REVISED RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**317-8271**
SRP Section:	**14.03.05 – Instrumentation and Controls – Inspections, Tests, Analyses, and Acceptance Criteria**
Application Section:	**14.03.05**
Date of RAI Issue:	**11/17/2015**

Question No. 14.03.05-14

Provide design descriptions and corresponding inspections, tests, analyses, and acceptance criteria (ITAAC) to verify the as-built plant protection system (PPS) is provided with the minimum number and locations of sensors required for protective variables that have spatial dependence.

10 CFR 50.55a(h)(3) states, in part, that an application filed on or after May 13, 1999, for design certifications must meet the requirements for safety systems in IEEE Std. 603-1991 and the correction sheet dated January 30, 1995. IEEE Std. 603-1991, Clause 4.6, states that for those variables in Clause 4.4 that have a spatial dependence (that is, where the variable varies as a function of position in a particular region), the minimum number and locations of sensors required for protective purposes shall be identified. The staff could not identify design descriptions and corresponding ITAAC in APR1400 FSAR Tier 1 to verify the as-built PPS is provided with the minimum number and locations of sensors required for protective variables that have spatial dependence to meet the requirements of IEEE Std. 603-1991, Clause 4.6. As such, the staff requests the applicant to provide this information in Tier 1 of the APR1400 FSAR.

Response – Rev. 1

As described in Item 6 of A.4 in the Safety I&C System technical report, the number and location of the sensors provided to monitor those variables specified in Clause 4.4 of IEEE Std. 603-1991 are given in Tables 7.2-3 and 7.3-4 of the DCD Tier 2.

A design description and its corresponding ITAAC item will be added to DCD Tier 1 Section 2.5.1 for identification of the number and locations of the sensors required for protective purposes that have spatial dependence to meet the requirements of IEEE Std. 603-1991, Clause 4.6. The number designation for the design description and ITAAC item are changed due to the added information provided in the response to RAI 301-8280, Question 07.01-44.

Table 2.5.1-2, “Reactor Trip System Variables” of DCD Tier 1 will also be revised to identify the protective variables that have a spatial dependence to meet the requirements of IEEE Std. 603-1991, Clause 4.6.

Impact on DCD

DCD Tier 1 Section 2.5.1 and Tables 2.5.1-2 and 2.5.1-5 will be revised as indicated in the attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical or Environmental Report.

17. The Class 1E equipment listed in Table 2.5.1-1 is protected from accident related hazards such as missiles, pipe breaks, and flooding.

18. The RTS and ESF initiation instrumentation (referenced in Tables 2.5.1-2 and 2.5.1-3) monitors the normal operating, anticipated operational occurrence (AOO), and postulated accident (PA) events.

19. The Class 1E instrument identified in Table 2.5.1-1 as being qualified for a harsh environment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of safety function for the time required to perform the safety function.

20 The PPS providing RTS and ESF initiation signals has the testing functions.

21 A single channel of RTS and ESF initiation is bypassed to allow testing, maintenance or repair and this capability does not prevent the RTS and ESF initiation from performing its safety function.

22. Input sensors from each channel of the RTS and ESF initiation as identified in Tables 2.5.1-2 and 2.5.1-3 are compared continuously in the information processing system (IPS) to allow detection of out-of-tolerance sensors.

23. Two sets of RTSS which consists of four RTSGs are diverse each other.

2.5.1.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.5.1-5 specifies the inspections, tests, analyses, and associated acceptance criteria for the RTS and ESF initiation.

25. The RTS is provided with the minimum number and locations of sensors for ~~those~~ the variables that have a spatial dependence ~~are~~ as identified and noted in Table 2.5.1-2.

