

ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Wednesday, February 25, 2009 6:12 PM
To: Getachew Tesfaye
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 115, FSAR Ch 14, Supplement 2
Attachments: RAI 115 Supplement 2 Response US EPR DC.pdf
Follow Up Flag: Follow up
Flag Status: Flagged

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 20 questions of RAI No. 115 on November 26, 2008. AREVA NP submitted Supplement 1 to the response on January 21, 2009 to address 8 of the remaining 18 questions. The attached file, "RAI 115 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining 10 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 115 Questions 14.03.09-5 14.03.09-6, 14.03.09-7, 14.03.09-8, 14.03.09-9, 14.03.09-10, 14.03.09-11, 14.03.09-12, 14.03.09-13, and 14.03.09-14.

The following table indicates the respective pages in the response document, "RAI 115 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 115 — 14.03.09-5	2	2
RAI 115 — 14.03.09-6	3	4
RAI 115 — 14.03.09-7	5	5
RAI 115 — 14.03.09-8	6	6
RAI 115 — 14.03.09-9	7	7
RAI 115 — 14.03.09-10	8	8
RAI 115 — 14.03.09-11	9	9
RAI 115 — 14.03.09-12	10	10
RAI 115 — 14.03.09-13	11	12
RAI 115 — 14.03.09-14	13	13

This concludes the formal AREVA NP response to RAI 115, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

AREVA NP, Inc.

An AREVA and Siemens company

From: WELLS Russell D (AREVA NP INC)
Sent: Wednesday, January 21, 2009 5:06 PM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 115, FSAR Ch 14, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 2 of the 20 questions of RAI No. 115 on November 26, 2008. The attached file, "RAI 115 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 8 of the 18 remaining questions, as committed. Since the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email does not contain any security-related information. The unredacted SUNSI version is provided under separate email.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 115 Questions 14.03.02-1, 14.03.02-2, 14.03.02-3, 14.03.02-4, 14.03.02-5, 14.03.02-6, 14.03.02-7, and 14.03.02-8.

The following table indicates the respective pages in the response document, "RAI 115 Supplement 1 US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 115 — 14.03.02-1	2	3
RAI 115 — 14.03.02-2	4	4
RAI 115 — 14.03.02-3	5	5
RAI 115 — 14.03.02-4	6	6
RAI 115 — 14.03.02-5	7	8
RAI 115 — 14.03.02-6	9	9
RAI 115 — 14.03.02-7	10	10
RAI 115 — 14.03.02-8	11	11

The schedule for technically correct and complete responses to the remaining 10 questions is unchanged and provided below:

Question #	Response Date
RAI 115 — 14.03.09-5	February 25, 2009
RAI 115 — 14.03.09-6	February 25, 2009
RAI 115 — 14.03.09-7	February 25, 2009
RAI 115 — 14.03.09-8	February 25, 2009
RAI 115 — 14.03.09-9	February 25, 2009
RAI 115 — 14.03.09-10	February 25, 2009
RAI 115 — 14.03.09-11	February 25, 2009
RAI 115 — 14.03.09-12	February 25, 2009
RAI 115 — 14.03.09-13	February 25, 2009
RAI 115 — 14.03.09-14	February 25, 2009

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

AREVA NP, Inc.

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)

Sent: Wednesday, November 26, 2008 1:37 PM

To: 'Getachew Tesfaye'

Cc: DUNCAN Leslie E (AREVA NP INC); DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 115 (1054, 1048),FSAR Ch. 14

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 115 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the 20 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 115 Questions 14.03.02-9 and 14.03.05-7.

The following table indicates the respective pages in the response document, "RAI 115 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 115 — 14.03.02-1	2	2
RAI 115 — 14.03.02-2	3	3
RAI 115 — 14.03.02-3	4	4
RAI 115 — 14.03.02-4	5	5
RAI 115 — 14.03.02-5	6	6
RAI 115 — 14.03.02-6	7	7
RAI 115 — 14.03.02-7	8	8
RAI 115 — 14.03.02-8	9	9
RAI 115 — 14.03.02-9	10	11
RAI 115 — 14.03.05-7	12	12
RAI 115 — 14.03.09-5	13	13
RAI 115 — 14.03.09-6	14	14
RAI 115 — 14.03.09-7	15	15
RAI 115 — 14.03.09-8	16	16
RAI 115 — 14.03.09-9	17	17
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RAI 115 — 14.03.09-12	20	20
RAI 115 — 14.03.09-13	21	22
RAI 115 — 14.03.09-14	23	23

A complete answer is not provided for 18 of the 20 questions. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 115 — 14.03.02-1	January 21, 2009
RAI 115 — 14.03.02-2	January 21, 2009
RAI 115 — 14.03.02-3	January 21, 2009
RAI 115 — 14.03.02-4	January 21, 2009
RAI 115 — 14.03.02-5	January 21, 2009
RAI 115 — 14.03.02-6	January 21, 2009
RAI 115 — 14.03.02-7	January 21, 2009
RAI 115 — 14.03.02-8	January 21, 2009
RAI 115 — 14.03.09-5	February 25, 2009
RAI 115 — 14.03.09-6	February 25, 2009
RAI 115 — 14.03.09-7	February 25, 2009
RAI 115 — 14.03.09-8	February 25, 2009
RAI 115 — 14.03.09-9	February 25, 2009
RAI 115 — 14.03.09-10	February 25, 2009
RAI 115 — 14.03.09-11	February 25, 2009
RAI 115 — 14.03.09-12	February 25, 2009
RAI 115 — 14.03.09-13	February 25, 2009
RAI 115 — 14.03.09-14	February 25, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR(TM) Design Certification

AREVA NP Inc.

