ArevaEPRDCPEm Resource

From: Pederson Ronda M (AREVA US) [Ronda.Pederson@areva.com]
Sent: Friday, December 12, 2008 4:47 PM
To: Getachew Tesfaye
Cc: DELANO Karen V (AREVA US); BENNETT Kathy A (OFR) (AREVA US); DUNCAN Leslie E (AREVA US)
Subject: Response to U.S. EPR Design Certification Application RAI No. 123(965_978_1037_1074), FSAR Ch. 14
Attachments: RAI 123 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 123 Response US EPR DC.pdf" provides technically correct and complete responses to 16 of the 28 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 123 Questions 14.03.03-3, 14.03.03-4, 14.03.03-7, 14.03.03-8, 14.03.03-9, 14.03.05-18, 14.03.05-19, 14.03.05-20, 14.03.05-21, 14.03.05-22, and 14.03.05-23.

The following table indicates the respective page(s) in the response document "RAI 123 Response US EPR DC.pdf" that contain AREVA NP's response to the each of the subject questions.

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A complete answer is not provided for 12 of the 28 questions. The schedule for a technically correct and complete response to each of these questions is provided below.

Question #	Response Date
RAI 123 — 14.03-4	February 13, 2009
RAI 123 — 14.03-5	February 13, 2009
RAI 123 — 14.03-6	February 13, 2009
RAI 123 — 14.03.03-1	February 13, 2009
RAI 123 — 14.03.05-9	March 31, 2009
RAI 123 — 14.03.05-10	March 31, 2009
RAI 123 — 14.03.05-11	March 31, 2009
RAI 123 — 14.03.05-12	March 31, 2009
RAI 123 — 14.03.05-14	March 31, 2009
RAI 123 — 14.03.05-15	March 31, 2009
RAI 123 — 14.03.05-16	March 31, 2009
RAI 123 — 14.03.05-17	March 31, 2009

Sincerely,

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To: ZZ-DL-A-USEPR-DL
Cc: Edmund Kleeh; Richard Laura; Michael Miernicki; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 123(965_978_1037_1074), FSAR Ch. 14

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 24, 2008, and on November 12, 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

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Hearing Identifier: AREVA_EPR_DC_RAIs
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Response to

Request for Additional Information No. 123 (965, 978, 1037, 1074), Revision 0

11/12/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.03 - Inspections, Tests, Analyses, and Acceptance Criteria
SRP Section: 14.03.03 - Piping Systems and Components - Inspections, Tests, Analyses, and Acceptance Criteria
SRP Section: 14.03.05 - Instrumentation and Controls - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: FSAR Section 14.3

QUESTIONS for Construction Inspection and Allegations Branch (CCIB)

Question 14.03-4:

ITAAC Item 3 in Table 3.3-1

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 are not aligned, as follows:

- The Commitment is not aligned with the ITA and the AC. The Commitment refers to "valves and dampers other than HVAC dampers in item 5.0." The ITA and AC refer to "all containment isolation valves." Please provide consistent wording for these ITAAC entries or explain why the wording is different.
- The Commitment states that containment isolation shall be completed within "the maximum acceptable time", while the AC states that all isolation valves will be closed "within 60 seconds of the isolation initiating event." It is not clear whether these two requirements are the same. Tier 2, Section 6.2.4.2.6, Isolation Valve Closure Times, requires some closure times that are considerably shorter than 60 seconds. Please clarify the requirement and acceptance criteria for isolation valve closure times.

Response to Question 14.03-4:

A response to this question will be provided by February 13, 2009.

Question 14.03-5:

ITAAC Item 4 in Table 3.3-1

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 states that the MSRT is capable of cooling the secondary system at a pre-define rate the upon SIS actuation, and the AC provides quantitative criteria for this capability. The ITA for confirmation of the MSRT cooldown rate capability only requires a test. Since this test will not be performed under actual accident conditions (e.g., fuel will not be in the core), it appears that this test should be accompanied by an analysis to verify the validity of the test results for actual accident conditions in order to demonstrate that the Design Commitment has been met. Should the ITA and AC include provisions for an analysis to confirm that the test is capable of demonstrating the design capability would be met under accident conditions?

Is the cooldown rate of 180 degrees Fahrenheit/hr the maximum rate that the secondary system can support? If so, should not the AC state at a maximum cooldown rate of 180 degrees Fahrenheit/hour? The term 'opening' in AC, should that be 'operating' instead?

Suggested AC - 'A report exists and concludes that the test and analysis?? results indicate that the secondary system was depressurized from a maximum opening or operating ?? pressure of 1414.7 psia to 900 psia at a rate sufficient to achieve a maximum?? cooldown rate of 180 degrees Fahrenheit/hour'

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03-5:

A response to this question will be provided by February 13, 2009.

Question 14.03-6:

ITAAC Item 5 in Table 3.3-1

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 are not aligned, as follows:

- The Commitment refers to 8 specific HVAC dampers, while the ITA and AC refer to “all containment isolation dampers”. Which of these statements is correct?
- The Commitment states that 'maximum acceptable time' whereas the AC has 'closed within 10 seconds of the actuation signal'. Is the maximum acceptable time the same as closed within 10 seconds of the actuation signal?
- Tier 2 refers to these dampers as valves. Which is correct Tier 2 or this ITAAC?

Response to Question 14.03-6:

A response to this question will be provided by February 13, 2009.

Question 14.03.03-1:

ITAAC Item 2.5 in Table 2.2.1-5

The AC should be revised to state that 'The RCS loops are physically separated from each other.' The design description should also be revised.

This is also applicable to following ITAAC:

ITAAC Item 2.3 in Table 2.2.5-3 - The AC should be revised to state that 'The divisions of the FPCPS have the required physical separation from each other.' Design description should also be revised.

ITAAC Item 2.3 in Table 2.2.7-3 - The AC should be revised to state that ' The divisions of the EBS have the required physical separation from each other'. Design description should also be revised.

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.03-1:

A response to this question will be provided by February 13, 2009.

Question 14.03.03-2:

ITAAC Item 3.3 in Table 2.2.1-5

This ITAAC and the similar ones should be written as in example provided at end of list of ITAAC below:

Also applicable to ITAAC:

ITAAC 3.3 in Table 2.2.2-3
ITAAC 3.4 in Table 2.2.3-3
ITAAC 3.4 in Table 2.2.4-3
ITAAC 3.4 in Table 2.2.5-3
ITAAC 3.4 in Table 2.2.6-3
ITAAC 3.4 in Table 2.2.7-3
ITAAC 3.2in Table 2.2.8-2
ITAAC 3.4 in Table 2.3.3-3

Example ITAAC provided below uses ITAAC Item 3.3 in Table 2.2.1-5 for illustration:

For the second column, "Inspection, Tests, Analysis":

b. Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.

c. Inspection will be performed of the as-installed seismic Category I equipment listed in Table 2.2.1-1 to verify that the equipment including anchorage is seismically bounded by the tested or analyzed conditions.

