ArevaEPRDCPEm Resource

From: BRYAN Martin (EXT) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, June 08, 2010 1:48 PM
To: Tesfaye, Getachew
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); WELLS Russell D (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 393, FSAR Ch. 3
Attachments: RAI 393 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 393 Response US EPR DC.pdf," provides technically correct and complete responses to the 2 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 393 Questions 03.11-34 and 03.11-36.

The following table indicates the respective pages in the response document, "RAI 393 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 393 — 03.11-34	2	3
RAI 393 — 03.11-36	4	4

This concludes the formal AREVA NP response to RAI 393, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, May 11, 2010 3:27 PM
To: ZZ-DL-A-USEPR-DL
Cc: Kang, Peter; Johnson, Robert; Patel, Jay; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 393 (4597), FSAR Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 28, 2010, and discussed with your staff on May 11, 2010. Draft RAI Question 03.11-35 was deleted as a result of that discussion. 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

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Response to

Request for Additional Information No. 393(4597), Revision 0

5/11/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment
Application Section: 03.11

QUESTIONS for Electrical Engineering Branch (EEB)

Question 03.11-34:

RAI No. 317 on Question 03.11-16 on Section 3D.6.2 (Analysis) of U.S. EPR FSAR Tier 2 response stated that the analysis with type test data will be used to demonstrate for equipment qualification (EQ) purpose. This response is consistent with the requirements in 10 CFR 50.49(f)(4) which identifies "analysis in combination with partial type test data that supports the analytical assumptions and conclusions," as a method to qualify electrical equipment. However, Inspection, Tests, Analyses (ITA) column of U.S. EPR ITAAC Tables (e.g., items 6.1 and 6.2 of Tables 2.2.1-5 for RCS, and 4.4 of Table 2.4.2-2 for Safety-Information and Control System) on FSAR Tier 1 pertaining to EQ indicates that "Type tests, analyses, or a combination of type tests and analyses will be performed to demonstrate the ability of the equipment … for the environmental conditions that could occur during and following design basis events." The above ITA statement could be interpreted as "analyses alone" is acceptable. This is contrary to the above RAI No.317 on Question 03.11-16 response. Revise the ITAAC tables shown in the above U.S. EPR FSAR Tier 1 to be consistent with 10 CFR 50.49(f)(4), or provide justification why including, the existing ITA statements are acceptable.

Response to Question 03.11-34:

The requested information was added to items 6.1 and 6.2 of U.S. EPR FSAR Tier 1, Table 2.2.1-5 in the Response to RAI 326, Supplement 2, Question 03.11-33. U.S. EPR FSAR Tier 1, Table 2.4.2-2, Item 4.4 will also be revised as requested. The following ITAAC will be revised to change the term "Type tests, analyses, or a combination of type tests and analyses" to "Type tests or type tests and analyses," which is consistent with IEEE Std 323 related to environmental qualification:

- U.S. EPR FSAR Tier 1, Table 2.4.1-7, Item 4.10.
- U.S. EPR FSAR Tier 1, Table 2.4.2-2, Item 4.4.
- U.S. EPR FSAR Tier 1, Table 2.4.4-5, Item 4.1.
- U.S. EPR FSAR Tier 1, Table 2.4.5-2, Item 4.3.
- U.S. EPR FSAR Tier 1, Table 2.4.11-3, Item 4.2.
- U.S. EPR FSAR Tier 1, Table 2.4.13-3, Item 4.1.
- U.S. EPR FSAR Tier 1, Table 2.4.14-2, Item 4.1.
- U.S. EPR FSAR Tier 1, Table 2.4.17-3, Item 4.1.
- U.S. EPR FSAR Tier 1, Table 3.5-3, Item 6.2.
- U.S. EPR FSAR Tier 1, Table 3.7-2, Item 3.4.

During the conference call that was held with the NRC regarding this question on May 11, 2009, the NRC indicated that this change should also be made to U.S. EPR FSAR Tier 1, Table 2.4.1-7, Item 3.1. This item does not require revision since it refers to seismic qualification (for