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]

Sent: Wednesday, October 29, 2008 8:18 AM

To: ZZ-DL-A-USEPR-DL

Cc: Edmund Kleeh; Richard Laura; David Jeng; Sujit Samaddar; Michael Miernicki; Joseph Colaccino; John Rycyna

Subject: U.S. EPR Design Certification Application RAI No. 115 (1054, 1048),FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 21, 2008, and on October 29, 2008, 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: 255

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD410125B265)

Subject: Response to U.S. EPR Design Certification Application RAI No. 115, FSAR Ch
14, Supplement 2
Sent Date: 2/25/2009 6:12:26 PM
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From: WELLS Russell D (AREVA NP INC)

Created By: Russell.Wells@areva.com

Recipients:

"Pederson Ronda M (AREVA NP INC)" <Ronda.Pederson@areva.com>

Tracking Status: None

"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>

Tracking Status: None

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

Tracking Status: None

"Getachew Tesfaye" <Getachew.Tesfaye@nrc.gov>

Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

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Response to

Request for Additional Information No. 115, Supplement 2

10/29/2008

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

**SRP Section: 14.03.02 - Structural and Systems Engineering - Inspections, Tests,
Analyses, and Acceptance Criteria**

**SRP Section: 14.03.05 - Instrumentation and Controls - Inspections, Tests,
Analyses, and Acceptance Criteria**

**SRP Section: 14.03.09 - Human Factors Engineering - Inspections, Tests,
Analyses, and Acceptance Criteria**

Application Section: FSAR Ch 14

**QUESTIONS for Construction Inspection and Allegations Branch (CCIB)
QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)**

Question 14.03.09-5:

Table 3.4-1 General (1)

SRP 14.3.9, Acceptance Criteria 5 states that HFE-related ITAAC should primarily address verification of products (e.g., the control room, the human-system interfaces, etc.) or results reports from implementing the HFE program element implementation plan. The ITAAC in Table 3.4-1 for Human Factors Engineering (HFE) appear to be directed at the HFE program and its processes and not verification of products for the plant design or results reports from implementing the HFE program element implementation plan. Explain why the ITAAC for HFE do not address products for the plant design or results reports from implementing the HFE program element implementation plan, or revise .

Response to Question 14.03.09-5:

ITAAC in U.S. EPR FSAR Tier 1, Section 3.4 and Table 3.4-1 will be revised to state that an output summary report exists which addresses the acceptance criteria for the appropriate program element. The output summary report contains a sample set of the documentation and the result from applying the HFE program element implementation plan. Because the NRC staff is requesting implementation plans for the docket per RAI 171, Question 18-34, the former part "a" of the ITAAC items that refer to program elements implementation plans will be deleted. For the program element, the ITAAC items do not reference the specific plant products because these specific details have not been finalized. However, the level of detail which the output summary report must meet has been determined and can be found in the acceptance criteria. A more detailed list of verification of products can be found in the specific element implementation plan.

FSAR Impact:

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

Question 14.03.09-6:

Table 3.4-1 General (2)

Several ITAAC items in Table 3.4-1 refer to an "output summary" without identifying the document that is summarized. Please fully identify the documents subject to inspection in the ITAAC. The connection should be made between the words output summary and what is stated in the Design Commitment and ITA.

For instance - the output summary fo item 2 in Table 3.4.-1 - The output summary is the Functional Requirements Analysis

For item 3 in Table 3.4.-1 - The output summary is the Functional Allocation report results

For item 5 in Table 3.4-1 - The output summary is the results of the staffing and qualification analysis.

For item 9 in Table 3.4-1 - In Tier 2 Section 18.8.3, The output summary referred to in AC b.1 for Item 9 is referred to as a results summary. Why is there a the difference in the terminology?

For item 10 in Table 3.4-1 - In Tier 2 Section 18.9.3, The output summary referred to in AC b.1 for Item 9 is referred to as a results summary. Why is there a difference in the terminology.?

For item 11 in Table 3.4-1 - In Tier 2 Section 18.10.3.7, The output summary referred to in AC b.1 for Item 9 is referred to as a results summary. Why is there a difference in the terminology? In addition, the items that "results summary" contains for V&V is different between Tier 2 in this section and what is in the AC b.1 for item 11. Please clarify why there is a diffeerence or revise appropriately.

The ITAs should be analysis or inspections or a combination of both. Evaluation is not a good word to use in the ITA since it is not defined in SRP Section 14.3. Analysis is defined as a "calculation, mathematical computation, or engineering or technical evaluation". Please consider revising the terninology used.

The ACs in this table are suggested to begin with either of the following: 1) A report exists and concludes that the **process.....**", or 2) "An output summary report exists and concludes that

Response to Question 14.03.09-6:

See the Response to Question 14.03.09-5 for additional information on referring to specific verification documents in the ITAAC acceptance criteria. U.S. EPR FSAR Tier 1, Section 3.4 and Table 3.4-1 language and U.S. EPR FSAR Tier 2, Section 18.8.3, Section 18.9.3, and Section 18.10.3.7 will be updated appropriately. The output summary report will contain the associated program element results which demonstrate that acceptance criteria are met.

FSAR Impact:

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

U.S. EPR FSAR Tier 2, Section 18.8.3, Section 18.9.3, and Section 18.10.3.7 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-7:

ITAAC Item 4 in Table 3.4-1

SRP 14.3, App. A IV.4.B states that any differences between the design descriptions and the Commitment Wording of the ITAAC should be minimized unless intended to better conform the commitments in the design descriptions with the ITAAC format. The Commitment for Table 3.4-1, Item 4 does not agree with the wording in the description of HFE program features in Tier 1 Section 3.4.1. Section 3.4.1 item 4 states, in part, "A task analysis is documented by validation of operating procedures...." The Commitment states, in part, "A task analysis is documented by validation of operating procedure *guidelines*...." Why is this terminology different?