Table 2.5.1-2

Reactor Trip System Variables

Trip Condition	Process Variable Input	Response Time Requirement
Variable Overpower	Ex-core Neutron Flux	Yes
High Logarithmic Power Level	Ex-core Neutron Flux	Yes
High Local Power Density (from CPCS)	Ex-core Neutron Detectors CEA subgroup position [2]	Yes Yes
Low Departure from Nucleate Boiling Ratio (from CPCS)	Ex-core Neutron Detectors Cold leg temperature [1] Hot leg temperature [1] (4) Pressurizer Pressure [1] RCP speed [1] CEA subgroup position [2]	Yes Yes Yes Yes Yes Yes
High Pressurizer Pressure	PZR Pressure (NR) [1]	Yes
Low Pressurizer Pressure	PZR Pressure (WR) [1]	Yes
High Steam Generator 1 Level	SG Level (NR) [1]	Yes
High Steam Generator 2 Level	SG Level (NR) [1]	Yes
Low Steam Generator 1 Level	SG Level (WR) [1]	Yes
Low Steam Generator 2 Level	SG Level (WR) [1]	Yes
Low Steam Generator 1 Pressure	SG Pressure [1]	Yes
Low Steam Generator 2 Pressure	SG Pressure [1]	Yes
High Containment Pressure	Containment Pressure (NR) [3]	Yes
Low Reactor Coolant Flow 1	SG Differential Pressure [1]	Yes
Low Reactor Coolant Flow 2	SG Differential Pressure [1]	Yes

(1) Instruments as listed in Table 2.4.2-3

(2) Instruments (Reed Switch Position Transmitter) as listed in Table 2.4.2-2

(3) Instruments as listed in Table 2.11.2-3

(4) Variable with a spatial dependence.

Table 2.5.1-5 (10 of 10)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
21. A single channel of RTS and ESF initiation is bypassed to allow testing, maintenance or repair and this capability does not prevent the RTS and ESF initiation from performing its safety function.	21. A test will be performed on the 2-out-of-4 voting logic in the as-built RTS and ESF initiation by providing simulated process signals, identified in Tables 2.5.1-2 and 2.5.1-3, to at least two of three non-bypassed channels of the as-built RTS and ESF initiation input under the manual single division bypass operation from the as-built the maintenance and test panel (MTP) in the MCR.	21. When the 2-out-of-4 voting logic in the non-bypassed divisions of each as-built RTS and ESF initiation receives at least two of three actuation signals, identified in Tables 2.5.1-2 and Table 2.5.1-3, from the respective non-bypassed channels, the 2-out-of-4 voting logic in the non-bypassed divisions of each as-built RTS and ESF initiation provides the actuation signal for the reactor trip and automatic ESF functions identified in the tables.
22. Input sensors from each channel of the RTS and ESF initiation as identified in Tables 2.5.1-2 and 2.5.1-3 are compared continuously in the information processing system (IPS) to allow detection of out-of-tolerance sensors.	22. A test of the as-built IPS will be performed by providing The simulated inputs for each monitored variable identified in Tables 2.5.1-2 and 2.5.1-3 which includes one out-of-tolerance , at the as-built RTS and ESF initiation input.	22. An alarm for the out-of-tolerance sensor detection is displayed on the as-built IPS in the MCR when the IPS receives simulated input signals for each monitored variable identified in Tables 2.5.1-2 and 2.5.1-3 which includes one out-of-tolerance signal.
23. Two sets of RTSS which consists of four RTSGs are diverse each other.	23. Inspection of the as-built RTSS equipment will be performed.	23. Two sets of the as-built RTSS which consists of four RTSGs are diverse each other.: One set of RTSGs is supplied from a different manufacturer than the other set of RTSGs.
25. The RTS is provided with the minimum number and locations of sensors for ~~those~~ the variables that have a spatial dependence ~~are~~ as identified and noted in Table 2.5.1-2.	25. An inspection ~~of design documents~~ will be performed on the as-built equipment for the variables that have a spatial dependence as identified and noted in Table 2.5.1-2.	25. The ~~documentations exist and identify~~ as-built equipment for the variables that have a spatial dependence as identified and noted in Table 2.5.1-2 is installed in accordance with the minimum number and locations of sensors ~~for variables that are required to perform a safety-related function and have a spatial dependence.~~

REVISED RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	**317-8271**
SRP Section:	**14.03.05 – Instrumentation and Controls – Inspections, Tests, Analyses, and Acceptance Criteria**
Application Section:	
Date of RAI Issue:	**11/17/2015**

Question No. 14.03.05-22

Clarify how the requirements of 10 CFR Part 50, Appendix A, GDC 19 regarding the provision of equipment outside the control room to shutdown the reactor are verified in the as-built design.

