

ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Friday, June 12, 2009 5:25 PM
To: Tesfaye, Getachew
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. 75, FSAR Ch 7, Supplement 4
Attachments: RAI 75 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 12 of the 31 questions of RAI No. 75 on November 3, 2008. Supplement 1 response to RAI No. 75 was sent on January 14, 2009 to address 5 of the remaining 19 questions. Supplement 2 response to RAI No. 75 was sent on February 4, 2009 to address 1 of the remaining 14 questions. Supplement 3 response to RAI No. 75 was sent on March 31, 2009 to address 7 of the remaining 13 questions. The attached file, "RAI 75 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining 6 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 75 Question 07.08-4.

The following table indicates the respective pages in the response document, "RAI 75 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 75 — 07.02-7	2	2
RAI 75 — 07.02-10	3	3
RAI 75 — 07.02-15	4	4
RAI 75 — 07.02-21	5	6
RAI 75 — 07.02-22	7	7
RAI 75 — 07.08-4	8	8

This concludes the formal AREVA NP response to RAI 75, 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

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: WELLS Russell D (AREVA NP INC)

Sent: Tuesday, March 31, 2009 2:33 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. 75, FSAR Ch 7, Supplement 3

Getachew,

AREVA NP Inc. provided responses to 12 of the 31 questions of RAI No. 75 on November 3, 2008 . AREVA NP submitted Response to RAI No. 75, Supplement 1 on January 14, 2009 to address 5 of the remaining 19 questions. AREVA NP submitted Response to RAI No. 75, Supplement 2 on February 4, 2009 to address 1 of the remaining 14 questions. The attached file, "RAI 75 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 7 of the remaining 13 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 75 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 75 — 07.02-11	2	2
RAI 75 — 07.02-17	3	4
RAI 75 — 07.02-18	5	6
RAI 75 — 07.02-20	7	7
RAI 75 — 07.02-27	8	8
RAI 75 — 07.08-5	9	10
RAI 75 — 07.08-6	11	12

Based upon feedback from the NRC staff, AREVA NP is modifying the I&C architecture. Therefore, AREVA NP is unable to provide technically correct and complete responses to the questions that were scheduled to be completed by March 31, 2009. The revised schedule for technically correct and complete responses to the remaining 6 questions is provided below:

Question #	Response Date
RAI 75 — 07.02-7	June 12, 2009
RAI 75 — 07.02-10	June 12, 2009
RAI 75 — 07.02-15	June 12, 2009
RAI 75 — 07.02-21	June 12, 2009
RAI 75 — 07.02-22	June 12, 2009
RAI 75 — 07.08-4	June 12, 2009

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

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From: Pederson Ronda M (AREVA NP INC)

Sent: Wednesday, February 04, 2009 2:42 PM

To: Getachew Tesfaye

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 75, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 12 of the 31 questions of RAI No. 75 on November 3, 2008. AREVA NP submitted Response to RAI No. 75, Supplement 1 on January 14, 2009 to address 5 of the remaining 19 questions. The attached file, "RAI 75 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 14 questions, as committed.

The following table indicates the respective page in the response document, ""RAI 75 Supplement 2 Response US EPR DC.pdf," that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 75 — 07.02-25	2	2

The schedule for technically correct and complete responses to the remaining 13 questions is unchanged and provided below:

Question #	Response Date
RAI 75 — 07.02-7	March 31, 2009
RAI 75 — 07.02-10	March 31, 2009
RAI 75 — 07.02-11	March 31, 2009
RAI 75 — 07.02-15	March 31, 2009
RAI 75 — 07.02-17	March 31, 2009
RAI 75 — 07.02-18	March 31, 2009
RAI 75 — 07.02-20	March 31, 2009
RAI 75 — 07.02-21	March 31, 2009
RAI 75 — 07.02-22	March 31, 2009
RAI 75 — 07.02-27	March 31, 2009
RAI 75 — 07.08-4	March 31, 2009
RAI 75 — 07.02-5	March 31, 2009
RAI 75 — 07.02-6	March 31, 2009

Sincerely,

Ronda Pederson

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From: Pederson Ronda M (AREVA NP INC)

Sent: Wednesday, January 14, 2009 2:09 PM

To: 'Getachew Tesfaye'

Cc: PANNELL George L (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. 75, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 12 of the 31 questions of RAI No. 75 on November 3, 2008. The attached file, "RAI 75 Supplement 1 Response USEPRDC.pdf," provides technically correct and complete responses to 5 of the remaining 19 questions, as committed.