In Tier 2, Section 18.4.3 - It states 'The results summary also describes how successive iterations of the task analysis (TA) for procedure development, the procedures themselves, and training programs results in an HSI design that supports in-scope information, control, and support requirements.' The AC for item 4 states 'how iterations of the procedure development task analysis' Explain this difference in terminology. In addition, the output summary referred to in the AC is the report for the task analysis.

Response to Question 14.03.09-7:

The commitment wording in U.S. EPR FSAR Tier 1, Table 3.4-1, Item 4 will be revised to be consistent with the wording in U.S. EPR FSAR Tier 1, Section 3.4.1, Item 4. The acceptance criteria for U.S. EPR FSAR Tier 1, Table 3.4-1, Item 4 will be revised to match the wording in U.S. EPR FSAR Tier 2, Section 18.4.3.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 4 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-8:

ITAAC Item 5 in Table 3.4-1

SRP 14.3, App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria in Column 3 for the inspections, test, or analyses described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. The Commitment for Table 3.4-1, Item 5 is not aligned with the AC. The Commitment states that the evaluation of staffing will be based on "HSI design features." The AC states that the output summary describes how minimum staffing "meets regulatory requirements while maintaining roles and responsibilities." Please explain how the AC satisfies the Commitment.

Tier 2 on page 18.5-2 states 'The objective of the U.S. EPR staffing and qualifications analyses is to demonstrate that the HSI design and the number, roles, and responsibilities of the plant operating staff is able to adequately meet the demands of the processes of the plant.' This seems to be a more suitable AC.

Response to Question 14.03.09-8:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 5 will be revised to reflect better alignment of the ITAAC within the three columns and with the overall human system interface (HSI) design process.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 5 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-9:

ITAAC Item 8 in Table 3.4-1

SRP 14.3, App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria in Column 3 for the inspections, test, or analyses described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. The three columns of Table 3.4-1, Item 8 are not aligned, as follows:

- The Commitment refers to the “methodology” for selecting and validating the final minimum inventory, while the ITA refers to the “process”.
- The Commitment and ITA refer to “validating the final minimum inventory”, while the AC refers to “verifying the completeness of the minimum inventory.”
- The AC refers to the “minimum inventory in the *MCR and RSS*”, while the Commitment and ITA refer only to the “*final* minimum inventory” without mentioning the MCR and RSS.

Why is the terminology used in the three ITAAC columns different?

In Tier 2 in Section 18.7.4.4 it is stated that 'The methodology for selecting the final minimum inventory is described in the HSI design implementation plan and includes a description'. After this sentence in Tier 2 is the listing of what the methodology for selecting the final minimum inventory includes, and that is what is stated for acceptance criterion a.1. Why is the implementation plan not used in this ITAAC?

Where is the acceptance criteria a.2 derived from? The methodology for verifying the completeness of the minimum inventory in the MCR and the RSS does not seem to be derived from Tier 2.

Response to Question 14.03.09-9:

Because the minimum inventory is a specific subset of the overall human system interface (HSI) design process, the ITAAC should be similar. U.S. EPR FSAR Tier 1, Table 3.4-1, Item 8 will be revised to reflect better alignment of the ITAAC within the three columns and with the overall HSI design process. The development, documentation, and verification of the final minimum inventory list for the main control room (MCR) and the remote shutdown station (RSS) is performed in accordance with the HSI Design Implementation Plan.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 8 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-10:

ITAAC Item 9 in Table 3.4-1

SRP 14.3, App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria in Column 3 for the inspections, test, or analyses described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. The Commitment refers to several attributes for procedures that are not mentioned in the AC. Explain why the AC does not align with the Commitment.

Response to Question 14.03.09-10:

See the Response to Question 14.03.09-13.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 9 will be revised as described in the response to Question 14.03.09-13 and indicated on the enclosed markup.

Question 14.03.09-11:

ITAAC Item 10 in Table 3.4-1

SRP 14.3, App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria in Column 3 for the inspections, test, or analyses described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. The Commitment for Table 3.4-1, Item 10 refers to several attributes for training program development that are not mentioned in the AC. Please explain why the AC does not align with the Commitment.

Response to Question 14.03.09-11:

See the Response to Question 14.03.09-13.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 10 will be revised as described in the response to Question 14.03.09-13 and indicated on the enclosed markup.

Question 14.03.09-12:

ITAAC Item 12 in Table 3.4-1

SRP 14.3, App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria in Column 3 for the inspections, test, or analyses described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. The AC for Table 3.4-1, Item 12 does not appear to properly address the Commitment. The Commitment appears to require that the as-built design conforms to the standard design resulting from the HFE V&V process. The ITA and AC refer to a process for conducting design implementation without mentioning whether as-built design actually conforms with the standard design resulting from the HFE V&V process. Please clarify whether this item is intended to verify processes or features of the as-built design.

Response to Question 14.03.09-12:

The intent of HFE verification and validation element is to validate that the as-built design conforms to the design resulting from the human factors engineering (HFE) verification and validation (V&V) process. The acceptance criteria in U.S. EPR FSAR Tier 1, Table 3.4-1, Item 12 will be revised to clarify the intent.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 12 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-13:

ITAAC item 1 in Table 3.4-1

The OER is conducted in accordance not only with a process but an implementation plan. Would the Commitment and AC for item 1 be more accurate if they referred to that implementation plan? For example:

Commitment - '.....performed in accordance with the implementation plan.....'

AC a.1 - 'A report exists and concludes that the implementation plan provided a method to:.....'

Item 6 in Table 3.4-1

An implementation plan is used to implement methodology for developing a HRA. In Tier 2, the following aspects of that implementation plan are listed: **(1)** considered to determine the risk-significant HAs and the importance measures, HRA sensitivity analyses, and threshold criteria used to compile the list of risk-significant HAs. **(2)** A description of how HAs influence operator tasks related to monitoring passive and automated systems. **(3)** A description of how the PRA and HRA results along with the risk-significant HAs are addressed in other aspects of the HFE program with a goal of minimizing the likelihood for operator error and the ability to detect and recover from errors. **(4)** A description of how HRA assumptions are validated during the design process. Four aspects of an implementation plan are listed here whereas the AC (a.1) only has three. Please explain or revise.