GDC 19 states, in part, "A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents…Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures."

The following design descriptions and corresponding ITAAC were provided in APR1400 FSAR Tier 1:

- Section 2.5.1.1, Item 8, and the corresponding design commitment in FSAR Tier 1, Table 2.5.1-5, Item 8, state, "Each PPS division is controlled from either the MCR [(main control room)] or RSR [(remote shutdown room)], as selected from MCR/RSR master transfer switches." The ITA of this ITAAC states, "A test of the as-built PPS will be performed to demonstrate the transfer function between the MCR and RSR." The acceptance criteria for this ITAAC states, "The as-built master transfer switches transfer controls between the MCR and RSR separately for each as-built PPS division, as follows: [1] Controls at the RSR are disabled when controls are active in the MCR. [2] Controls at the MCR are disabled when controls are active in the RSR."

- Section 2.5.4.1, Item 8 and the corresponding design commitment in FSAR Tier 1, Table 2.5.4-4, Item 8, state, "Each ESF-CCS division is controlled from either the MCR or RSR, as selected from MCR/RSR master transfer switches." The ITA of this ITAAC states, "A test of the as-built system for one control within each ESF-CCS division will be performed to demonstrate the transfer of control capability between the MCR and

RSR." The acceptance criteria for this ITAAC states, "The as-built master transfer switches transfer controls between the MCR and RSR separately for each as-built ESF-CCS division, as follows: [1] Controls at the RSR are disabled when controls are active in the MCR. [2] Controls at the MCR are disabled when controls are active in the RSR."

- APR1400 FSAR Tier 1, Section 2.5.5.1, Item 3, and the corresponding design commitment in FSAR Tier 1, Table 2.5.5-2, Item 3, state, "The PCS [(power control system)] and PCCS [(process-component control system)] are controlled from either the MCR or RSR, as selected from master transfer switches." The ITA of this ITAAC states, "A test of the as-built system will be performed to demonstrate the transfer of control capability between the MCR and RSR." The acceptance criteria for this ITAAC states, "The as-built MCR/RSR master transfer switches transfer controls between the MCR and the RSR for as-built PCS and P-CCS, as follows: [1] Controls at the RSR are disabled when controls are active in the MCR for the as-built PCS and P-CCS. [2] Controls at the MCR are disabled when controls are active in the RSR for the as-built PCS and P-CCS."

Based on the above descriptions, it is unclear whether this ITAAC is intended to verify that the RSR will have controls for the PPS, ESF-CCS, PCS and P-CCS to meet the requirements of the GDC 19 since the design description and corresponding ITAAC only focuses on verifying the operation of the transfer switch. As such, the staff requests the applicant to provide design descriptions and corresponding ITAACs to verify that the as-built RSR contain sufficient controls to meet the requirements of GDC 19.

Response – Rev. 1

ITAAC Item 8 provided in Table 2.5.1-5 of DCD Tier 1 will be revised to include the control functions based on the transfer capability between the MCR and the RSR to be consistent with the design commitment, Section 2.5.1.1 Item 8 and in compliance with GDC 19.

Regarding engineered safety features-component control system and control system not required for safety, the descriptions and its corresponding ITAACs are provided for each system which has sufficient controls required for safe shutdown throughout subsections of Sections 2.4, 2.6, 2.7, and 2.11. Table 2.5.4-4, Item 8 and Table 2.5.5-2, Item 3 will also be revised to include the control functions based on the transfer capability between the MCR and the RSR in compliance with GDC 19.

Initial test program will be performed to verify that the as-built RSR is designed with capability for cold shutdown of the reactor to meet the requirements of GDC 19 in accordance with the procedure described in Chapter 14.2.12.4.7 of DCD Tier 2.