For the third column, "Acceptance Criteria":

b. The seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

c. The as-installed seismic Category I equipment listed in Table 2.2.1-1 including anchorage are seismically bounded by the tested or analyzed conditions.

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.03-2:

See the response to RAI 128, Question 14.03.04-3.

FSAR Impact:

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

Question 14.03.03-3:

ITAAC Item 3.6 in Table 2.2.1-5

During pre-op testing is there a test that checks for reverse rotation of an RCP motor? If so, should the ITA be a combination of inspection and tests?

Response to Question 14.03.03-3:

A test will be performed to verify the correct rotation of the reactor coolant pump motor. U.S. EPR FSAR Tier 1, Table 2.2.1-5, RCS Inspections, Test, Analyses, and Acceptance Criteria, Item 3.6 will be revised from an inspection to a test of the device that prevents reverse rotation.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.2.1-5 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.03-4:

ITAAC Item 3.7 in Table 2.2.1-5

SRP 14.3 App. A IV.4.B states that acceptance criteria should be objective and unambiguous. The Design Commitment is that piping and interconnected component nozzles listed in Table 2.2.1-1 have been evaluated for LBB. The ITA states that an analysis will be performed. The AC states that an analysis exists that assesses the LBB capability, but does not state "the analysis concludes". A conclusion statement needs to be provided.

Evaluate this deficiency and revise/respond as necessary.

Response to Question 14.03.03-4:

U.S. EPR FSAR, Tier 1, Table 2.2.1-5, RCS Inspections, Test, Analyses, and Acceptance Criteria, Item 3.7 Acceptance Criteria will be revised from "An analysis exists that assesses the LBB capability of the piping and equipment listed in Table 2.2.1-1" to "An analysis exists and concludes that the piping and equipment listed in Table 2.2.1-1 meet the LBB acceptance criteria."

FSAR Impact:

U.S. EPR FSAR, Tier 1, Table 2.2.1-5 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.03-5:

ITAAC Item 4.3 in Table 2.2.1-5, the ITA should be split into two paragraphs.

The design commitment states this requirement 'Actuators listed as being controlled by a PACS module in Table 2.2.1-2 are controlled by a PACS module.' Table 2.2.1-2 does not list actuators just equipment and valves. It is more appropriate to refer to valves and equipment instead of their actuators. The design commitment seems to require verification that those equipment and valves have PACS modules which actuate them, whereas the ITA and AC only verify that the actuators actuate to different states dependent on that requested by a test signal.

The design commitment is better stated as the following: 'Equipment and valves listed as being controlled by a PACS module in Table 2.2.1-2 actuate to the state requested by the test signal.'

Applicable also to:

ITAAC 4.3 in Table 2.2.2-3
ITAAC 4.3 in Table 2.2.3-3
ITAAC 4.3 in Table 2.2.4-3
ITAAC 4.3 in Table 2.2.5-3
ITAAC 4.3 in Table 2.2.6-3
ITAAC 4.3 in Table 2.2.7-3
ITAAC 4.2 in Table 2.3.3-3

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.03-5:

See the response to RAI 128, Question 14.03.07-3.

FSAR Impact:

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

Question 14.03.03-6:

ITAAC Item 5.1 in Table 2.2.1-5

The tables 2.2.1-2 and 2.2.1-3 are rather confusing in that under column for IEEE Class 1E there are numbers instead of a Yes or No statement. The numbers per footnote 2 for Table 2.2.1-3 represent divisional numbers. This is also confusing. For Table 2.2.1-2, this same convention is followed, however there is no footnote 2 for this table. These tables need to be revised for clarification.

For this ITAAC there are actually two ITAs and two ACs, both of which should be numbered. The second ITAAC for alternate feed is rather confusing as written considering that alternate feed is to divisional pair not individual divisions. How is each division checked independently?

This is applicable to following ITAAC also:

ITAAC Item 5.1 in Table 2.2.2-3
ITAAC Item 5.1 in Table 2.2.3-3
ITAAC Item 5.1 in Table 2.2.4-3
ITAAC Item 5.1 in Table 2.2.5-3
ITAAC Item 5.1 in Table 2.2.6-3
ITAAC Item 5.1 in Table 2.2.7-3

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.03-6:

See the response to RAI 128, Question 14.03.07-7.

FSAR Impact:

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

Question 14.03.03-7:

ITAAC Item 5.3 in Table 2.2.1-5

This ITAAC should be split into two ITAs and ACs - one for the requirement that only two emergency diesels are required to supply minimum number of PZR heaters, and one for the requirement that each heater group provides 144 kW. Alternatively, if technically correct, the present AC could also be rewritten to state 'A report exists and concludes that only two emergency diesels are required to operate in order to supply power to the minimum number of emergency PZR heaters rated at 144 KW per heater group.'

Evaluate these defficiencies and revise/respond as necessary.

Response to Question 14.03.03-7:

U.S. EPR FSAR Tier 1, Section 2.2.1, Item 5.3 and Table 2.2.1-5, RCS Inspections, Test, Analyses, and Acceptance Criteria, Item 5.3 will be revised:

- The Inspection, Test, or Analysis will be revised to "An analysis will be performed."
- The Commitment Wording and Acceptance Criteria will be revised to "An analysis exists and concludes that only two emergency diesel generators are required to operate to supply power to the minimum number of emergency PZR heaters, which are rated at 144 kW per heater group."

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.2.1 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.03-8:

ITAAC Item 7.4 in Table 2.2.1-5 (In addition to Generic)

SRP 14.3 App. A IV.4.B describes the three column format for ITAAC including the provision that the acceptance criteria (AC) in Column 3 for the inspections, test, or analyses (ITA) described in Column 2 which, if met, demonstrate that the Design Commitments in Column 1 have been met. Table 2.2.1-5, Item 7.4

AC wording does not align with the Commitment Wording. The Commitment Wording requires RCP standstill seal system (SSSS) can be *closed or engaged* when the RCP is stopped. The ITA states that testing will be performed.

The AC wording requires the SSSS can be *closed* when the RCP is stopped. Is "SSSS can be *closed or engaged* when the RCP is stopped." stated in the Commitment Wording the same as "SSSS can be *closed* when the RCP is stopped" as stated in the AC?

Response to Question 14.03.03-8:

The terminology "closed" and "engaged" have the same meaning. The nitrogen injection valve (30JEB10/20/30/40 AA018) is opened and the nitrogen discharge valve (30JEB10/20/30/40 AA020) is closed to enable the nitrogen gas to act on the seal ring, moving it upward and closing it against a landing on the rotor, creating a tight metal-to-metal seal.

For clarity, U.S. EPR FSAR, Tier 1, Table 2.2.1-5, RCS Inspections, Test, Analyses, and Acceptance Criteria, Item 7.4 will be revised to specify "engaged" in the Commitment Wording column and in the Acceptance Criteria column. The associated Design Commitment 7.4 will be revised so only the word "engaged" is used.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.2.1 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.03-9:

ITAAC Item 7.5 in Table 2.2.1-5, (In addition to Generic)

FSAR Tier 2, Table 5.4-9 states that the PSRV maximum opening time (including pilot valve opening time) is 0.7 seconds. This conflicts with Item 7.5 AC, which states that the PSRVs open within 0.89 seconds (including pilot valveopening time. Which is correct?