In Tier 2 in Section 18.6.3 for item 6, it states that 'An output report identifies the list of risk-important HAs and summarizes how those HAs and the associated tasks and scenarios were addressed during the various parts of the HFE design process. The output report addresses the results of the HRA assumption validation. This wording is different from what is in AC (b.1) for item 6 in Table 3.4-1. Please explain or revise.

Item 9 in Table 3.4-1

Again in Tier 2 an implementation plan is key to development of procedures. In Tier 2, it is stated ' An implementation plan describes:

- The basis or starting point for procedure development (i.e., how the TA (see Section 18.4) and procedure development interrelate).
- The content of procedures.
- How the HSI style guide (see Section 18.7.6.1) integrates with the procedure writer's guide.
- How procedures are verified and validated.
- The justification for using electronic operating procedures instead of paper-based procedures.'

In Item 9 for AC a.1 in Table 3.4-1, why does it state a process describes the items listed above?

Item 10 in Table 3.4-1

The AC for this item, in Tier 2 Section 18.9.1 states: 'An implementation plan describes training program scope including:

- Categories of personnel to be trained (similar to the scope of analysis conducted for staffing, see Section 18.5.1)
- Specific plant conditions, operational activities (e.g., operations, maintenance, testing and surveillance), and HSIs which effect training scenarios and methods.'

Why does the AC a.1 for item 10 state that a process describes the items listed above?

Response to Question 14.03.09-13:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 1 will be revised to reflect better alignment of the ITAAC within the three columns and with the Operating Experience Review (OER) Implementation Plan.

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 6 will be revised to reflect better alignment of the ITAAC within the three columns and to include how human actions (HA) influence operator tasks related to monitoring passive and automated systems. The acceptance criteria will also be revised to align with the output report results defined by U.S. EPR FSAR Tier 2, Section 18.6.3.

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 9 will be revised to reflect better alignment of the ITAAC within the three columns and with the Procedure Implementation Plan.

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 10 will be revised to reflect better alignment of the ITAAC within the three columns and with the Procedure Implementation Plan.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 3.4-1, Item 1, Item 6, Item 9, and Item 10 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.09-14:

ITAAC Item 12 in Table 3.4-1

In Tier 2 Section 18.11.1, the following is stated; 'Design implementation verifies the following:

- Aspects of the design that were not verified during the V&V process.
- Modifications to the standard U.S. EPR design conform to the HFE principles and design guidance expressed in the HFE style guide and meets the HFE review criteria in NUREG-0711 (Reference NUREG-0711, "Human Factors Engineering Program Review Model," 1994.) and NUREG-0700 (Reference NUREG-0700, "Human-System Interface Design Review Guidelines," Revision 2, May 2002.).
- As-built HSIs, plant-specific procedures, and training conform to the design that resulted from the V&V process.
- Items in the HFE Issues Tracking Database have been adequately addressed.'

This appears to be different from what is stated in AC a.1 for Item 12.

In Tier 2 Section 18.11.4, the following is stated:

A summary report is generated detailing the status of HEDs tracked including any that remain unresolved. Also included are the methods and criteria used during the design implementation process and the results of the verification. This report becomes part of the final design documentation owned by the U.S. EPR operator.

This appears to be different from what is stated in AC b.1 for Item 12. Please explain.

Response to Question 14.03.09-14:

The difference between the summary report and U.S. EPR FSAR Tier 1, Table 3.4-1, Item 12 occurs because U.S. EPR FSAR Tier 2, Section 18.11.1 describes the objectives and scope and not the results. The results summary report section of U.S. EPR FSAR Tier 2, Section 18.11.4 will be revised to match the ITAAC in U.S. EPR FSAR Tier 1, Table 3.4-1, Item 12.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 18.11.4 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

The HFE program applies to the design of the main control room (MCR), the Technical Support Center (TSC), the Instrumentation and Control Service Center (I&CSC), the remote shutdown station (RSS), and local control stations (LCS) associated with operation or maintenance. The design of LCS is accomplished concurrent with the applicable system design and follows guidelines established by the HFE and Control Room Design Team. The HFE and Control Room Design Team also participates in the design of the Emergency Operations Facility (EOF).

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.

The HFE program has the following features:

1. HFE operating experience review (OER) is performed in accordance with the prescribed process described in the OER Implementation Plan. ~~Results of the operating experience review are incorporated in the HSI design.~~
2. Functional requirements are performed in accordance with the prescribed process described in the Functional Requirements Analysis (FRA) Implementation Plan. ~~translated from the predecessor design engineering documentation.~~
3. Functional allocation decisions are made based on a set of automation criteria which is defined and validated with the prescribed process described in the FRA Implementation Plan.
4. A task analysis is performed in accordance with the prescribed process described in the Task Analysis (TA) Implementation Plan. ~~documented by validation of operating procedures containing human actions (HA) that the PRA found to be risk significant.~~
5. 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.
6. 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 Human Reliability Analysis (HRA) Implementation Plan. ~~prescribed process.~~