Impact on DCD

DCD Tier 1 Tables 2.5.1-5, 2.5.4-4, and 2.5.5-2 will be revised as indicated in the attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

Table 2.5.1-5 (5 of 10) and the MCR controls the PPS division

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
8. Each PPS division is controlled from either the MCR or the RSR as selected from master transfer switches.	8. A test of the as-built PPS will be performed to demonstrate the transfer and control function between the MCR and the RSR.	8. The as-built master transfer switches transfer controls between the MCR and the RSR separately for each as-built PPS division, as follows: - Controls at the RSR are disabled when controls are active in the MCR and the MCR controls the PPS division. - Controls at the MCR are disabled when controls are active in the RSR and the RSR controls the PPS division.
9. The PPS utilizes a 2-out-of-4 coincidence logic when no channels are in trip channel bypass. The PPS converts to a 2-out-of-3 coincidence logic whenever a trip channel bypass is present.	9. A test will be performed using simulated input signals for RPS and ESFAS process inputs to each channel of the BPs.	9. When a trip channel bypass is present, the PPS performs a coincidence signal utilizing 2-out-of-3 logic.
10. Accuracy, response time testing, surveillance testing, and maintenance are applied to determine setpoints for variables of RT and ESF initiation.	10. Inspection will be performed for the setpoint calculations for RT and ESF initiation listed in Tables 2.5.1-2 and 2.5.1-3 respectively.	10. A report exists and concludes that the setpoints for RT and ESF actuations listed in Tables 2.5.1-2 and 2.5.1-3 respectively account for accuracy, response time testing, surveillance testing, and maintenance.

Table 2.5.4-4 (3 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. Each ESF-CCS division receives ESFAS initiation signals from two divisions of the RMS as shown in Tables 2.7.6.4-2 and 2.7.6.5-2 and performs 1-out-of-2 logic taken twice except the fuel handling area emergency ventilation actuation signal which has one 1-out-of-2 logic to perform the BOP ESF actuation functions identified in Table 2.5.4-2.	5. A test will be performed using simulated input signals for initiation input to each division of the as-built ESF-CCS.	5. Each ESF-CCS division receives ESFAS initiation signals from two divisions of the RMS, performs 1-out-of-2 logic taken twice except the fuel handling area emergency ventilation actuation signal which has one 1-out-of-2 logic for each BOP ESF actuation function identified in Table 2.5.4-2 and sends the control signals to the ESF components.
6. Upon receipt of a SIAS, CSAS, or AFAS, the ESF-CCS initiates an automatic start of the EDGs and automatic EDG loading sequencer of ESF loads identified in Table 2.5.4-2.	6. A test will be performed using simulated input signals for initiation input to each division of the as-built ESF-CCS.	6. Each ESF-CCS division receives a SIAS, CSAS, or AFAS and initiate an automatic start of the EDGs and automatic loading sequencer of ESF loads identified in Table 2.5.4-2.
7. Upon detecting loss of power to Class 1E buses, the ESF-CCS initiates startup of the EDGs, shedding of electrical loads, transfer of Class 1E bus connections to the EDGs, and EDG loading sequencer to the reloading of safety-related loads to the Class 1E buses.	7. A test will be performed using simulated input signals for initiation input to each division of the as-built ESF-CCS.	7. Each ESF-CCS division receives loss of power to Class 1E buses, and initiate an automatic start of the EDGs, shedding of electrical loads, transfer of Class 1E bus connections to the EDGs, and sequencing to the reloading of safety-related loads to the Class 1E buses.
8. Each ESF-CCS division is controlled from either the MCR or RSR, as selected from MCR/RSR master transfer switches.	8. A test of the as-built ~~system for one control within each~~ ESF-CCS ~~division~~ will be performed to demonstrate the transfer ~~of~~ [and] control ~~capability~~ [function] between the MCR and RSR.	8. The as-built master transfer switches transfer controls between the MCR and RSR separately for each as-built ESF-CCS division, as follows: a. Controls in the RSR are disabled when controls are active in the MCR [and the MCR controls the ESF-CCS division]. b. Controls in the MCR are disabled when controls are active in the RSR [and the RSR controls the ESF-CCS division].