Response to Question 14.03.03-9:

The pressurizer safety relief valve (PSRV) maximum opening time is 0.70 seconds (0.60 seconds of dead time + 0.10 seconds of stroke time). An additional 0.19 seconds is added to the delay time for analytical purposes, since effective seal relief flow is not achieved until the PSRV flow clears the loop seal line.

U.S. EPR FSAR, Tier 1, Table 2.2.1-5, RCS Inspections, Test, Analyses, and Acceptance Criteria, Item 7.5 Acceptance Criteria will be revised to 0.70 seconds. U.S. EPR FSAR Tier 2, Table 14.3-1, Design Basis Accident Analysis (Safety Significant Features), Item 1-9 Value will be revised to 0.70 seconds.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.2.1-5, Item 7.5 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 2, Table 14.3-1, Item 1-9 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-8:

ITAAC Item 3.1 in Table 2.4.1-9

SRP 14.3, App. A IV.1.A.x defines “inspections” as visual observations, physical examinations, or review of records of this type activity that compare the SSC condition to one or more design commitments. Table 2.4.1-9, Item 3.1 ITA provides for “Inspection, type tests, tests, analyses or a combination of tests and analyses…” This wording implies that a “combination of tests and analyses” can be used in lieu of inspection. This is not consistent with the Acceptance Criteria which requires a report showing equipment was installed as designed, since review of this report is an inspection activity.

Suggested wording is as follows for this ITAAC :

For the second column, "Inspection, Tests, Analysis":

a. Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.

b. Inspection will be performed of the as-installed seismic Category I equipment listed in Table 2.4.1-1 to verify that the equipment including anchorage is seismically bounded by the tested or analyzed conditions.

For the third column, "Acceptance Criteria":

a. Test/analysis reports exist and conclude that the seismic Category I equipment 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 2.4.1-1 including anchorage are seismically bounded by the tested or analyzed conditions.

Other ITAAC to which wording above applies are the following:

ITAAC Item 3.1 in Table 2.4.2-2
ITAAC Item 3.1 in Table 2.4.4-5
ITAAC Item 3.1 in Table 2.4.5-2,
ITAAC Item 3.1 in Table 2.4.11-3
ITAAC Item 3.1 in Table 2.4.13-3
ITAAC Item 3.1 in Table 2.4.14-2
ITAAC Item 3.1 in Table 2.4.16-2
ITAAC Item 3.1 in Table 2.1.17-3
ITAAC Item 3.1 in Table 2.4.19-3

Response to Question 14.03.05-8:

See the response to RAI 128, Question 14.03.06-27.

FSAR Impact:

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

Question 14.03.05-9:

ITAAC Item 4.1 in Table 2.4.1-9

SRP 14.3 App. A IV.4.B states that Acceptance Criteria should be objective and unambiguous. The AC for Table 2.4.1-9, Item 4.1 states that the PS generates an automatic RT signal (singular) as identified in Table 2.4.1-3. However, Table 2.4.1-3 identifies several RT signals. This discrepancies needs clarification. Suggested wording is as follows:

- The Commitment Wording -change words 'an automatic RT signal, as identified' to 'an automatic RT signal for each of the parameters identified'.
- The AC -change words 'an automatic RT signal, as identified' to 'an automatic RT signal for each of the parameters identified'.

Response to Question 14.03.05-9:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-10:

ITAAC Item 4.2 in Table 2.4.1-9

SRP 14.3 App. A IV.4.B states that Acceptance Criteria should be objective and unambiguous. The Commitment Wording in Table 2.4.1-9, Item 4.2 states that "the PS generates the automatically actuated engineered safety feature *signals listed in Table 2.4.1-4*." The AC states that "the PS generates automatic actuation of engineered safety *features*." The Commitment Wording requires the generation of *signals*, whereas the AC appears to require actuation of the final ESF actuation device. A test that either verifies actuation of the final device or just a signal at the input terminals to the actuation device would appear to satisfy the Commitment Wording.. Why are the wording in the Commitment Wording and the AC different? In addition, the ITA should be aligned with the Commitment Wording and AC by referencing Table 2.4.1-4 relative to using the test signals to simulate the RTs in Table 2.4.1-4.

Response to Question 14.03.05-10:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-11:

ITAAC Item 4.6 in Table 2.4.1.9

Table states that an inspection is performed for the existence of a document that describes the setpoint methodology. The inspection is to verify that there is an established methodology that can be used for determining the setpoints in question. In addition, an analysis is performed to verify that the PS setpoints are determined using that methodology..... These are two separate actions. The AC states that 'a report exists and concludes that the PS setpoints..... are determined using a methodology.....' The AC only addresses the second ITA. The existence of a document that establishes that methodology is not addressed. The document that the inspection is to verify the existence of is not the report stated in the AC, but is the analysis. Should there not be an AC that addresses the first ITA in which the inspection is performed?

Response to Question 14.03.05-11:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-12:

ITAAC 4.11 in Table 2.4.1-9

If both the existence and operation of the controls are to be validated, It would seem that the design commitment could be revised to state: 'Controls exist in the MCR and the RSS and can be manually actuated to produce the functions identified in Table 2.4.1-5.'

ITA -' Inspections and tests will be performed to confirm the existence and operation of the controls that produce the manually actuated functions identified in Table 2.4.1-5.'

AC - 'A report exists and concludes that the inspection and test results confirm the existence and operation of the controls that produce the manually actuated functions identified in Table 2.4.1-5.'

This question is also applicable to ITAAC 4.12 in Table 2.4.1-9. In addition ITAAC 4.12 should reference the table where manual permissives are found.

This question is also applicable to ITAAC 4.2 in Table 2.4.2-2. In addition ITAAC 4.2 should reference the table where minimum inventory of controls, displays, and alarms are found.

Evaluate these deficiencies and respond/ revise as necessary.

Response to Question 14.03.05-12:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-13:

ITAAC 5.1 in Table 2.4.1-9

Tests using simulated signals could be a better means to confirm that equipment is supplied from correct division.

Also applicable to following ITAAC:

ITAAC 5.1 in Table 2.4.2-2
ITAAC 5.1 in Table 2.4.4-5
ITAAC 5.1 in Table 2.4.5-2
ITAAC 5.1 in Table 2.4.11-3
ITAAC 5.1 in Table 2.4.14-2
ITAAC 5.1 in Table 2.4.16-2
ITAAC 5.1 in Table 2.4.17-3

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.05-13:

See the response to RAI 128, Question 14.03.06-29.

FSAR Impact:

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

Question 14.03.05-14:

ITAAC Item 4.1 in Table 2.4.2-2

This ITAAC stresses the existence of procedures and the capabilities that arise from them. The existence of those procedures and the capability to make the transfer from the MCR to the RSS is what is really important.