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7. HSI ~~interface~~ design is performed in accordance with the prescribed process described in the HSI Design Implementation Plan. ~~to translate the function and task requirements into HSI characteristics and functions.~~
8. The selection of the minimum inventory is performed in accordance with the HSI Design Implementation Plan. ~~The process for HSI design describes minimum inventory criteria and the methodology for selecting and validating the final minimum inventory.~~
9. Procedures are developed in accordance with the Procedure Implementation Plan which directs the integration of the HFE procedure development. ~~HFE integration with procedure development is performed so that procedures are technically accurate, comprehensive, explicit, conform with HFE ease of use principles, and validated (i.e., the user can comply with the requirements of each step).~~
10. Training is developed in accordance with the Training Implementation Plan. ~~HFE integration with training program development is performed so that a methodical analysis of job and task requirements and a systematic approach to training are used to provide plant personnel with required knowledge, skills, and attributes to perform assigned tasks.~~
11. HFE verification and validation is performed in accordance with the prescribed process described in the Verification and Validation (V&V) Implementation Plan. ~~establishes that the design of the HSI meets design requirements and that the HSI is effective in supporting the performance of personnel tasks.~~
12. Design implementation is performed in accordance with the prescribed process described in the Design Implementation Plan. ~~verifies that the as-built design conforms to the standard design resulting from the HFE V&V process and that issues defined as human engineering discrepancies identified in the HFE Issues Tracking Database are addressed.~~

3.4.2 Inspection, Tests, Analyses and Acceptance Criteria

Table 3.4-1—lists the HFE ITAAC. ~~Human Factors Engineering Inspections, Tests, Analyses, and Acceptance Criteria provides the ITAAC for the HFE program.~~

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

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	<u>Commitment Wording</u>	<u>Inspections, Tests, Analyses</u>	<u>Acceptance Criteria</u>
1	<u>HFE operating experience review (OER) is performed in accordance with the prescribed process described in the OER Implementation Plan.</u>	<u>An analysis of the output summary report has been performed.</u>	<u>An output summary report exists and concludes that the lessons learned from the reviewed operating experience have been incorporated into the HSI design.</u>
2	<u>Functional requirements are performed in accordance with the prescribed process described in the Functional Requirements Analysis (FRA) Implementation Plan.</u>	<u>An analysis of the output summary report has been performed.</u>	<u>An output summary report exists and includes:</u> <ul style="list-style-type: none"> • <u>A list of functions in-scope for meeting plant safety objectives.</u> • <u>Details of the differences between functional requirements for safety functions between predecessor designs and the U.S. EPR.</u> • <u>Technical justification and design basis for each difference between predecessor and U.S. EPR functional requirement.</u>
3	<u>Functional allocation decisions are made based on a set of automation criteria which is defined and validated with the prescribed process described in the FRA Implementation Plan.</u>	<u>An analysis of the output summary report has been performed.</u>	<u>The output summary report exists and includes:</u> <ul style="list-style-type: none"> • <u>The complete set of automation criteria used including the established control hierarchy between automatic and manual actions.</u> • <u>A list of the functions automated for predecessor EPRs and the differences between the predecessors and the U.S. EPR.</u> • <u>Technical justification for each difference in functional allocation.</u>

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

	<u>Commitment Wording</u>	<u>Inspections, Tests, Analyses</u>	<u>Acceptance Criteria</u>
4	<p><u>A task analysis is performed in accordance with the prescribed process described in the Task Analysis (TA) Implementation Plan.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p>	<p>a. <u>The 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.</u></p> <p>b. <u>The draft operating procedure guidelines identify functions needed to complete the given series of tasks.</u></p>
5	<p><u>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.</u></p>	<p><u>An analysis of the V&V activities driven by the initial staffing assumptions for the U.S. EPR document has been performed.</u></p>	<p><u>The 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 adequately meet the demands of the processes of the plant.</u></p>
6	<p><u>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 Human Reliability Analysis (HRA) Implementation Plan.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p>	<p><u>The 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.</u></p>

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

	<u>Commitment Wording</u>	<u>Inspections, Tests, Analyses</u>	<u>Acceptance Criteria</u>
7	<p><u>HSI design is performed in accordance with the prescribed process described in the HSI Design Implementation Plan.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p> <p style="text-align: center;">14.03.09-9 ↓</p>	<p><u>The output summary report exists which:</u></p> <ul style="list-style-type: none"> • <u>Demonstrates that the HSI design was performed in accordance with the prescribed process.</u> • <u>Documents the HSI descriptions including how the design requirements and design characteristics were met.</u> • <u>Documents the outcome of tests and evaluations performed in support of V&V of HSI design.</u>
8	<p><u>The selection of the minimum inventory is performed in accordance with the HSI Design Implementation Plan.</u></p>	<p><u>An analysis is performed on the final HSI design results documents.</u></p>	<p><u>A final results summary document exists that concludes that the HSI design process for the minimum inventory was conducted in accordance with the implementation plan and contains:</u></p> <ul style="list-style-type: none"> • <u>The detailed HSI description including its form, function and performance requirements and characteristics.</u> • <u>The basis for the HSI requirements and design characteristics.</u> • <u>The records of the basis of the design changes.</u> • <u>The outcomes of tests and evaluations.</u>

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**Table 3.4-1—Human Factors Engineering ITAAC
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	<u>Commitment Wording</u>	<u>Inspections, Tests, Analyses</u>	<u>Acceptance Criteria</u>
9	<p><u>Procedures are developed in accordance with the Procedure Implementation Plan which directs the integration of the HFE procedure development.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p>	<p><u>An output summary report exists which:</u></p> <ul style="list-style-type: none"> • <u>Addresses the final set of procedures and support equipment developed using the established methodology.</u> • <u>Includes the results of verification and validation activities as they relate to procedure development.</u> • <u>Describes how procedures will be maintained and updates controlled.</u> • <u>Gives a description of how operators access and use procedures, especially during operational events including:</u> • <u>Storage of procedures.</u> • <u>Ease of operator access to the correct procedures.</u>
10	<p><u>Training is developed in accordance with the Training Implementation Plan.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p>	<p><u>An output summary report exists and includes:</u></p> <ul style="list-style-type: none"> • <u>The roles of organizations that contributed to the training program.</u> • <u>How learning objectives were developed and translated into the use of associated knowledge, skills, and attributes.</u> • <u>The use of resources (e.g., lectures, simulators, computer-based training, schedule) for training.</u> • <u>Methods used to evaluate effectiveness of the program.</u>

