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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)

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.

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.

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?

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.

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.

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?

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.

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.

IThe 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.

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.

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.

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?

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?

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 :

<u>For the second column, "Inspection, Tests, Analysis":</u>

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

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'.

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.

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?

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.

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.

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.

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.

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.

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.

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.

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.

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?

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.

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.

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 <u>' for any one or more</u> of the following divisional combinations are received by the module:' Evaluate this deficiency and revise/respond as necessary.