Suggested wording is as follows:

- Commitment Wording – "Transfer of control of the SICS from the MCR to the RSS can be performed."
- 1st ITA – "An inspection will be performed to verify the existence of procedures.
- 1st AC – "A report exists and concludes that procedures exist for transfer of control of the SICS from the MCR to the RSS.
- 2nd ITA – "A test will be performed to verify that control of the SICS can be transferred from the MCR to the RSS."
- 2nd AC – "A report exists and concludes that the test results confirm that control of the SICS can be transferred from the MCR to the RSS.

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.05-14:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-15:

ITAAC Item 4.3 in Table 2.4.2-2

SRP 14.3, App. A IV.4.B states that any differences in Design Commitment text between the design descriptions and the ITAAC should be minimized unless intended to better conform the commitments in the design descriptions with the ITAAC format. The Commitment Wording does not agree with section 4.3 of design description. Section 4.3 refers to "…safety related *parts*…." , and the Commitment Wording refers to"…safety related *portions*…." One of these should be changed.

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 Wording, ITA, and AC are not aligned and are not focused on the topic of interest, electrical isolation of the as-built circuits. The Commitment Wording and AC talk about signal paths, while the ITA only talks about the isolation devices. Further, the AC only talks about the existence of isolation devices. It is suggested that this ITAAC have two ITA and AC. Suggested wording is as follows:

- Commitment Wording –'Electrical independence is achieved in the signal paths between the safety related parts of SICS and non-safety I&C systems using the isolation devices.'
- 1st ITA – 'Type tests, tests, and/or analyses will be performed to verify that the isolation devices provide electrical independence if inserted in the signal paths between safety related and non-safety circuits.'
- AC – 'A report exists and concludes that electrical independence is achieved in the signal paths between the safety related and non-safety circuits using the isolation devices.'
- 2nd ITA – 'An inspection will be performed to verify that the isolation devices exist in the signal paths between the safety related portions of SICS and the non-safety I&C systems.'
- AC – 'A report exists and concludes that the isolation devices exist in the signal paths between the safety related portions of SICS and the non-safety I&C systems.'

This change should also be reflected in the design description.

Also applicable to following ITAAC:

ITAAC Item 4.2 in Table 2.4.5-2 in regard to electrical independence being achieved by the isolators.

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.05-15:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-16:

ITAAC Item 4.2 in Table 2.4.4-5

SRP 14.3 App. A IV.1.A defines “inspection” as visual observations, physical observations, or a review of records of these activities. “Test” is defined as the actuation, or operation, or establishment or specified conditions to evaluate the performance of components. The Table 2.4.4-5, Item 4.2 ITA entry provides for “inspection” to verify the existence of input signals. Should the term 'test' be used instead of 'inspection' for this item?

Applicable also to Item 4.3 in Table 2.4.4-5

Evaluate and revise/respond as necessary.

Response to Question 14.03.05-16:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-17:

ITAAC Item 4.5 in Table 2.4.4-5

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 Wording ITA, and AC are not well aligned, as follows.

- The Commitment Wording refers to a design *process*, while the AC refers to design *outputs*. The AC should state that a report exists and provides conclusions about the *process* rather than the outputs of the various phases.
- The AC mentions activities not mentioned in the Commitment Wording. For instance, item 1b) refers to Concept and Requirements Activities, 2b) refers to Implementation Activities, 4b) refers to the Test Activity, and 5b) refers to the Installation and Checkout Activity . It was not clear whether verification of these activities was sufficient to draw conclusions about the life cycle phases mentioned in the Commitment Wording.
- The second activity under the ITA column is appears to be essentially the same as the first. The AC corresponding to this activity appear to relate to the validity of the design process outputs rather than to the process itself. The Commitment Wording only mentions the process, not whether it produced valid results. Consequently, the purpose of this activity is not clear.

Suggested wording:

Commitment Wording:

'The SAS 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: .....'

1st ITA - 'Inspections will be performed to verify that the design process has five life-cycle phases with each one having design outputs.'

2nd ITA - ' A V&V analysis will be performed to verify that the design ouputs for each life cycle phase conform to the requirements of that phase.'

All the ACs that confirm there are design outputs for each phase could be adjacent to the first ITA.

All the ACs that confirm that the design outputs for each phase conform to the requirements of the phase could be adjacent to second ITA.

Applicable also to the following ITAAC:

ITAAC Item 4.14 in Table 2.4.1-9
ITAAC Item 4.5 in Table 2.4.2-2
ITAAC Item 3.1 in Table 2.4.9-3 The V&V analyses may or may not be required for non-safety related system.

Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.05-17:

A response to this question will be provided by March 31, 2009.

Question 14.03.05-18:

ITAAC 3.1 in Table 2.4.6-2

The commitment wording should be split into two ITAAC since two different design commitments are stated.

For the first ITA, add the words ' to verify' after 'performed' and delete word 'on'.

Evaluate this deficiency and revise/respond as necessary.

Response to Question 14.03.05-18:

U.S. EPR FSAR, Tier 1, Table 2.4.6-2, Item 3.1 will be divided into two design commitments as recommended in the question, including the wording recommendations in the Inspection, Test or Analysis column.

FSAR Impact:

U.S. EPR FSAR, Tier 1, Table 2.4.6-2 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-19:

ITAAC Item 2.1 in Table 2.4.7-1

SRP 14.3 App. A IV.4.B states that Acceptance Criteria should be objective and unambiguous. The ITA for Table 2.4.7-1, Item 2.1 requires inspections of the location of SMS equipment. The acceptance criteria for SMS equipment location refers to design description Section 2.1. Section 2.1 describes the analytical criteria for selection of equipment location, rather than actual equipment locations. It appears that the ITA should require both analyses and inspections to determine whether the as-installed locations are acceptable. Evaluate this deficiency and revise/respond as necessary.

Response to Question 14.03.05-19:

U.S. EPR FSAR Tier 1, Table 2.4.7-1, Item 2.1 will be revised. The statement “Analyses will be performed to determine the precise location of the SMS equipment” will be added at the beginning of the Inspection, Test or Analysis column, and the Acceptance Criteria will be revised to “The SMS equipment is located as per the analyses.”

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.4.7-1 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-20:

ITAAC Item 2.1 in Table 2.4.9-3

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. All three ITAAC columns for Table 2.4.9-3, Item 2.1 refer to Table 2.4.1-1, which applies to the SAS rather than the PAS. The commitment wording in Section 2.1 of the design description refers to Table 2.4.9-1. Is the correct reference for the PAS location Table 2.4.9-1?

Response to Question 14.03.05-20:

The correct reference to the process automation system equipment (PAS) table is U.S. EPR FSAR Tier 1, Table 2.4.9-1. U.S. EPR FSAR Tier 1, Table 2.4.9-3, Item 2.1 will be revised to reference the correct equipment table.