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

	<u>Commitment Wording</u>	<u>Inspections, Tests, Analyses</u>	<u>Acceptance Criteria</u>
11	<p><u>HFE verification and validation is performed in accordance with the prescribed process described in the Verification and Validation (V&V) Implementation Plan.</u></p>	<p><u>An analysis of the output summary report has been performed.</u></p> <p style="text-align: center;">14.03.09-12 ↓</p>	<p><u>The output summary report exists which:</u></p> <ul style="list-style-type: none"> • <u>Demonstrates that the V&V was performed in accordance with the prescribed process.</u> • <u>Demonstrates that the design conforms to HFE design principles.</u> • <u>Demonstrates that the design enables plant personnel to successfully perform their tasks to achieve plant safety and other operation goals.</u> • <u>Provides results of V&V activities and conclusions from these activities.</u>
12	<p><u>Design implementation is performed in accordance with the prescribed process described in the Design Implementation Plan.</u></p>	<p><u>An analysis of the output summary has been performed.</u></p>	<p><u>The output summary report exists that demonstrates:</u></p> <ul style="list-style-type: none"> • <u>The design implementation was performed in accordance with the prescribed process for validation that the as-built design conforms to the standard design resulting from the HFE V&V process.</u> • <u>Appropriate issues identified in the HFE issues tracking database have been adequately addressed.</u>

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
1	<p>HFE operating experience review is performed in accordance with the prescribed process. Results of the operating experience review are incorporated in the HSI design.</p>	<p>a. An evaluation of the process for conducting operating experience review has been performed.</p> <p>b. An evaluation of the output summary has been performed.</p>	<p>a.1 The process provides a method to:</p> <ul style="list-style-type: none"> • Identify predecessor/related plants. • Identify recognized industry HFE issues. • Identify OE of related HFE technology. • Identify issues identified by plant personnel. • Identify risk important human actions requiring special attention during the design process. • Analyze, document, track, and review issues. <p>b.1 The output summary demonstrates that the lessons learned from the reviewed operating experience have been incorporated into the HSI design.</p>
2	<p>Functional requirements are translated from the predecessor design engineering documentation.</p>	<p>a. An evaluation of the output summary (included with the V&V documentation) has been performed.</p>	<p>a.1 The output summary includes:</p> <ul style="list-style-type: none"> • A list of functions in scope for meeting plant safety objectives. • Details of the differences between functional requirements for safety functions between predecessor designs and the U.S. EPR. • Technical justification and design basis for each difference between predecessor and U.S. EPR functional requirement.



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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3	<p>Functional allocation decisions are made based on a set of automation criteria which is defined and validated with the prescribed process.</p>	<p>a. An evaluation of the process for allocating functions has been performed.</p> <p>b. An evaluation of the output summary (included with the V&V documentation) has been performed.</p>	<p>a.1 The process provides:</p> <ul style="list-style-type: none"> • A structured method to allocate functions to human and machine resources. • A method to document and keep the function allocation current over the life of the plant. • A method to identify the technical basis for all function allocations. <p>b.1 The output summary includes:</p> <ul style="list-style-type: none"> • The complete set of automation criteria used including the established control hierarchy between automatic and manual actions. • A list of the functions automated for predecessor EPRs and the differences between the predecessors and the U.S. EPR. • Technical justification for each difference in functional allocation.
4	<p>A task analysis is documented by validation of operating procedure guidelines containing HAS that the PRA found to be risk significant.</p>	<p>a. An evaluation of the output summary (included with the V&V documentation) has been performed.</p>	<p>a.1 The output summary includes a description of how iterations of the procedure development task analyses, the procedures themselves, and training programs result in an HSI design that supports in-scope control, information, and support requirements.</p> <p>a.2 The draft operating procedure guidelines identify functions needed to complete the given series of tasks.</p>

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
5	<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.</p>	<p>a. An evaluation of the output summary (included with the V&V documentation) has been performed.</p>	<p>a.1 The output summary describes:</p> <ul style="list-style-type: none"> • How staffing assumptions were validated. • How minimum staffing meets regulatory requirements while maintaining roles and responsibilities.
6	<p>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 prescribed process.</p>	<p>a. An evaluation of the process for integration of human reliability analysis with HFE design activities has been performed.</p>	<p>a.1 The process provides a method for:</p> <ul style="list-style-type: none"> • Identifying risk important human actions. • Addressing risk important human actions in the HFE program. • Validating HRA assumptions.
		<p>b. An evaluation of the output summary has been performed.</p>	<p>b.1 The output summary documents:</p> <ul style="list-style-type: none"> • The results of the human reliability analysis and how HFE design efforts were affected. • The validation of the human reliability analysis through plant-specific control room mockup or simulator.

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
7	<p>HSI design is performed in accordance with the prescribed process to translate the function and task requirements into HSI characteristics and functions.</p>	<p>a. An evaluation of the process for HSI design has been performed.</p>	<p>a.1 The process:</p> <ul style="list-style-type: none"> • Allows for incorporation of personnel task requirements. • Considers system requirements, regulatory requirements, and other requirements in the HSI design. • Includes development of a concept of operations. • Includes development of a functional requirement specification. • Provides a method to develop the HSI design. • Includes development of design guidance (i.e., a style guide). • Provides a method to develop the HSI detailed design and integration. • Provides a method for determining the minimum inventory of alarms, displays, and controls. • Describes a method to determine the complete list of accident monitoring instrumentation. • Provides a method for developing HSI tests and evaluations. • Describes how the HSI design is documented.

