unchanged as a result of this question.

U.S. EPR FSAR Tier 2, Section 18.1 will be revised to clarify that the EOF is not within the scope of the U.S. EPR design certification.

U.S. EPR FSAR Tier 2, Section 18.12 and the associated Implementation Plan—U.S. EPR Human Performance Monitoring Implementation Plan, will remain unchanged. The EOF will have to be addressed by Human Performance Monitoring, as expressed in the Response to RAI 427, Question 18-192). However, this is the responsibility of the COL applicant, as shown in Section 1.5 of the Implementation Plan.

There will be no other changes to U.S. EPR FSAR Tier 2, Section 18.1.1.3, or any of the associated Implementation Plans, which currently reflect the position of U.S. EPR FSAR Tier 2, Table 1.8-2, Combined License Information Items, Item 18.1-2 that:

“A COL applicant that references the U.S. EPR design certification will be responsible for HFE design implementation for a new Emergency Operations Facility (EOF) or changes resulting from the addition of the U.S. EPR to an existing EOF.”

**FSAR Impact:**

U.S. EPR FSAR Tier 2, Section 18.1 will be revised as described in the response and indicated on the enclosed markup.

# U.S. EPR Final Safety Analysis Report Markups



applicable system design and follows guidelines established by the HFE and Control Room Design Team.

The scope of the HFE program includes HSI that are related to plant process monitoring and control, as well as input to procedures and training associated with monitoring and controlling instrumentation and control (I&C) systems. The I&C systems include those required during normal operating modes as well as those required during tests, inspections, surveillances, maintenance, abnormal, emergency, and accident conditions. HSI associated with non-I&C systems (e.g., manual valve operators and other LCS) follow guidelines established by the HFE and Control Room Design Team.

## 2.0 Design Features

- 1.0 HFE operating experience review (OER) is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR Human Factors Operating Experience Review Implementation Plan.
- 2.0 Functional requirements analysis is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR Functional Requirements Analysis and Functional Allocation Implementation Plan.
- 3.0 Functional allocation decisions are made based on a set of automation criteria which is defined and validated in accordance with the ~~prescribed process described in the~~ U.S. EPR Functional Requirements Analysis and Functional Allocation Implementation Plan.
- 4.0 A task analysis is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR Task Analysis (TA) Implementation Plan.
- 5.0 The staffing and qualification analysis, which includes an evaluation of the number and qualifications of personnel needed to operate, maintain, and test the U.S. EPR based on HSI design features, is performed in accordance with ~~as described in the~~ U.S. EPR TA Implementation Plan.
- 6.0 Human reliability analysis evaluates the potential for, and mechanisms of, human errors that may affect plant safety. Integration of human reliability analysis findings with HFE design is performed in accordance with the U.S. EPR Implementation Plan for the Integration of Human Reliability Analysis (HRA) into the Human Factors Engineering (HFE) Program.
- 7.0 HSI design is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR Human System Interface Design Implementation Plan.
- 8.0 The selection of the minimum inventory of MCR and RSS fixed alarms, displays, and controls is performed in accordance with the U.S. EPR Human System Interface Design Implementation Plan.
- 9.0 Deleted.
- 10.0 Deleted.



- 11.0 HFE verification and validation is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR Human Factors Verification and Validation (V&V) Implementation Plan.
- 12.0 Design implementation is performed in accordance with the ~~prescribed process described in the~~ U.S. EPR HFE Design Implementation Plan.
- 13.0 Integrated System Validation scenarios are developed in accordance with the U.S. EPR Human Factors V&V Implementation Plan and contain similar content as scenario examples for the U.S. EPR.

### **3.0 Inspection, Tests, Analyses and Acceptance Criteria**

Table 3.4-1 lists the HFE ITAAC.