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.4.9-1 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-21:

ITAAC Item 3.2 in Table 2.4.9-3

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 Wording column for Table 2.4.9-3, Item 3.2 describes the DAS as consisting of "equipment from sensor output to the final actuator device." The ITA and Acceptance Criteria columns refer to "the PAS digital I&C platform" and "the digital I&C platform used for the PAS", respectively. Why wasn't the same terminology used in the three ITAAC columns? In addition, the ITA requires an inspection on "documentation." The ITA activity should directly address the design commitment, not the documentation. Evaluate these deficiencies and revise/respond as necessary.

Response to Question 14.03.05-21:

The diversity requirement of the process automation system (PAS) requires the system hardware and software to be diverse from the system hardware and software in the protection system (PS) and the safety automation system (SAS). U.S. EPR FSAR Tier 1, Section 2.4.9 will be revised as follows:

- Design Commitment 3.2 will be revised to "The system hardware and system software in PAS is diverse from the system hardware and system software in the protection system (PS) and the safety automation system (SAS)."

- In U.S. EPR FSAR, Tier 1, Table 2.4.9-3, Item 3.2 the Commitment Wording will be revised to be the same as Design Commitment 3.2 above.

- In U.S. EPR FSAR, Tier 1, Table 2.4.9-3, Item 3.2 the Inspection, Test or Analysis wording will be revised to "An analysis will be performed to demonstrate that the system hardware and system software in PAS is diverse from the system hardware and system software in the PS and the SAS."

- In U.S. EPR FSAR, Tier 1, Table 2.4.9-3, Item 3.2 the Acceptance Criteria wording will be revised to "A report exists and concludes that the system hardware and system software in the PAS is diverse from the system hardware and system software in the PS and SAS."

FSAR Impact:

U.S. EPR FSAR, Tier 1, Section 2.4.9 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-22:

ITAAC Items 2.1, 2.2, and 2.3 in Table 2.4.10-1

ITAAC should not be worded to perform inspections on documentation. Each ITA should be changed to eliminate the words 'on documentation that provides an analysis on' and replaced with the words 'to determine'. Evaluate and revise/respond as necessary.

Response to Question 14.03.05-22:

U.S. EPR FSAR Tier 1, Table 2.4.10-1, Item 2.1 will be revised as follows:

- The Commitment Wording will be revised to “The system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.”

- The Inspection, Test or Analysis wording will be revised to “An analysis will be performed to demonstrate that the system hardware and software in the PICS is diverse from the safety related system hardware and software in the SICS.”

- The Acceptance Criteria wording will be revised to “A report exists and concludes that the system hardware and software in the PICS is diverse from the safety related system hardware and software in the SICS.”

The above revisions to U.S. EPR FSAR Tier 1, Table 2.4.10-1, Item 2.1 cover U.S. EPR FSAR Tier 1, Section 2.4.10, Item 2.2 and Item 2.3. Therefore U.S. EPR FSAR Tier 1, Section 2.4.10, Item 2.2 and Item 2.3 and associated ITAAC will be deleted.

Also, U.S. EPR FSAR Tier 1, Section 2.4.10, Item 2.1 will be revised to the wording used in the Commitment Wording in U.S. EPR FSAR, Tier 1, Table 2.4.10-1, Item 2.1.

The revised U.S. EPR FSAR Tier 1, Section 2.4.10, Item 2.1 stated above replaces the phrase “on documentation that provides an analysis on” in the ITA with the phrase “to demonstrate.”

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.4.10 will be revised as described in the response and indicated on the enclosed markup.

Question 14.03.05-23:

ITAAC Item 4.3 in Table 2.4.13-3

The AC should be revised to state 'The .....from the PS ' for any one or more of the following divisional combinations are received by the module:' Evaluate this deficiency and revise/respond as necessary.

Response to Question 14.03.05-23:

The introduction before the bulleted items in the Acceptance Criteria column of U.S. EPR FSAR Tier 1, Table 2.4.13-3, Item 4.3 will be revised to include the phrase “for any one or more of.”

FSAR Impact:

U.S. EPR FSAR Tier 1, Table 2.4.13-3 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

retrievable in the main control room (MCR) and remote shutdown station (RSS) as listed in Tables 2.2.1-2 and 2.2.1-3.

4.2 The RCS system equipment controls are provided in the MCR and RSS as listed in Table 2.2.1-2.

4.3 ~~Actuators~~ Equipment listed as being controlled by a priority and actuat~~i~~o~~n~~r ~~and~~ control system (PACS) module in Table 2.2.1-2 responds to the state requested by a test signal~~are controlled by a PACS module~~.

5.0 Electrical Power Design Features

5.1 The components designated as Class 1E listed in Tables 2.2.1-2 and 2.2.1-3 are powered from the Class 1E divisions as listed in Tables 2.2.1-2 and 2.2.1-3 in a normal or alternate feed condition.

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5.2 Valves listed in Table 2.2.1-2 fail to the position noted in Table 2.2.1-2 on loss of power.

5.3 The power supply arrangement is such that only two emergency diesels are required to operate ~~in order~~ to supply power to the minimum required number of PZR heaters.

6.0 Environmental Qualifications

6.1 Equipment listed in Table 2.2.1-2 for harsh environment can perform the function listed in Table 2.2.1-1 following exposure to the design basis environments for the time required.

6.2 Instrumentation listed in Table 2.2.1-3 for harsh environment can display following exposure to the design basis environments.

7.0 Equipment and System Performance

7.1 Class 1E valves listed in Table 2.2.1-2 can perform the function listed in Table 2.2.1-1 under system design conditions.

7.2 The RCPs have rotational inertia to provide coastdown flow of reactor coolant on loss of power to the pump motors.

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7.3 The RCPs provide flow.

7.4 RCP standstill seal system (SSSS) can be ~~closed or~~ engaged when the RCP is stopped.

7.5 The PZR safety relief valves (PSRVs) open.

7.6 The PSRVs open below their maximum design setpoint.

7.7 The PSRVs provide relief capacity.

7.8 Each RCP is tripped by a protection system signal.

Table 2.2.1-5—RCS Inspections, Tests, Analyses, and Acceptance Criteria (6 Sheets)

~~Design~~ Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
		~~e~~b. Inspections will be performed of the as-installed Seismic Category I equipment listed in Table 2.2.1-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	~~e~~b. ~~The as-installed equipment supports and restraints are seismically bounded by tested or analyzed conditions~~Inspection reports exist and conclude that the as-installed Seismic Category I equipment listed in Table 2.2.1-1 including anchorage is installed as specified on the construction drawings.
3.4a	The piping identified as being within the ASME Code Section III boundary as indicated on Figure 2.2.1-1 has been designed in accordance with ASME Code Section III Requirements including seismic loads.	Analysis of the as-designed piping will be performed in accordance with ASME Code Section III requirements for the piping indicated on Figure 2.2.1-1.	ASME Code Section III stress reports exist and conclude that the as-designed piping identified as ASME Code Section III in Figure 2.2.1-1 meets ASME Code Section III requirements.
3.4b	The piping identified as being within the ASME Code Section III boundary as indicated on Figure 2.2.1-1 has been welded and hydrostatically tested in accordance with ASME Code Section III.	Inspections will be of the as-built piping as indicated on Figure 2.2.1-1 for the following:	A report exists and concludes that the piping as indicated on Figure 2.2.1-1 as ASME Code Section III has been:
		a. Welding has been performed per ASME Code Section III.	a. Welded in accordance with ASME Code Section III welding requirements.
		b. Hydrostatic testing per ASME Code Section III was performed.	b. Hydrostatically tested in accordance with ASME Code Section III requirements.
3.5	The steam outlet nozzles on the SGs include flow-limiting devices.	An inspection will be performed.	The flow area through each flow-limiting device is less than 1.39 ft^2.
3.6	The RCP motors include a device to prevent reverse rotation. 14.03.03-3	An ~~inspection~~ test will be performed.	~~A device to prevent reverse rotation is installed on each RCP motor.~~Idle RCPs do not rotate in the reverse direction as a result of flow.