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		<p>b.—An evaluation of the output summary has been performed.</p>	<p>b.1 The output summary:</p> <ul style="list-style-type: none"> •Demonstrates that the HSI design was performed in accordance with the prescribed process. •Documents the HSI descriptions including how the design requirements and design characteristics were met. •Documents the outcome of tests and evaluations performed in support of V&V of HSI design.
8	<p>The process for HSI design describes minimum inventory criteria and the methodology for selecting and validating the final minimum inventory.</p>	<p>a.—An evaluation of the criteria and the process for selecting and validating the final minimum inventory has been performed.</p>	<p>a.1 The methodology for selecting the final minimum inventory includes:</p> <ul style="list-style-type: none"> •The selection criteria. •How the functions and tasks that need to be supported by the minimum inventory are identified. •The technical requirements that apply to the design of the minimum inventory including those imposed by regulatory requirements including those for qualification, independence, and accessibility. •How the plant-specific PRA is used to identify operator actions or tasks that are risk-important. •How the guidance related to defining post-accident monitoring variables is addressed. •The operator actions credited in the safety analysis or plant-

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

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		<p>specific EPGs for safety and non-safety success paths.</p> <ul style="list-style-type: none"> •How the diversity and defense-in-depth evaluation is used to identify any specific operator actions credited for coping with common cause failures of the protection systems. •The criteria that are used to determine which SICS components need to be spatially dedicated, continuously visible, continuously available, or accessible by taking only one action (i.e., MCR design and concept of operations). <p>a.2 The methodology for verifying the completeness of the minimum inventory in the MCR and the RSS includes:</p> <ul style="list-style-type: none"> •How generic technical guidelines or design-specific guidelines are used for developing EOPs. •How task analysis activities related to procedure development describe the operator actions necessary to bring the reactor to safe shutdown. •How the risk important operator actions identified through the plant-specific HRA are incorporated into the HSI design. •How the critical operator actions credited for diversity and

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			<p>defense-in-depth are incorporated into the HSI design.</p> <ul style="list-style-type: none"> •How the full-scope simulator is utilized in the verification process.
9	<p>HFE integration with procedure development is performed so that procedures are technically accurate, comprehensive, explicit, easy to use, and validated (i.e., the user can comply with the requirements of each step).</p>	<p>a. An evaluation of the process for HFE integration with procedure development has been performed.</p>	<p>a.1 The process for HFE integration with procedure development describes:</p> <ul style="list-style-type: none"> •The basis or starting point for procedure development (i.e., how the TA and procedure development interrelate). •The content of procedures. •How the HSI style guide integrates with the procedure writer's guide. •How procedures are verified and validated. •The justification for use of electronic operating procedures instead of paper-based procedures.

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		<p>b.—An evaluation of the output summary has been performed.</p>	<p>b.1 The output summary:</p> <ul style="list-style-type: none"> •Addresses the final set of procedures and support equipment developed using the established methodology. •Includes the results of verification and validation activities as they relate to procedure development. •Describes how procedures will be maintained and updates controlled. •Gives a description of how operators access and use procedures, especially during operational events including: •Storage of procedures. •Ease of operator access to the correct procedures.
10	<p>HFE integration with training program development is performed so that a methodical analysis of job and task requirements and a systematic approach to training are used to provide plant personnel with required knowledge, skills,</p>	<p>a.—An evaluation of the process for HFE integration with training program development has been performed.</p>	<p>a.1 The process describes training program scope including:</p> <ul style="list-style-type: none"> •Categories of personnel to be trained. •Specific plant conditions, operational activities (e.g., operations, maintenance, testing and surveillance), and HSIs which effect training scenarios and methods.

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

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
<p>and attributes to perform assigned tasks.</p>	<p>b. An evaluation of the output summary has been performed.</p>	<p>b.1 The output summary addresses:</p> <ul style="list-style-type: none"> • The roles of organizations that contributed to the training program. • How learning objectives were developed and translated into the use of associated knowledge, skills, and attributes. • The use of resources (e.g., lectures, simulators, computer-based training, schedule) for training. • Methods used to evaluate effectiveness of the program.

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
11	<p>HFE verification and validation establishes that the design of the HSI meets design requirements and that the HSI is effective in supporting the performance of personnel tasks.</p>	<p>a. An evaluation of the process for conducting HFE V&V has been performed.</p>	<p>a.1 The process provides a method:</p> <ul style="list-style-type: none"> • For sampling operational conditions. • For identifying appropriate sampling dimensions. • To identify scenarios. • To inventory and characterize the HSI defined in the scope of the HSI design review. • To verify that the HSI provides alarms, information, and control capabilities required for personnel tasks. • To verify that the characteristics of the HSI and the environment in which it is used conform to HFE guidelines. • To evaluate the integrated system to determine whether it acceptably supports safe operation of the plant. • To address and resolve human error discrepancies.
		<p>b. An evaluation of the output summary has been performed.</p>	<p>b.1 The output summary:</p> <ul style="list-style-type: none"> • Demonstrates that the V&V was performed in accordance with the prescribed process. • Demonstrates that the design conforms to HFE design principles. • Demonstrates that the design enables plant personnel to successfully perform their tasks to achieve plant safety and other operation goals.

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

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			<ul style="list-style-type: none"> • Provides results of V&V activities and conclusions from these activities.
12	<p>Design implementation validates that the as-built design conforms to the standard design resulting from the HFE V&V process and that issues defined as human engineering discrepancies identified in the HFE Issues Tracking Database are addressed.</p>	<p>a. An evaluation of the process for conducting design implementation has been performed.</p> <p>b. An evaluation of the output summary has been performed.</p>	<p>a.1 The process provides a method:</p> <ul style="list-style-type: none"> • For evaluating aspects of the design that were not addressed in the V&V step of the design process. • To validate that the final as-built HSIs conform to the design that resulted from the HFE design process and V&V activities. <p>b.1 The output summary demonstrates that:</p> <ul style="list-style-type: none"> • The design implementation was performed in accordance with the prescribed process. • Appropriate issues identified in the HFE issues tracking database have been adequately addressed.