Table 2.5.5-2

Control System Not Required for Safety ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The major controllers of PCS and NPCS are arranged in separate controller groups as identified in Table 2.5.5-1.	1. Inspection of the as-built PCS and NPCS will be performed.	1. The as-built PCS and NPCS are arranged in separate controller groups as identified in Table 2.5.5-1.
2. The digital equipment and software used in the PCS and P-CCS are independent from those of the plant protection system (PPS) and the engineered safety features-component control system (ESF-CCS).	2. Inspection of the as-built PCS and P-CCS equipment will be performed. Inspection of the design documentation will be performed to confirm that the software is developed by independent design groups.	2. The as-built digital equipment and software used in the PCS and P-CCS are independent from those of the PPS and ESF-CCS based on: • PCS and P-CCS use a platform which is independent from the platform used in the PPS and ESF-CCS and • The design group(s) which developed the PCS and P-CCS software is independent from the design group(s) which developed the PPS and ESF-CCS software.
3. The PCS and P-CCS are controlled from either the MCR or RSR, as selected from MCR/RSR master transfer switches.	3. A test of the as-built ~~system~~ PCS and P-CCS will be performed to demonstrate the transfer ~~of~~ and control function ~~capability~~ between the MCR and RSR.	3. The as-built MCR/RSR master transfer switches transfer controls between the MCR and the RSR for as-built PCS and P-CCS, as follows: • Controls at the RSR are disabled when controls are active in the MCR ~~for the as-built PCS and P-CCS.~~ and the MCR controls the PCS and P-CCS. • Controls at the MCR are disabled when controls are active in the RSR ~~for the as-built PCS and P-CCS.~~ and the RSR controls the PCS and P-CCS.

REVISED RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: **317-8271**

SRP Section: **14.03.05**

Application Section:

Date of RAI Issue: **11/17/2015**

Question No. 14.03.05-28

Clarify how verification of adequate electrical independence of the as-built ESF-CCF is achieved as required by the IEEE Std 603-1991, Clause 5.6.

10 CFR 50.55a(h)(3) states, in part, that an application filed on or after May 13, 1999, for design certifications must meet the requirements for safety systems in IEEE Std 603-1991 and the correction sheet dated January 30, 1995. IEEE Std 603-1991, Clause 5.6.1, requires redundant portions of safety systems provided for a safety function be independent of and physically separated from each other to the degree necessary to retain the capability to accomplish the safety function during and following any design basis event requiring that safety function. IEEE Std 603-1991, Clause 5.6.3, requires the safety system design to be such that credible failures in and consequential actions by other systems, as documented in Clause 4.8 of the design basis, shall not prevent the safety systems from meeting the requirements of this standard. IEEE Std. 603-1991, Clause 5.6.3.1 states, in part, “Isolation devices used to effect a safety system boundary shall be classified as part of the safety system.”

APR1400 FSAR Tier 1, Section 2.5.4.1, Item 2 states that redundant Class 1E divisions listed in Table 2.5.4-1 and associated field equipment are physically separated and electrically isolated from each other and physically separated and electrically isolated from non-Class 1E equipment. The associated acceptance criteria in FSAR Tier 1, Table 2.5.4-4, Items 2.b and 2.c, state “A report exists and concludes that independence of as-built redundant Class 1E divisions listed in Table 2.5.4-1 and associated field equipment is achieved by independent power sources and electrical circuits for each division, and by fiber optic cable interfaces, qualified isolation devices at interfaces between redundant divisions, and at interfaces between safety and non-safety systems.” The staff finds that additional information is needed to clarify whether the qualified isolation devices at interfaces between redundant safety divisions and at interfaces between safety and non-safety systems are Class 1E qualified. In addition, it is not clear whether an inspection will be performed to verify that that Class 1E qualified isolation devices exist between redundant portions of safety systems and between safety and non-safety systems in the as-built ESF-CCS. As such, the staff requests the applicant to modify the FSAR Tier 1,

Table 2.5.4-4, Item 2 to clarify that these qualified isolation devices are Class 1E qualified as required by IEEE Std 603-1991, Clause 5.6.3.1, and to verify via inspection that Class 1E qualified isolation devices exist between redundant portions of safety systems and between safety and non-safety systems.