example IEEE Std 344 permits qualification to be performed by testing, analysis, or a combination of both). During this conference call the NRC also noted that in the Response to RAI 326, Supplement 2, Question 03.11-33, numerous U.S. EPR FSAR Tier 1 tables were revised to add the phrase “including the time required to perform the listed function" to the acceptance criteria column addressing Equipment Qualification Data Packages (EQDPs) and Seismic Qualification Data Packages (SQDPs) (for example, U.S. EPR FSAR Tier 1, Table 2.2.1-5). During this conference call, NRC also requested that AREVA NP modify the corresponding U.S. EPR FSAR Tier 1, ITAAC 6.1 text for each of these tables to also add the term “including the time required to perform the listed function." The U.S. EPR FSAR Tier 1 ITAAC 6.1 text is identical to the “Commitment Column” for the corresponding item number in the U.S. EPR FSAR Tier 1 tables (e.g., ITAAC 6.1 of U.S. EPR FSAR Tier 1, Section 2.2.1 and U.S. EPR FSAR Tier 1, Table 2.2.1-5 item 6.1, both of which state “Components in Table 2.2.1-2, that are designated as harsh environment, will perform the function listed in Table 2.2.1-1 in the environments that exist during and following design basis events.) The acceptance criteria column for this ITAAC was revised in the Response to RAI 326, Supplement 2, Question 3.11-33 to indicate that the time required to perform the listed function is documented as part of the EQDPs and SQDPs. Therefore, the U.S. EPR FSAR Tier 1 ITAAC 6.1 text does not need to be revised for the U.S. EPR FSAR Tier 1 tables that were revised in the Response to RAI 326, Supplement 2.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.4.1-7, Table 2.4.2-2, Table 2.4.4-5, Table 2.4.5-2, Table 2.4.11-3, Table 2.4.13-3, Table 2.4.14-2, Table 2.4.17-3, Table 3.5-3, and Table 3.7-2, will be revised as described in the response and indicated on the enclosed markup.

Question 03.11-36:

Staff identified inconsistencies with the definition of "harsh radiation level" in Section 3.11.1.2 and Table 3D-1 (Appendix 3D) of U.S. EPR Chapter 3.11, Tier 2. Section 3.11.1.2 defines a harsh radiation level as “greater than 1.0E03 Rads gamma for electrical or digital equipment,” while Table 3D-1 defines “electronic devices and components.” Provide corrected text with a consistent definition of a "harsh radiation level," or a basis for two different definitions.

Response to Question 03.11-36:

U.S. EPR FSAR Tier 2, Section 3.11.1.2 will be revised to state “electronic devices and components” consistent with U.S. EPR FSAR Tier 2, Table 3D-1.

FSAR Impact:

U.S. EPR FSAR, Tier 2 Section 3.11.1.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

Table 2.4.1-79—Protection System ITAAC (5 12 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.9	Deleted. ~~Electrical isolation devices exist in the data communication paths between the PS and the non safety related displays and controls.~~	Deleted. ~~Inspections will be performed on the existence of the electrical isolation devices.~~ 03.11-34	Deleted. ~~Electrical isolations devices exist in the data communication paths between the PS and the non safety related displays and controls.~~
4.10	~~The~~ Class 1E PS equipment ~~listed as Class 1E in Table 2.4.1-1~~ can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	~~Type tests, tests, analyses or a combination~~Type tests or type tests and analyses of these will be performed on the Class 1E equipment listed in Table 2.4.1-1.	A report exists and concludes that the equipment ~~listed~~ identified as Class 1E in Table 2.4.1-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.11	Controls exist in the MCR that allow manual actuation~~,~~ at the system level~~, of the functions identified in Table 2.4.1-5.~~	~~a. Inspections will be performed to verify the existence of controls in the MCR.~~ ~~b.~~ Tests will be performed to verify the correct functionality of the controls in the MCR.	~~a. Controls exist in the MCR that allow manual actuation at the system level of the functions listed in Table 2.4.1-5.~~ ~~b.~~ For each function in Table 2.4.1-~~5~~4, the PS generates actuation signals ~~the correct actuation signals are present at the output of the PS actuation logic units (ALU)~~ after the corresponding controls in the MCR are manually activated. Deliberate manual action is required to return the PS to normal.
4.12	Controls exist in the MCR and RSS to allow validation or inhibition of manual permissives ~~listed in Table 2.4.1-7~~.	~~a. Inspections will be performed to verify the existence of controls in the RSS.~~ ~~b.~~ Tests will be performed to verify the correct functionality of the controls in the MCR and RSS.	~~a. Controls exist in the MCR and RSS to allow validation or inhibition of manual permissives listed in Table 2.4.1-7.~~ ~~b.~~ For each of the manual permissives in Table 2.4.1-5~~7~~, the correct permissive status is present in the PS actuation logic units (ALU) after the corresponding controls in the MCR and RSS are manually activated.