The following table indicates the respective page(s) in the response document, "RAI 75 Supplement 1 Response USEPRDC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 75 — 07.02-1	2	5
RAI 75 — 07.02-2	6	6
RAI 75 — 07.02-4	7	7
RAI 75 — 07.02-16	8	8
RAI 75 — 07.02-26	9	9

The schedule for technically correct and complete responses to the remaining 14 questions is unchanged and provided below:

Question #	Response Date
RAI 75 — 07.02-7	March 31, 2009
RAI 75 — 07.02-10	March 31, 2009
RAI 75 — 07.02-11	March 31, 2009
RAI 75 — 07.02-15	March 31, 2009
RAI 75 — 07.02-17	March 31, 2009
RAI 75 — 07.02-18	March 31, 2009
RAI 75 — 07.02-20	March 31, 2009
RAI 75 — 07.02-21	March 31, 2009
RAI 75 — 07.02-22	March 31, 2009
RAI 75 — 07.02-25	March 31, 2009
RAI 75 — 07.02-27	March 31, 2009
RAI 75 — 07.08-4	March 31, 2009
RAI 75 — 07.02-5	March 31, 2009
RAI 75 — 07.02-6	March 31, 2009

Sincerely,

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From: WELLS Russell D (AREVA NP INC)

Sent: Monday, November 03, 2008 8:15 PM

To: 'Getachew Tesfaye'

Cc: 'John Rycyna'; 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. 75, FSAR Ch 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 75 Response US EPR DC.pdf" provides technically correct and complete responses to 12 of the 31 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 75 Questions 07.02-23, 07.02-24, and 07.02-28.

The following table indicates the respective pages in the response document, "RAI 75 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 75 — 07.02-1	2	2
RAI 75 — 07.02-2	3	3
RAI 75 — 07.02-3	4	4
RAI 75 — 07.02-4	5	5
RAI 75 — 07.02-5	6	7
RAI 75 — 07.02-6	8	8
RAI 75 — 07.02-7	9	9
RAI 75 — 07.02-8	10	10
RAI 75 — 07.02-9	11	11
RAI 75 — 07.02-10	12	12
RAI 75 — 07.02-11	13	13
RAI 75 — 07.02-12	14	15
RAI 75 — 07.02-13	16	16
RAI 75 — 07.02-14	17	17
RAI 75 — 07.02-15	18	18
RAI 75 — 07.02-16	19	19
RAI 75 — 07.02-17	20	20
RAI 75 — 07.02-18	21	21
RAI 75 — 07.02-19	22	22
RAI 75 — 07.02-20	23	23
RAI 75 — 07.02-21	24	24
RAI 75 — 07.02-22	25	25
RAI 75 — 07.02-23	26	26
RAI 75 — 07.02-24	27	27
RAI 75 — 07.02-25	28	28
RAI 75 — 07.02-26	29	29
RAI 75 — 07.02-27	30	30
RAI 75 — 07.02-28	31	31
RAI 75 — 07.08-4	32	32
RAI 75 — 07.02-5	33	34
RAI 75 — 07.02-6	35	35

A complete answer is not provided for 19 of the 31 questions. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 75 — 07.02-1	January 15, 2009

RAI 75 — 07.02-2	January 15, 2009
RAI 75 — 07.02-4	January 15, 2009
RAI 75 — 07.02-7	March 31, 2009
RAI 75 — 07.02-10	March 31, 2009
RAI 75 — 07.02-11	March 31, 2009
RAI 75 — 07.02-15	March 31, 2009
RAI 75 — 07.02-16	January 15, 2009
RAI 75 — 07.02-17	March 31, 2009
RAI 75 — 07.02-18	March 31, 2009
RAI 75 — 07.02-20	March 31, 2009
RAI 75 — 07.02-21	March 31, 2009
RAI 75 — 07.02-22	March 31, 2009
RAI 75 — 07.02-25	March 31, 2009
RAI 75 — 07.02-26	January 15, 2009
RAI 75 — 07.02-27	March 31, 2009
RAI 75 — 07.08-4	March 31, 2009
RAI 75 — 07.02-5	March 31, 2009
RAI 75 — 07.02-6	March 31, 2009

Sincerely,

(Russ Wells on behalf of)

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

Sent: Thursday, October 02, 2008 8:36 PM

To: ZZ-DL-A-USEPR-DL

Cc: Tung Truong; Kenneth Mott; Michael Canova; Terry Jackson; Joseph Colaccino; John Rycyna

Subject: U.S. EPR Design Certification Application RAI No. 75 (570_1131),FSAR Ch 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on September 9, 2008, and on October 2, 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: 573

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD410195306C)