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18.8.2.3 Electronic Procedures

Operating procedures are implemented in a screen-based format that provides access to process information by direct links. These electronic procedures also provide access to related information and direct the operator to the appropriate control screens. Refer to Section 2.2.9 of Reference 1 for further details on the development of electronic procedures.

Paper-based procedures serve as backup to screen-based (i.e., electronic) procedures and contain the same guidance and format. Hard copy backups of operating procedures are provided in the main control room (MCR), remote shutdown station (RSS), and the Technical Support Center (TSC) in the event that a failure of the operating procedure computer occurs. Aside from differences in how electronic and hard copy procedures are used (i.e., the navigation and layout) as well as the availability of live data, electronic and hard copy procedures contain the same information in the same format. Adequate space is provided at appropriate workstations in the MCR and RSS for operators to display paper-based procedures, when required.

18.8.3 Results

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A results summary [report](#) addresses the final set of procedures and support equipment developed using the established methodology. The [results](#) summary [report](#) includes:

- The results of verification and validation (V&V) activities as they relate to procedure development.
- How procedures will be maintained and updates controlled.
- A description of how operators access and use procedures, especially during operational events including:
 - Storage of procedures.
 - Ease of operator access to the correct procedures.

18.8.4 References

1. ANP-10279, Revision 0, “U.S. EPR Human Factors Engineering Program,” AREVA NP Inc., January 2007.

18.9 Training Program Development

Training plant personnel is an important factor in promoting the safe and reliable operation of a nuclear power plant. A methodical analysis of job and task requirements and a Systematic Approach to Training (SAT) are used to provide plant personnel with required knowledge, skills, and attributes (KSA) to perform assigned tasks.

A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development of training program scope, structure, and methodology.

18.9.1 Objectives and Scope

Section 5.4.10 of the AREVA NP Human Factors Topical Report (Reference 1) describes the objectives of the training program development as they relate to the HFE program.

An implementation plan describes training program scope including:

- Categories of personnel to be trained (similar to the scope of analysis conducted for staffing, see Section 18.5.1)
- Specific plant conditions, operational activities (e.g., operations, maintenance, testing and surveillance), and HSIs which effect training scenarios and methods.

18.9.2 Methodology

Section 5.4.10 of Reference 1 provides an outline of the design process used in developing a training program for the U.S. EPR.

Specific training objectives unique to the operation of the U.S. EPR are developed to coordinate with the HSI design process and the development of procedure guidelines. These training objectives are provided to each COL applicant referencing the U.S. EPR standard design for implementation into their site-specific training program.

18.9.3 Results

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A results summary [report](#) addresses the training program development including:

- The roles of organizations that contributed to the training program.
- How learning objectives were developed and translated into the use of associated KSAs.
- The use of resources (e.g., lectures, simulators, computer-based training, schedule) for training.

18.10.3.7 **Results**

Procedures and expected documentation requirements for various V&V activities are summarized in the preceding sections. A results summary [report](#) addresses the following:

14.03.09-6 →

- [Demonstrates that V&V was performed in accordance with the prescribed process described in the V&V implementation plan.](#)
- [Demonstrates that the design conforms to the HFE design principles.](#)
- [Demonstrates that the design enables plant personnel to successfully perform their task to achieve plant safety and other operation goals.](#)
- [Provides results of V&V activities and conclusions from those activities.](#)
- ~~Scope and objectives.~~
- ~~Identification of participants, including their qualifications.~~
- ~~Descriptions of HSIs involved.~~
- ~~Methods and procedures used.~~
- ~~Test conditions.~~
- ~~Personnel performance issues (e.g., level of training of participants).~~
- ~~Deviations from test methods, procedures, and acceptance criteria, if any.~~
- ~~Identification of HEDs.~~
- ~~Records of resolution or justification of deviations.~~
- ~~Evaluation of test results and findings including any changes made to input assumptions or as a result of further analyses (i.e., FRA, FA, TA, Staffing, HSI design).~~
- ~~Conclusions.~~

18.10.4 **References**

1. NUREG-0700, “Human-System Interface Design Review Guidelines,” Revision 2, U.S. Nuclear Regulatory Commission, May 2002.
2. NUREG-6393, “Integrated System Validation: Methodology and Review Criteria,” U.S. Nuclear Regulatory Commission, September 1995.

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18.11.3.1 Verification that HFE Issues Tracking Database Items Have Been Addressed

This verification process confirms that HEDs being tracked are adequately addressed. This is accomplished by reviewing the database, verifying that HEDs have been addressed, and addressing any remaining HEDs as necessary. In some cases, there are HEDs that require a design change, but are not implemented by the time design implementation is finished and closed. Those HEDs are turned over to the U.S. EPR operator for implementation or closure at a later date.

18.11.4 Results Summary

14.03.09-14



Throughout the design implementation, the HFE Issues Tracking Database is updated as new HEDs are discovered during the process. Resolution for these HEDs is also updated in the HFE Issues Tracking Database. A results summary report is generated detailing the status of HEDs tracked including any that remain unresolved and concludes HFE issues have been adequately addressed. The results summary report concludes the design implementation was performed in accordance with the prescribed process for validating that the as built design conforms to the standard design resulting from the HFE V&V process. Also included are the methods and criteria used during the design implementation process and the results of the verification. This report becomes part of the final design documentation owned by the U.S. EPR operator.

18.11.5 References

1. NUREG-0711, "Human Factors Engineering Program Review Model," U.S. Nuclear Regulatory Commission, 1994.
2. ANP-10279, Revision 0, "U.S. EPR Human Factors Engineering Program," AREVA NP Inc, January 2007.
3. ANP-10266A, Revision 1, "AREVA NP Inc. Quality Assurance Plan (QAP) for Design Certification of the U.S. EPR," AREVA NP Inc., April 2007.
4. NUREG-0700, "Human-System Interface Design Review Guidelines," Revision 2, U.S. Nuclear Regulatory Commission, May 2002.