Table 2.4.2-2—Safety Information and Control System ITAAC
(~~4~~ 8 Sheets)

03.11-34

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.4	~~The~~ Class 1E SICS equipment ~~listed as Class 1E in Table 2.4.2-1~~ can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	~~Type tests, tests, analyses or a combination~~Type tests or type tests and analysis of these will be performed for the Class 1E equipment listed in Table 2.4.1-1.	A report exists and concludes that the equipment ~~listed~~ identified as Class 1E in Table 2.4.2-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.5	The SICS system design and application software are developed using a process composed of six life cycle phases, with each phase having outputs which must conform to the requirements of that phase. The six life cycle phases are the following: 1) Basic Design Phase. 2) Detailed Design Phase. 3) Manufacturing Phase. 4) System Integration and Testing Phase 5) Installation and Commissioning Phase. 6) Final Documentation Phase.~~The SICS hardware and software are developed using a design process composed of five life cycle phases with each phase having design outputs which must conform to the requirements of that phase. The five life cycle phases are the following:~~	a. Analyses will be performed to verify that the outputs for the SICS basic design phase conform to the requirements of that phase. **{{DAC}}**~~a. Inspections will be performed to verify that the SICS basic design phase process has design outputs.~~	a. A report exists and concludes that the outputs conform requirements of the basic design phase of the SICS. **{{DAC}}**~~a. A report exists and provides the design outputs for the basic design phase of the SICS hardware and software design process.~~
		b. Analyses will be performed to verify that the outputs for the SICS detailed design phase conform to the requirements of that phase. **{{DAC}}**~~b. Analyses will be performed to verify that the design outputs for the SICS basic design phase conform to the requirements of that phase.~~	b. A report exists and concludes that the outputs conform to requirements of the detailed design phase of the SICS. **{{DAC}}**~~b. A verification and validation (V&V) report exists and concludes that the design outputs conform to the requirements of the SICS basic design phase.~~
		c. Analyses will be performed to verify that the outputs for the SICS manufacturing phase conform to the requirements of that phase.~~c. Inspections will be performed to verify that the SICS detailed design phase process has design outputs.~~	c. A report exists and concludes that the outputs conform to the requirements of the manufacturing phase of the SICS.~~c. A report exists and provides the design outputs for the detailed design phase of the SICS hardware and software design process.~~

Table 2.4.4-5—Safety Automation System ITAAC (~~3~~ 9 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
	03.11-34	b. Inspections will be performed of the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.4-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	b. Inspection reports exist and conclude that the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.4-1 including anchorage is installed as specified on the construction drawings.
4.1	~~Equipment~~ Class 1E SAS equipment ~~listed as Class 1E in Table 2.4.4-1~~ can perform its safety function when subjected to ~~electromagnetic interference~~ EMI, RFI, ESD, and power surges.	~~Type tests, tests, analyses or a combination~~Type tests or type tests and analysis of these will be performed for the Class 1E equipment listed in Table 2.4.4-1.	A report exists and concludes that the equipment ~~listed~~ identified as Class 1E in Table 2.4.4-1 can perform its safety function when subjected to electromagnetic interference EMI, RFI, ESD, and power surges.
4.2	The SAS receives input signals from the sources listed in Table 2.4.4-2.	Tests will be performed to verify the existence of input signals.	The SAS receives input signals from the sources listed in Table 2.4.4-2.
4.3	The SAS provides the output signals listed in Table 2.4.4-3.	Tests will be performed to verify the existence of output signals.	The SAS provides output signals to the recipients listed in Table 2.4.4-3.
4.4	The SAS provides the interlocks listed in Table 2.4.4-4.	Tests will be performed using test signals to verify the operation of the interlocks listed in Table 2.4.4-4.	The interlocks listed in Table 2.4.4-4 respond as specified when activated by a test signal.

Table 2.4.5-2—Priority and Actuator Control System ITAAC
(~~2~~ 4 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.2	Electrical isolation is provided on connections between ~~the~~ PACS equipment and non-Class 1E equipment.~~the non-safety I&C systems.~~	a. Analyses will be performed to determine the test specification for electrical isolation devices on connections between ~~the~~ PACS equipment and non-Class 1E equipment.~~the non safety I&C systems.~~	a. A test plan exists that provides the test specification for determining whether a device is capable of preventing the propagation of credible electrical faults on connections between ~~the~~ PACS equipment and non-Class 1E equipmen. ~~the non safety I&C systems.~~
		b. Type tests, analyses, or a combination of type tests and analyses will be performed on the electrical isolation devices between ~~the~~ PACS equipment and non-Class 1E equipment.~~the non safety I&C systems.~~	b. A report exists and concludes that the Class 1E isolation devices used between ~~the~~ PACS equipment and non-Class 1E equipment ~~the non safety I&C systems~~ prevent the propagation of credible electrical faults.
	03.11-34	c. Inspections will be performed on ~~all~~ connections between ~~the~~ PACS equipment and non-Class 1E equipment. ~~the non safety I&C systems.~~	c. Class 1E electrical isolation devices exist on ~~all~~ connections between ~~the~~ PACS and non-Class 1E equipment.~~the non safety I&C systems.~~
4.3	~~The~~ Class 1E PACS equipment ~~classified as Class 1E in Table 2.4.5-1~~ can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	~~Type tests, tests, analyses or a combination~~Type tests or type tests and analysis of these will be performed for the Class 1E equipment listed in Table 2.4.5-1.	A report exists and concludes that the equipment ~~listed~~ identified as Class 1E in Table 2.4.5-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.4	The input wiring from other I&C systems to the PACS is properly connected.	Inspections will be performed to verify that the input wiring from other I&C systems to the PACS is properly connected.	The input wiring from the other I&C systems to the PACS is properly connected.