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
1.0	<p>HFE operating experience review (OER) is performed in accordance with the <del>prescribed process described in the</del> U.S. EPR Human Factors Operating Experience Review Implementation Plan.</p>	<p>An analysis <del>of the output summary report has been</del> <u>will</u> be performed.                      {{DAC}}</p>	<p>An output summary report exists and concludes that the lessons learned from the <del>reviewed</del> operating experience <u>review</u> have been incorporated into the HSI design. The <u>output summary</u> report addresses the scope and results of the OER process including:</p> <ul style="list-style-type: none"> <li>• <u>A list of databases used for searching.</u></li> <li>• <u>A list of analyzed documents.</u></li> <li>• <u>A list of significant issues found along with their implementation status at the time of the report.</u></li> </ul> <div style="border: 1px solid red; padding: 5px;"> <ul style="list-style-type: none"> <li>• <u>The report includes documentation that shows the operating experience review process was conducted in accordance with the U.S. EPR Human Factors Operating Experience Review Implementation Plan.</u></li> </ul> </div> <p>{{DAC}}</p>

14.03.09-18

  




Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.0	Functional requirements analysis is performed in accordance with the <del>prescribed process described in the</del> U.S. EPR Functional Requirements Analysis and Functional Allocation Implementation Plan.	An analysis <del>of the output summary report has been</del> <u>will</u> be performed. {{DAC}}	An output summary report exists and includes: <ul style="list-style-type: none"> <li>• <u>A</u> list of functions in-scope for meeting plant safety objectives.</li> <li>• Details of the differences between functional requirements for safety functions between predecessor designs and the U.S. EPR.</li> <li>• Technical justification and design basis for each difference between predecessor and U.S. EPR functional requirement.</li> <li>• The <del>output summary</del> report includes documentation that shows <u>the</u> functional requirements process was conducted in accordance with the U.S. EPR Functional Requirements Analysis and Functional Allocation Implementation Plan.</li> </ul> {{DAC}}



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.0	<p>Functional allocation decisions are made based on a set of automation criteria which is defined and validated <u>in accordance</u> with the <del>prescribed process described in the U.S. EPR</del> Functional Requirements Analysis and Functional Allocation Implementation Plan.</p>	<p>An analysis <del>of the output summary report has been</del> <u>will be</u> performed.                      {{DAC}}</p>	<p><del>The</del> <u>An</u> output summary report exists and includes:</p> <ul style="list-style-type: none"> <li>• <u>The</u> complete set of automation criteria used including the established control hierarchy between automatic and manual actions.</li> <li>• A list of the functions automated for predecessor EPRs and the differences between the predecessors and the U.S. EPR.</li> <li>• Technical justification for each difference in functional allocation.</li> <li>• The <del>output summary</del> report includes documentation that shows <u>the</u> functional requirements process was conducted in accordance with the U.S. EPR Functional Requirements Analysis and Functional Allocation Implementation Plan.</li> </ul> <p>{{DAC}}</p>





Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.0	<p>A task analysis is performed in accordance with the <del>prescribed process described in the</del> U.S. EPR Task Analysis (TA) Implementation Plan.</p>	<p>An analysis <del>of the output summary report has been</del> <u>will</u> be performed.                      {{DAC}}</p>	<p>a. <del>The</del> <u>An</u> output summary report exists and includes a description of how iterations of TA for procedure development, the procedures themselves, and training programs result in an HSI design that supports in-scope control, information, and support requirements.  <del>This</del> <u>The output summary</u> includes:</p> <ul style="list-style-type: none"> <li>• <del>Identific</del> <u>atione</u>d of specific tasks that are needed to accomplish the analyzed functions that are allocated to personnel covering the modes of operation.</li> <li>• Information, control, and support requirements defined for each task.</li> <li>• An inventory of alarms, displays, and controls necessary for operators to perform the tasks.</li> <li>• Identification of risk-significant <u>human actions</u> (HAs) and their incorporation into the design.</li> <li>• Determination of necessary number and skill levels of crew members.</li> <li>• Documentation of necessary changes to the crew compliment as specified in the initial staffing assumption for the U.S. EPR design.</li> <li>• Allocation of monitoring and control tasks for crew members.</li> </ul> <p><del>}}</del> <u>}}</u></p>