Subject: Response to U.S. EPR Design Certification Application RAI No. 75, FSAR Ch 7,
Supplement 4
Sent Date: 6/12/2009 5:25:05 PM
Received Date: 6/12/2009 5:25:08 PM
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

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Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	Size	Date & Time
MESSAGE	12504	6/12/2009 5:25:08 PM
RAI 75 Supplement 4 Response US EPR DC.pdf		97858

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

Response to

Request for Additional Information No. 75, Supplement 4

10/2/2008

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 07.02 - Reactor Trip System

SRP Section: 07.08 - Diverse Instrumentation and Control Systems

Application Section: FSAR Ch 7

Question 07.02-7:

DC FSAR, Tier 2, Section 7.1.2.6.10, does not explicitly state that safety systems meet Clause 4.11 of IEEE 603-1991. If safety systems do meet the requirement, provide information as to how compliance is achieved?

Clause 4.11 of IEEE Standard 603-1991 requires documentation of the equipment protective provisions that prevent the safety systems from accomplishing their safety function. DC FSAR, Tier 2, Section 7.1.2.6.10, states that "I&C systems provide the capability to implement equipment protection of the safety process systems."

Response to Question 07.02-7:

See the Response to RAI 60, Supplement 4, Question 07.03-14.

FSAR Impact:

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

Question 07.02-10:

ITAAC were provided for physical and communications independence, but where is the ITAAC for electrical independence?

Clause 5.6 of IEEE Standard 603-1991 requires that redundant portions of a safety system provided for a safety function to be independent of and physically separated from each other to the degree necessary to retain the capability to accomplish the safety function during and following any design-basis event requiring that safety function. Three aspects of independence should be addressed in each case: Physical independence, Electrical independence, Communications independence. DC FSAR, Tier 1, Table 2.4.1-9, Protection System ITAAC, list the following relevant ITAAC: 2.2 Physical separation exists between the four divisions of the PS and 4.4 Communication independence is provided in the inter-division communication paths within the PS.

Response to Question 07.02-10:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 added U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.17 to address electrical independence between the redundant portions of the protection system (PS). The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.02-15:

How and when will the following identifications be verified? Is there an ITAAC associated with the identification of safety system equipment?

Clause 5.11 of IEEE Std 603-1991 requires that (1) safety system equipment be distinctly identified in accordance with the requirements of IEEE Std 384 (Ref. 7.10- 44), (2) components or modules mounted in equipment or assemblies that are clearly identified as being in a single redundant portion of a safety system do not themselves required identification, (3) identification of safety system equipment be distinguishable from other purposes, (4) identification of safety system equipment not require frequent use of reference material, and (5) the associated documentation be distinctly identified.

DC FSAR, Tier 2, Section 7.1.2.6.22, states that safety systems meet the identification requirements of IEEE 603-1998 and the additional guidance of IEEE 7-4.3.2-2003. The applicant states that redundant divisions of each safety system are distinctively marked, versions of hardware are marked accordingly, and configuration management is used for maintaining identification of safety-related software.

Response to Question 07.02-15:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 added U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.19 to address IEEE 603, Clause 5.11 for the protection system (PS). The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.02-21:

Demonstrate how the Protection System (PS) addresses Clauses 6.6 and 7.4 of IEEE Std. 603-1991? What tests will be run to demonstrate compliance?

IEEE 603-1991, Clauses 6.6 and 7.4, state that whenever the applicable permissive conditions are not met, a safety system shall automatically prevent the activation of an operating bypass or initiate the appropriate safety function(s). If plant conditions change so that an activated operating bypass is no longer permissible, the safety system shall automatically accomplish one of the following actions:

- 1) Remove the appropriate active operating bypass(es)
- 2) Restore plant conditions so that permissive conditions once again exist
- 3) Initiate the appropriate safety function(s)

SRP Appendix 7.1-C states that the requirement for automatic removal of operational bypasses means that the reactor operator shall have no role in such removal. The operator may take action to prevent the unnecessary initiation of a protective action.

DC FSAR, Tier 2, Section 7.1.2.6.33, states that safety systems meet the requirements of Clause 6.6 and 7.4 of IEEE 603-1998, and that operating bypasses are implemented using permissive signals from the PS. If the plant conditions associated with allowing operational bypasses are not met, the PS automatically prevents the activation of the operating bypass...If plant conditions change during activation of an operating bypass, and the operating bypass is no longer permissible, in general the PS automatically removes the appropriate active operating bypass.