Table 2.4.11-3—Boron Concentration Measurement System ITAAC (2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The BCMS equipment is located as listed in Table 2.4.11–1.	Inspections will be performed of the location of the BCMS equipment.	The equipment listed in Table 2.4.11-1 is located as listed in Table 2.4.11-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.11-1 can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.11-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.11-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.11-1 can withstand seismic design basis loads without loss of safety function. b. Inspection reports exist and conclude that the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.11-1 including anchorage is installed as specified on the construction drawings.
4.1	The BCMS provides output signals listed in Table 2.4.11-2.	Tests will be performed to verify the existence of output signals.	The BCMS provides output signals to the recipients listed in Table 2.4.11-2.
4.2	The BCMS equipment classified as Class 1E in Table 2.4.11-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	~~Type tests, tests, analyses or a combination~~Type tests or type tests and analysis of these will be performed for the Class 1E equipment listed in Table 2.4.11-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.11-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.

03.11-34

Table 2.4.13-3—Control Rod Drive Control System ITAAC
(2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The CRDCS equipment is located as listed in Table 2.4.13-1.	Inspections will be performed of the location of the CRDCS equipment.	The equipment listed in Table 2.4.13-1 is located as listed in Table 2.4.13-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.13-1 can withstand seismic design basis loads without loss of safety function.	a. Type tests, , analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.13-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.13-1 can withstand seismic design basis loads without loss of safety function.
		b. Inspections will be performed of the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.13-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	b. Inspection reports exist and conclude that the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.13-1 including anchorage is installed as specified on the construction drawings.
4.1	The CRDCS equipment classified as Class 1E in Table 2.4.13-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests or type tests and analysis~~Type tests, tests, analyses or a combination~~ of these will be performed for the Class 1E equipment listed in Table 2.4.13-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.13-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.2	The CRDCS receives input signals from the sources listed in Table 2.4.13-2.	Tests will be performed to verify the existence of input signals.	The CRDCS receives input signals from the sources listed in Table 2.4.13-2.

03.11-34

Table 2.4.14-2—Hydrogen Monitoring System ITAAC
(2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The HMS equipment is located as listed in Table 2.4.14-1.	Inspections will be performed of the location of the HMS equipment.	The equipment listed in Table 2.4.14-1 is located as listed in Table 2.4.14-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.14-1 can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.14-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.14-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.14-1 withstand seismic design basis loads without loss of safety function. b. Inspection reports exist and conclude that the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.14-1 including anchorage is installed as specified on the construction drawings.
4.1	The HMS equipment classified as Class 1E in Table 2.4.14-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests or type tests and analysis~~Type tests, tests, analyses or a combination~~ of these will be performed for the Class 1E equipment listed in Table 2.4.14-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.14-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.

03.11-34

Table 2.4.17-3—Excore Instrumentation System ITAAC
(2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The EIS equipment is located as listed in Table 2.4.17-1.	Inspections will be performed of the location of the EIS equipment.	The equipment listed in Table 2.4.17-1 is located as listed in Table 2.4.17-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.17-1 can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.17-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.17-1 can withstand seismic design basis loads without loss of safety function.
		b. Inspections will be performed of the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.17-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	b. Inspection reports exist and conclude that the ~~as-installed~~ Seismic Category I equipment listed in Table 2.4.17-1 including anchorage is installed as specified on the construction drawings.
4.1	The EIS equipment classified as Class 1E in Table 2.4.17-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests or type tests and analysis~~Type tests, tests, analyses or a combination~~ of these will be performed for the Class 1E equipment listed in Table 2.4.17-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.17-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.2	The EIS system provides output signals listed in Table 2.4.17-2.	Tests will be performed to verify the existence of output signals.	The EIS system provides output signals to the recipients listed in Table 2.4.17-2.