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			<ul style="list-style-type: none"> <li>• <del>b.</del>—The <del>output summary</del> report includes documentation that shows the task analysis process was conducted in accordance with the U.S. EPR Task Analysis Implementation Plan. This includes the functional branch tree database which contains the results of TA as described in the U.S. EPR Task Analysis Implementation Plan. {{DAC}}</li> </ul>
5.0	<p>The staffing and qualification analysis includes an evaluation of the number and qualifications of personnel needed to operate, maintain, and test the U.S. EPR based on HSI design features as described in the TA Implementation Plan.</p>	<p>An analysis of the output summary report has been performed. {{DAC}}</p>	<p><del>a.</del>—The <del>TA</del> <u>An</u> output summary report of the U.S. EPR staffing and qualifications analyses demonstrates that the HSI design supports the number, roles, and responsibilities of the plant operating staff to meet the demands of the processes of the plant. {{DAC}}</p> <p><del>b.</del>—The TA output summary report includes documentation that shows the staffing and qualifications <u>analysis design process</u> was conducted in accordance with the U.S. EPR Task Analysis Implementation Plan. {{DAC}}</p>



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
6.0	Human reliability analysis evaluates the potential for, and mechanisms of, human errors that may affect plant safety. Integration of human reliability analysis findings with HFE design is performed in accordance with the U.S. EPR Implementation Plan for the Integration of Human Reliability Analysis (HRA) into the Human Factors Engineering (HFE) Program.	An analysis <del>of the output summary report has been</del> <u>will</u> be performed. {{DAC}}	<p><del>a. The</del> <u>An</u> output summary report exists and documents the list of risk-important human actions (HA) and summarizes how those HA and the associated tasks and scenarios were addressed during the various parts of the HFE design process including validation of HRA assumptions. {{DAC}}</p> <p><del>b. The</del> output summary report includes documentation that shows the HRA process was conducted in accordance with the U.S. EPR Implementation Plan for the Integration of Human Reliability Analysis (HRA) into the Human Factors Engineering (HFE) Program. {{DAC}}</p>
7.0	HSI design is performed in accordance with the prescribed process described in the U.S. EPR Human System Interface Design Implementation Plan.	An analysis of the output summary report has been performed. {{DAC}}	<p><del>The</del> <u>An</u> output summary report exists which:</p> <ul style="list-style-type: none"> <li><u>Demonstrates</u> that the HSI design was performed in accordance with the <u>U.S. EPR Human System Interface Design Implementation</u> <del>prescribed</del> <u>process</u>.</li> <li>Documents the HSI descriptions including how the design requirements and design characteristics were met.</li> <li>Documents the outcome of tests and evaluations performed in support of V&amp;V of HSI design.</li> </ul> <p>{{DAC}}</p>



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
8.0	The selection of the minimum inventory <u>of MCR and RSS fixed alarms, displays, and controls</u> is performed in accordance with the U.S. EPR Human System Interface Design Implementation Plan.	An analysis <del>will be</del> <u>is</u> performed <del>on the final HSI design results documents.</del> {{DAC}}	An <del>final results output</del> <u>document report</u> summary exists that concludes that the HSI design process for the minimum inventory was conducted in accordance with the implementation plan and contains: <ul style="list-style-type: none"> <li>• The detailed HSI description including its form, function and performance requirements and characteristics.</li> <li>• The basis for the HSI requirements and design characteristics.</li> <li>• The outcomes of tests and evaluations.</li> <li>• The minimum inventory of <u>MCR and RSS</u> <del>main control room and remote shutdown</del> station fixed alarms, displays, and controls.</li> <li>• Verification that the as-built MCR and RSS contain the minimum inventory and validation that the minimum inventory supports operator performance of EOP actions and PRA critical actions to bring the reactor to a safe shutdown condition and to maintain it in that condition.</li> </ul> {{DAC}}
9.0	Deleted.	Deleted.	Deleted.
10.0	Deleted.	Deleted.	Deleted.