Response to Question 07.02-21:

PS operating bypass indications in the main control room (MCR) will be provided to show the operator the PS permissive signals status and verify the accomplishment of associate functionality confirming IEEE 603-1991, Clause 6.6 and Clause 7.4 requirements. The MCR indication and functional detail will be developed later in the design process and verified in accordance with ITAAC. The PS Logic Diagram will depict the following:

- a) Sensors for four divisions will provide the initial permissive signal. This signal enables or disables a certain reactor protective function (operating bypass).
- b) Permissive signals will be compared to a pertinent setpoint and validated or inhibited according to design.
- c) In some cases, manual input is required to validate or inhibit the permissive.
- d) A validated permissive enables or disables a protective function based on a voting system 2/4 or 3/4.
- e) If the plant condition changes regarding the specified setpoint, the safety system will automatically remove the appropriate operating bypass as required by IEEE 603-1991, Clause 6.6 and Clause 7.4.

Operating bypasses are implemented by using PS permissive signals, which will be tested and inspected in accordance with U.S. EPR FSAR Tier 1, Section 2.4.1 ITAAC. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.02-22:

Demonstrate through the design of the Protection System (PS) how Clause 6.7 of IEEE Std. 603-1991 is addressed? What tests will be run to demonstrate compliance?

IEEE 603-1991, Clause 6.7, states that capability of a safety system to accomplish its safety function shall be retained while sense and command features equipment is in maintenance bypass. During such operation, the sense and command features equipment shall continue to meet the requirements of 5.1 and 6.3.

DC FSAR, Tier 2, Section 7.1.2.6.34, states that safety systems meet the requirements of Clause 6.7 of IEEE 603 (1998), and that safety systems are designed to permit channel bypass for maintenance, testing, or repair. However, additional information is need for the staff to verify that the design meets Clause 6.7.

Response to Question 07.02-22:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 revised U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.5 to address IEEE 603-1991, Clause 6.7. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.08-4:

Demonstrate how the Process Information and Control System (PICS) will meet the requirements of 10 CFR 50.55a(a)1 and GDC 1, including its design, construction, installation, inspection, testing, operation, maintenance, and modifications. Discuss the quality assurance aspects associated with the PICS software development, hardware qualification, and system testing.

The PICS is credited as being a diverse system from the Protection System and provides controls for both safety-related and non-safety-related process systems. Section 7.8 of the Standard Review Plan identifies 10 CFR 50.55a(a)1 and GDC 1 as acceptance criteria for diverse instrumentation and control systems.

Response to Question 07.08-4:

10 CFR 50.55a(a)1 and GDC 1 apply specifically to the performance of safety functions. Although the PICS has the capability to control safety-related equipment, it is not the credited system used to perform safety functions and therefore is not designed to meet these requirements. U.S. EPR FSAR Tier 2, Table 7.1-2—I&C System Requirements Matrix identifies the safety-related I&C system, safety information and control system (SICS), as the credited system for meeting 10 CFR 50.55a(a)1 and GDC 1.

AREVA NP recognizes the quality requirements associated with diverse systems as defined in Generic Letter 85-06. The PICS is designed under the quality assurance program described in U.S. EPR FSAR Tier 2, Chapter 17, which is consistent with the guidance in GL 85-06.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 7.1 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

The PUs consist of industrial computers. Operator workstations typically consist of computers, displays, and input devices (i.e., computer mice and keyboards). The operator may use several monitors that share input devices. These monitors display different plant functions, and the display content is interchangeable. The POP is a set of large panels that display an overview of plant and system status. Equipment such as network switches and electrical and fiber optic cable are provided to support data communications.

The plant annunciator is integrated into the PICS operating and monitoring system. Special screens display and organize alarms and warnings based on their status and relative level of importance. An alarm hierarchy with a color coding system is used to immediately alert the operator of the importance of the alarm based on the relevance to plant safety.

The PICS is used to control both safety-related and non-safety-related process systems. The PICS implements these measures to preclude spurious actuation of plant equipment:

- Operation of plant equipment is performed using a two-step process. A single mouse click on a component is followed by a verification step requiring a second single mouse click, so a single inadvertent action by the operator does not result in a command signal.
- Touch screen displays are not used.

Qualification Requirements

There are no qualification requirements for the PICS equipment.

Quality Requirements

07.08-4
↓

The PICS is designed, fabricated, erected, and tested under the quality assurance program described in Chapter 17. ~~There are no quality requirements for the PICS equipment.~~

Diversity Requirements

The PICS is credited by the defense-in-depth and diversity analysis described in Section 7.8.2. These diversity requirements are established:

- The system hardware in the PICS is diverse from the TXS system hardware.
- The system software in the PICS is diverse from the TXS system software.
- The PICS displays are diverse from the SICS displays (QDS).