Table 2.2.1-5—RCS Inspections, Tests, Analyses, and Acceptance Criteria (6 Sheets)

~~Design~~ Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
3.7	The piping and interconnected component nozzles listed in Table 2.2.1-1 have been evaluated for LBB.	An analysis will be performed. 14.03.03-4	An analysis exists and concludes that ~~assesses~~ the ~~LBB capability of the~~ piping and equipment listed in Table 2.2.1-1 meets the LBB acceptance criteria.
3.8	The RPV internals are designed to withstand the effects of flow-induced vibration.	Type tests, tests, analyses, or a combination of tests and analyses will be performed for the first plant only.	The RPV internals can withstand the effects of flow-induced vibration.
3.9	The RCS is designed to allow movement of the components as necessary due to thermal expansion and contraction.	A test of the RCS will be performed.	The measured gaps meet the specification requirements for the necessary component supports.
3.10	Supports for piping shown as ASME Section III on Figure 2.2.1-1 will be designed in accordance with ASME section III.	An analysis will be performed.	a. Supports for piping shown as ASME Section III on Figure 2.2.1-1 are designed in accordance with ASME section III.
			b. Snubbers have been identified, including those analyzed for fatigue for piping shown as ASME Section III on Figure 2.2.1-1.
			c. Support mass is less than ten percent of the adjacent pipe span for piping shown as ASME Section III on Figure 2.2.1-1.
3.11	Components listed as ASME Code Class I in Table 2.2.1-1 will be analyzed for fatigue per ASME Section III Class I.	An analysis will be performed.	a. Fatigue analysis has been performed for components listed as ASME Code Class I in Table 2.2.1-1.
			b. For components listed as ASME code Class I in Table 2.2.1-1, operating modes where peak stresses are within ten percent of allowable have been identified.

Table 2.2.1-5—RCS Inspections, Tests, Analyses, and Acceptance Criteria (6 Sheets)

~~Design~~ Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
	alternate feed condition. 14.03.03-7	b. Testing will be performed for components designated as Class 1E in Tables 2.2.1-2 and 2.2.1-3 by providing a test signal in each division with the alternate feed aligned to the divisional pair.	b. The test signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E components identified in Tables 2.2.1-2 and 2.2.1-3.
5.2	Valves listed in Table 2.2.1-2 fail as indicated in Table 2.2.1-2 on loss of power.	Testing will be performed for the valves listed in Table 2.2.1-2 to fail as indicated in Table 2.2.1-2 on loss of power.	Following loss of power, the valves listed in Table 2.2.1-2 fail as indicated in Table 2.2.1-2.
5.3	The power supply arrangement is such that only two emergency diesels are required to operate ~~in order~~ to supply power to the minimum number of PZR heaters.	~~Testing~~ An analysis will be performed.	~~Each emergency heater group in Table 2.2.1-2 provides 144KW each.~~ An analysis exists and concludes that only two emergency diesel generators are required to operate to supply power to the minimum number of emergency PZR heaters, which are rated at 144 kW per heater.
6.1	Components listed in Table 2.2.1-2, which are designated as harsh environment, perform the function listed in Table 2.2.1-1 in the environments that exist before and during the time required to perform their function.	a. Type tests, tests, analyses, or a combination of tests and analyses will be performed to demonstrate the ability of the equipment listed for harsh environment in Table 2.2.1-2 to perform the function listed in Table 2.2.1-1 for the environmental conditions that could occur before and during a design basis accident.	a. The Class 1E equipment listed for harsh environment in Table 2.2.1-2 can perform the function listed in Tables 2.2.1-1 before and during design basis accidents for the time required to perform the listed function.
		b. For equipment listed for harsh environment in Table 2.2.1-2, an inspection will be performed of the as-installed Class 1E equipment and the associated wiring, cables and terminations.	b. Inspection concludes the as-installed Class 1E equipment and associated wiring, cables, and terminations as listed in Table 2.2.1-2 for harsh environment conform with the design.

Table 2.2.1-5—RCS Inspections, Tests, Analyses, and Acceptance Criteria (6 Sheets)

~~Design~~ Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
6.2	Instrumentation listed in Table 2.2.1-3 for harsh environment can display following exposure to the design basis environments for the time required.	a. Type tests, tests, analyses, or a combination of tests and analyses will be performed to demonstrate the ability of the instrumentation listed for harsh environment in Table 2.2.1-3 to display for the environmental conditions that could occur before and during a design basis accident.	a. Instrumentation listed for harsh environment in Table 2.2.1-3 can display before and during design basis accidents.
		b. For instrumentation listed for harsh environment in Table 2.2.1-3, an inspection will be performed of the as-installed instrumentation and the associated wiring, cables and terminations.	b. Inspection concludes the as-installed instrumentation and associated wiring, cables, and terminations as listed in Table 2.2.1-3 for harsh environment conform with the design.
7.1	Class 1E valves listed in Table 2.2.1-2 perform the function listed in Table 2.2.1-1 under system design conditions.	Tests and analyses or a combination of tests and analyses will be performed to demonstrate the ability of the valves listed in Table 2.2.1-2 to change position as listed in Table 2.2.1-1 under system design conditions.	The as-installed valve changes position as listed in Table 2.2.1-1 under system design conditions.
7.2	The RCPs have rotational inertia to provide coast down flow of reactor coolant on simultaneous loss of power to all four pump motors.	Tests will be performed.	The RCPs provide the minimum coastdown flow as listed on Table 2.2.1-4.
7.3	The RCPs provide flow.	a. Testing and analysis will be performed.	a. The RCP provides greater than the minimum required flow rate of 119,692 gpm/loop.
		b. Testing and analysis will be performed.	b. The RCP provides less than the maximum required flow rate of 134,662 gpm/loop.
7.4	RCP standstill seal system (SSSS) can be ~~closed or~~ engaged when the RCP is stopped.	Testing will be performed.	The SSSS can be ~~closed~~ engaged when the RCP is stopped.
7.5	PSRVs open.	Testing will be performed.	PSRVs open within ~~0.89~~0.70 seconds (including pilot valve opening time).