03.11-34

Table 3.5-3—Containment Isolation ITAAC (6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
		b. Components listed as harsh environment in Table 3.5-2 will be inspected to verify installation in accordance with the construction drawings including the associated wiring, cables and terminations. Deviations to the construction drawings will be reconciled to the EQDP.~~b. For equipment listed for harsh environment in Table 3.5-2, an inspection will be performed of the as-installed Class 1E equipment and the associated wiring, cables and terminations.~~	b. Inspection reports exists and conclude that the components listed in Table 3.5-2 as harsh environment has been installed per the construction drawings and any deviations have been reconciled to the EQDP.~~b. Inspection concludes the as-installed Class 1E equipment and associated wiring, cables, and terminations as listed in Table 3.5-2 for harsh environment conform with the design.~~
6.2	Containment electrical penetrations assemblies are qualified for harsh environment and perform the required safety function following exposure to the operational and design basis environments.	a. Type tests or type tests and analysis~~Type tests, tests, analyses or a combination~~ of tests and analyses will be performed to demonstrate the ability of the equipment for harsh environment to perform the function for the environmental conditions that could occur before and during ~~a~~ and following design basis ~~accident~~events. b. Equipment listed for harsh environment will have an inspection performed of the as-built~~as-installed~~ Class 1E equipment and the associated wiring, cables and terminations.	a. Containment electrical penetrations assemblies are qualified for harsh environment and perform the required safety function during and following exposure to the operational and design basis environments. b. Inspection concludes as-built~~as-installed~~ containment electrical penetrations assemblies are qualified for harsh environment and perform the required safety function following exposure to the operational and design basis environments.

03.11-34

Table 3.7-2—Accident Monitoring Instrumentation ITAAC
(2 Sheets)

03.11-34

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
3.4	The AMI identified in 3.7.2.1 will perform their function in the environments that exist before and during the time required to perform their function.	Type tests or type tests and analysis~~Type test, tests, analyses or a combination~~ of tests and analyses will be performed to demonstrate the ability of the AMI identified in 3.7.2.1 to perform their function in the environments that exist before and during the time required to perform their function.	A report exists and concludes that the AMI identified in 3.7.2.1 are qualified to perform their associated function in the environments that exist before and during the time required to perform their function.

3D and in the tables and figures provided in Appendix 3D. Use of synergistic effects is considered when these effects are believed to have a significant effect on equipment performance.

Service conditions are the actual environmental, physical, mechanical, electrical, and process conditions experienced by equipment during service. Plant operation includes both normal and abnormal operations. Abnormal operation occurs during plant transients, system transients, or in conjunction with certain equipment or system failures.

Service condition environments fall into two general categories of harsh and mild environments.

- Harsh environments (H) are plant areas where the environmental conditions significantly exceed the normal design conditions as a direct result of a DBE. This excludes the seismic-related DBEs that are discussed in Section 3.10. Harsh environments include environmentally harsh environments and radiation harsh environments as discussed below:

  – An environmentally harsh environment is a location that is subject to a break in the RCS, steam, or other HELB piping that significantly alters the environmental parameters of temperature, pressure, humidity, and/or flooding. This includes a LOCA, main steam line break (MSLB) within the containment building (see Figures 3D-1 and 3D-2) and outside the containment in the feedwater valve compartment (see Figures 3D-3 and 3D-4) and main steam valve compartment (see Figures 3D-5 and 3D-6). Other HELB breaks outside of containment in areas such as the SBs and fuel building, while creating adverse environments (e.g., temperature, pressure, humidity, and/or flooding) does not require consideration as a harsh environment because of the independent and redundant safety trains.

  – A radiation harsh environment is a location inside or outside containment where the radiation levels exceed the following thresholds:

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    - >1.0E04 Rads gamma for mechanical equipment including non-metallics or consumables (e.g., O-rings, seals, packing, gaskets, lube oil, diaphragms).
    - >1.0E03 Rads gamma for electronic devices and components~~electrical or digital equipment~~.

- Mild environments (M) are plant areas where the environment at no time would be significantly more severe than the environment that would occur during normal plant operation, including anticipated operational occurrences. A mild location is essentially an area not subject to DBEs (excluding seismic events) and whose radiation levels are less than or equal to the thresholds discussed above for mechanical and electrical equipment.

A new service condition for plant equipment, especially for digital I&C systems, is electromagnetic compatibility (EMC). Addressing EMC involves testing to show that