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
11.0	HFE verification and validation is performed in accordance with the <del>prescribed process described in the</del> U.S. EPR Human Factors Verification and Validation (V&V) Implementation Plan.	An analysis <del>of the output summary report has been</del> <u>will be</u> performed. {{DAC}}	<del>The</del> <u>An</u> output summary report exists which: <ul style="list-style-type: none"> <li><u>Demonstrates that the V&amp;V was performed in accordance with the <del>prescribed process</del> U.S. EPR Human Factors Verification and Validation (V&amp;V) Implementation Plan.</u></li> <li><del>Demonstrates that the design conforms to HFE design principles.</del></li> <li>Demonstrates that the design enables plant personnel to successfully perform their tasks to achieve plant safety and other operation goals.</li> <li>Provides results of V&amp;V activities and conclusions from these activities.</li> </ul> {{DAC}}
12.0	Design implementation is performed in accordance with the <del>prescribed process described in the</del> U.S. EPR HFE Design Implementation Plan.	An analysis <del>of the output summary has been</del> <u>will be</u> performed. {{DAC}}	<del>The</del> <u>An</u> output summary report exists that demonstrates: <ul style="list-style-type: none"> <li><u>The design implementation was performed in accordance with the U.S. EPR HFE Design Implementation Plan <del>prescribed process</del> for validation that the as-built design conforms to the standard design resulting from the HFE V&amp;V process.</u></li> <li>Issues identified in the HFE issues tracking database have been addressed.</li> </ul> {{DAC}}



Table 3.4-1—Human Factors Engineering ITAAC (8 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
13.0	<p>Integrated System Validation scenarios are developed in accordance with the U.S. EPR Human Factors V&amp;V Implementation Plan and contain similar content as scenario examples for the U.S. EPR.</p>	<p>An analysis <del>of the output summary has been</del> <u>will be</u> performed.</p>	<p><del>The</del> <u>An</u> output summary report exists that demonstrates:</p> <ul style="list-style-type: none"> <li>• V&amp;V scenarios developed based on sampling dimensions described in the U.S. EPR Human Factors V&amp;V Implementation Plan.</li> <li>• V&amp;V scenarios incorporated scenario definition, performance measure, test design, and data analysis, and interpreted in accordance to the U.S. EPR Human Factors V&amp;V Implementation Plan.</li> <li>• HFE scenarios are performed on a validation test bed in accordance with the U.S. EPR Human Factors V&amp;V Implementation Plan.</li> </ul> <p>{{DAC}}</p>

established by the HFE and Control Room Design Team (see Section 18.1.2). In addition, the Instrumentation and Control Service Center (I&CSC), the central location for maintaining the digital I&C systems for the plant, is included in the application of the HFE program. A COL applicant that references the U.S. EPR design certification will be responsible for HFE design implementation for a new emergency operations facility (EOF) or changes resulting from the addition of the U.S. EPR to an

14.03.09-19

~~The HFE and Control Room Design Team provides guidance to that design. Execution of the HFE program guidance described herein provides reasonable assurance that HFE principles are both comprehensively and properly applied for the design of the EOF. This HFE guidance also provides a level of consistency for all HSI facilities in the U.S. EPR.~~

#### 18.1.1.4 **Applicable Human System Interfaces**

The scope of the HFE program includes HSIs associated with monitoring and controlling U.S. EPR plant processes and equipment through the system functions. These system functions include those required during the various normal operating modes as well as those required during tests, inspections, surveillances, and maintenance, and during abnormal, emergency, and accident conditions. HSIs associated with non-I&C systems (e.g., manual valve operators and other LCSs) follow guidelines established by the HFE and Control Room Design Team. See Section 18.1.3.2 for information on implementation of these guidelines.

HSIs for the U.S. EPR design are implemented as described in Section 7.1.1.

Details of the design and the concept of operations associated with each of these HSIs can be found in Section 18.7 and associated references.

#### 18.1.1.5 **Applicable Plant Personnel**

The HFE program is tailored allowing licensed control room operators the capability to attain, view, assimilate, and act on process data in order to maintain plant safety. HFE principles are also applied to the tasks which relate to plant safety that are performed by personnel as listed.

Plant personnel addressed by the AREVA NP HFE program include licensed control room operators as defined in 10 CFR 55 and the following categories of personnel defined by 10 CFR 50.120.

- Non-licensed operators.
- Shift manager.
- Shift technical advisor.
- Instrument and control technicians.