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14.03.03-9

Table 14.3-1—Design Basis Accident Analysis (Safety-Significant Features)
Sheet 1 of 5

Item #	Tier 2 Reference	Design Feature	Value
1-1	Table 4.4-1	Initial rated reactor power is 4590 $MW_{t.}$	4590 MW_t
1-2	Table 3.4.9-1	RCCA bank withdrawal rate.	Maximum 30 in/min (75 steps/min)
1-3	Table 5.1-1	RCS loop flowrate.	Minimum 119,692 gpm/ loop. Maximum 134,662 gpm/ loop.
1-4	Section 5.2.2.2.2	CVCS charging pump flow.	Maximum runout flow (delivered to the cold legs) of 112.66 lb_m/sec (total for both pumps)
1-5	Section 5.4.1.2.2	The reactor coolant pumps have a device to prevent reverse rotation.	
1-6	Section 5.4.1.4	RCS flow coastdown.	Minimum flow (% of initial flow) after pump trip: Time - Flow 0.0 sec – 100 % 1.0 sec - 94.03 % 2.0 sec - 87.59 % 4.0 sec - 77.01 % 6.0 sec - 68.66 % 8.0 sec - 61.81 % 10.0 sec - 56.10 % 20.0 sec - 38.00 %
1-7	Table 5.4-2	SG steam outlet flow restrictor throat area.	Maximum 1.39 ft^2
1-8	Table 5.4-9	PSV capacity. 14.03.03-9	Minimum 661,400 lb_m / hr per valve at 2535 psig (Total of 3 valves)
1-9	Table 5.4-9	PSV opening time.	Maximum ~~0.89~~0.70 s (including pilot valves).
1-10	Section 6.2.1.1.2	Containment design pressure.	62 psig.
1-11	Table 6.2-1	Containment Free Volume.	Minimum 2.755 x 10^6 ft^3
1-12	Table 6.3-1	Accumulator total volume.	Minimum 1942.3 ft^3 per accumulator (total of 4 accumulators).
1-13	Table 6.3-1	Accumulator fL/D + K.	Minimum 2.78 for a flow area of 0.3941 ft^2

2.4.6 Plant Fire Alarm System

1.0 Description

The plant fire alarm system (PFAS) is a non-safety related alarm signaling system which provides control and monitoring of plant fire protection, suppression and detection system parameters.

The PFAS provides the following non-safety related functions:

- Provides a fire alarm management interface to the operators.
- Controls and monitors plant fire suppression and detection systems.
- Provides the main control room (MCR) operators with information displays and supports automatic and manual control of fire protection equipment.

2.0 I&C Design Features, Displays and Controls

2.1 The PFAS provides the displays listed in Table 2.4.6-1—Plant Fire Alarm System Displays and Alarms – Main Control Room and Remote Shutdown Station.

2.2 The as-built plant fire alarm system is consistent with the post-fire safe shutdown analyses.

3.0 Electrical Power

3.1 The PFAS is provided with both an electrically supervised primary and secondary power source that will transfer automatically to the secondary power source upon loss of the primary source. ~~A trouble signal indication is provided in the MCR upon a loss of either power source to any local fire control panel (LFCP) or workstation.~~

14.03.05-18

3.2 A trouble signal indication is provided in the MCR upon a loss of either power source to any local fire control panel (LFCP) or workstation.

4.0 System Inspections, Tests, Analyses, and Acceptance Criteria

4.1 Table 2.4.6-2—Plant Fire Alarm System ITAAC specifies the inspections, tests, analyses, and acceptance criteria for the PFAS.

Table 2.4.6-2—Plant Fire Alarm System ITAAC

Commitment Wording		Inspection, Test or Analysis	Acceptance Criteria
2.1	The PFAS provides the displays listed in Table 2.4.6-1.	Testing will be performed to verify the existence of the displays on PICS at the MCR and the RSS as listed in Table 2.4.6-1.	(1) The displays listed in Table 2.4.6-1 exist on the PICS in the MCR and the RSS. (2) Turbine Building alarm system signals also displayed at PFAS with same signals listed in Table 2.4.6-1.
2.2	The as-built plant fire alarm system is consistent with the post-fire safe shutdown analyses.	An inspection will be performed. 14.03.05-18	An inspection report documents that the as-built plant fire alarm system is consistent with the post-fire safe shutdown analysis.
3.1	The PFAS is provided with both an electrically supervised primary and secondary power source that will transfer automatically to the secondary source upon loss of the primary source. ~~A trouble signal indication is provided in the MCR upon a loss of either power source to any LFCP or workstation.~~	Tests will be performed ~~on~~ to verify the transfer of power of the PFAS from the primary source of power to the secondary source. ~~Testing will be performed to verify the existence of a trouble signal indication in the MCR when either the primary or secondary power source is lost at any LFCP or workstation.~~	~~(1)~~ The PFAS is provided with an electrically supervised primary and secondary power source that will transfer automatically to the secondary source upon loss of the primary source. ~~(2) A trouble signal indication is provided in the MCR upon a loss of either power source to any LFCP or workstation.~~
3.2	A trouble signal indication is provided in the MCR upon a loss of either power source to any LFCP or workstation.	Testing will be performed to verify the existence of a trouble signal indication in the MCR when either the primary or secondary power source is lost at any LFCP or workstation.	A trouble signal indication is provided in the MCR upon a loss of either power source to any LFCP or workstation.

Next File

Table 2.4.7-1—Seismic Monitoring System ITAAC

	Commitment Wording	Inspection, Test or Analysis	Acceptance Criteria
2.1	The location of the SMS equipment is as described in Section 2.1. 14.03.05-19	~~Inspections will be performed of the location of the SMS equipment.~~Analyses will be performed to determine the location of the SMS equipment, and inspections will be performed of the location of the SMS equipment.	~~The SMS equipment is located as described in Section 2.1.~~The SMS equipment is located as per the analyses.
3.1	The SMS system can compute the CAV and provides a display of the CAV in the MCR.	Type tests, tests, analyses, or a combination of analyses and tests will be performed on the SMS. Inspections will be performed for the existence or retrieve-ability of a display of CAV in the MCR.	(1) The SMS can compute the CAV. (2) Indication and alarms from CAV can be retrieved in the MCR.
3.2	The SMS has sufficient dynamic range.	Type tests, analyses or a combination of type tests and analyses of the SMS equipment will be performed.	The SMS has a dynamic range of at least 1000:1 zero-to-peak and is able to record at least 1.0 g zero-to-peak.
3.3	The SMS has sufficient bandwidth.	Type tests, analyses or a combination of type tests and analyses of the SMS equipment will be performed.	The SMS has bandwidth of at least 0.2 to 50 Hertz.
3.4	The SMS has a sufficient sampling rate.	Type tests, analyses or a combination of type tests and analyses of the SMS equipment will be performed.	The SMS has a sample rate of at least 200 samples per second in each of the three directions.
3.5	The SMS has a sufficient trigger rate.	Type tests, analyses or a combination of type tests and analyses of the SMS equipment will be performed.	The SMS has an actuating level that is adjustable and within the range of 0.001g and 0.02g.
4.1	The SMS backup battery has sufficient capacity to power its instruments for continuous operation for a period of time.	Type tests, analyses or a combination of type tests and analyses of the SMS equipment will be performed.	The SMS has a backup battery that has a capacity for a minimum of 25 minutes of system operation.

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14.03.05-21

3.2 ~~The DAS consists of equipment from sensor output to the final actuator device that is independent and diverse from the protection system (PS) and safety automation system (SAS) I&C platforms.~~The system hardware and system software in the PAS is diverse from the system hardware and system software in the protection system (PS) and the safety automation system (SAS).

3.3 The DAS generates signals for automatic actuation of the functions identified in Table 2.4.9-2—Functions Automatically Actuated by the DAS.

4.0 System Inspections, Tests, Analyses, and Acceptance Criteria

4.1 Table 2.4.9-3—Process Automation System ITAAC specifies the inspections, tests, analyses, and acceptance criteria for the PAS.

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14.03.05-20

Table 2.4.9-3—Process Automation System ITAAC
(2 Sheets)

	Commitment Wording	Inspection, Test or Analysis	Acceptance Criteria
2.1	The PAS equipment is located as listed in Table 2.4.~~1~~9-1.	Inspections will be performed of the location of the PAS equipment.	The equipment listed in Table 2.4.~~1~~9-1 is located as listed in Table 2.4.~~1~~9-1.
2.2	Physical separation exists between the four divisions of the DAS.	Inspections will be performed to verify that the divisions of the DAS are located in separate buildings.	The four divisions of the DAS are located in separate buildings.
3.1	The DAS hardware and software are developed using a design process with the following life cycle phases: • Basic design phase. • Detailed design phase. • Manufacturing phase. • Testing phase. • Installation and commissioning phase.	Inspection will be performed on the design process for the DAS hardware and software development.	1) A report exists and provides the design outputs of the basic design phase of the DAS hardware and software design process. 2) A report exists and provides the design outputs of the detailed design phase of the DAS hardware and software design process. 3) A report exists and provides the design outputs of the manufacturing phase of the DAS hardware and software design process. 4) A report exists and provides the design outputs of the testing phase of the DAS hardware and software design process. 5) A report exists and provides the design outputs of the installation and commissioning phase of the DAS hardware and software design process.
3.2	~~The DAS consists of equipment from sensor output to the final actuator device~~	~~An inspection will be performed on documentation that provides an analysis on the~~	~~A report exists and concludes that the digital I&C platform used for the PAS is~~

14.03.05-21

14.03.05-21

Table 2.4.9-3—Process Automation System ITAAC
(2 Sheets)

	Commitment Wording	Inspection, Test or Analysis	Acceptance Criteria
	~~that is independent and diverse from the protection system (PS) and safety automation system (SAS) I&C platforms.~~The system hardware and system software in the PAS is diverse from the system hardware and system software in the protection system (PS) and safety automation system (SAS)	~~diversity between the PAS digital I&C platform and the PS and SAS digital I&C platforms.~~An analysis will be performed to demonstrate that the system hardware and system software in the PAS is diverse from the system hardware and system software in the PS and SAS.	~~independent and diverse from the digital I&C platform used for the PS and SAS.~~A report exists and concludes that the system hardware and system software in the PAS is diverse from the system hardware and system software in the PS and SAS.
3.3	The DAS generates signals for automatic actuation of the functions identified in Table 2.4.9-2.	Tests will be performed on the as-built DAS using test signals.	The DAS generates signals for automatic actuation of the functions identified in Table 2.4.9-2.

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2.4.10 Process Information and Control System

1.0 Description

The process information and control system (PICS) is a digital human machine interface (HMI). It provides monitoring and control of plant systems. The PICS is non-safety related and is provided in both the main control room (MCR) and the remote shutdown station (RSS).

14.03.05-22

2.0 I&C Design Features

2.1 ~~The PICS consists of hardware that is diverse from the safety-related hardware of~~ The system hardware and software in the PICS is diverse from the safety-related system hardware and software in the Safety Information and Control System (SICS).

2.2 ~~The PICS consists of software that is diverse from the safety-related software of the Safety Information and Control System (SICS).~~ Deleted

2.3 ~~The PICS consists of displays that are diverse from the safety-related Qualified Display System (QDS) of the Safety Information and Control System (SICS).~~ Deleted

2.4 Electrical isolation is provided between the RSS and the MCR for the PICS.

3.0 System Inspections, Tests, Analyses, and Acceptance Criteria

3.1 Table 2.4.10-1—Process Information and Control System ITAAC specifies the inspections, tests, analyses, and acceptance criteria for the PICS.

14.03.05-22

Table 2.4.10-1—Process Information and Control System ITAAC

	Commitment Wording	Inspection, Test or Analysis	Acceptance Criteria
2.1	~~The PICS consists of hardware that is diverse from the safety related hardware of the SICS.~~ The system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.	~~An inspection will be performed on documentation that provides an analysis on the diversity between the PICS hardware and the safety related hardware of the SICS.~~ An analysis will be performed to demonstrate that the system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.	~~A report exists and concludes that the PICS consists of hardware that is diverse from the safety related hardware of the SICS.~~ A report exists and concludes that the system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.
2.2	~~The PICS consists of software that is diverse from the safety related software of the SICS.~~Deleted	~~An inspection will be performed on documentation that provides an analysis on the diversity between the PICS software and the safety related software of the SICS.~~	~~A report exists and concludes that the PICS consists of software that is diverse from the safety related software of the SICS.~~
2.3	~~The PICS consists of displays that are diverse from the safety related Qualified Display System (QDS) of the Safety Information and Control System (SICS).~~ Deleted	~~An inspection will be performed on documentation that provides an analysis on the diversity between the PICS displays and the safety related Qualified Display System (QDS) of the Safety Information and Control System (SICS).~~	~~A report exists and concludes that the PICS consists of displays that are diverse from the safety related Qualified Display System (QDS) of the Safety Information and Control System (SICS).~~
2.4	Electrical Isolation is provided between the RSS and the MCR for the PICS.	An inspection will be performed.	Electrical isolation is provided between RSS and the MCR for the PICS.

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

Commitment Wording		Inspection, Test or Analysis	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 ~~a~~ seismic design basis ~~seismic event~~ loads without loss of safety function.	a. ~~Inspections, t~~Type tests, ~~tests~~, analyses or a combination of type tests and analyses will be performed on the equipment ~~designated~~ 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. 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.	~~(1) A report exists and concludes that the equipment listed as Seismic Category I in Table 2.4.13-1 is installed as designed.~~ ~~(2)~~a. Tests/analysis ~~A~~ reports exists and concludes 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. 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, 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.
4.3	The reactor trip contactors in the reactor trip contactor modules open when reactor trip signals from at least two of the four PS divisions are received by the module.	An operational test of the as-built reactor trip contactor modules will be performed using test signals. 14.03.05-23	The reactor trip contactors in the reactor trip contactor modules open when reactor trip test signals from the PS ~~in~~ for any one or more of the following divisional