Response – Rev. 1

The isolation devices used between redundant portions of safety systems and between safety and non-safety systems are to be Class 1E. The description in Section 2.5.4.1 Item 2 and the ITAAC in Table 2.5.4-4 Item 2 will be revised to clearly identify and verify that the isolation devices used in these applications are Class 1E and are installed to prevent fault propagation.

Impact on DCD

Section 2.5.4.1 and Table 2.5.4-4 of the APR1400 DCD Tier 1 will be modified as indicated in the Attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical /Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

1. The seismic Category I equipment and components identified in Table 2.5.4-1 withstand seismic design basis loads without loss of the safety function.

2. Redundant Class 1E divisions listed in Table 2.5.4-1 and associated field equipment are physically separated and electrically isolated from each other and physically separated and electrically isolated from non-Class 1E equipment.

3. The Class 1E equipment and components identified in Table 2.5.4-1 are powered from its respective Class 1E train.

4. Each ESF-CCS division receives ESFAS initiation signals from four divisions of the PPS and performs selective 2-out-of-4 coincidence logic to perform NSSS ESF actuation functions identified in Table 2.5.4-2.

5. Each ESF-CCS division receives ESFAS initiation signals from two divisions of the RMS as shown in Tables 2.7.6.4-2 and 2.7.6.5-2 and performs 1-out-of-2 logic taken twice except the fuel handling area emergency ventilation actuation signal which has one 1-out-of-2 logic to perform the BOP ESF actuation functions identified in Table 2.5.4-2.

6. Upon receipt of a SIAS, CSAS, or AFAS, the ESF-CCS initiates an automatic start of the EDGs and automatic EDG loading sequencer of ESF loads identified in Table 2.5.4-2.

7. Upon detecting loss of power to Class 1E buses, the ESF-CCS initiates startup of the EDGs, shedding of electrical loads, transfer of Class 1E bus connections to the EDGs, and EDG loading sequencer to the reloading of safety-related loads to the Class 1E buses.

8. Each ESF-CCS division is controlled from either the MCR or RSR, as selected from MCR/RSR master transfer switches.

isolation devices

9. Once a BOP ESF actuation has been actuated (automatically or manually), the ESF actuation logic is latched in the actuated state and is not reset automatically

Class 1E qualified ~~isolators~~ such as fiber optic modems or interposing relays are applied at interfaces between redundant safety divisions and at interfaces between safety and non-safety systems.

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Table 2.5.4-4 (2 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2. (cont.)	2.b A test, analysis, or a combination of a test and analysis of the as-built redundant Class 1E divisions listed in Table 2.5.4-1and associated field equipment will be performed to verify its electrical independence.	2.b A report exists and concludes that independence of as-built redundant Class 1E divisions listed in Table 2.5.4-1 and associated field equipment is achieved by independent power sources and electrical circuits for each division, and by fiber-optic cable interfaces, conventional isolators, or other qualified isolation methods or devices at interfaces between redundant divisions, and at interfaces between safety and non-safety systems.
	~~2.e~~ 2.c.ii A test, analysis, or a combination of a test and analysis will be performed for the electrical isolation devices.	~~2.e~~ 2.c.ii A report exists and concludes that the electrical isolation devices prevent credible faults from propagating into a safety system division.
3. The Class 1E equipment and components identified in Table 2.5.4-1 are powered from its respective Class 1E train.	3. A test of the as-built ESF-CCS will be performed by providing a simulated test signal in only one Class 1E train at a time.	3. The Class 1E equipment and components identified in Table 2.5.4-1 are powered from its respective Class 1E train.
4. Each ESF-CCS division receives ESFAS initiation signals from four divisions of the PPS and performs selective 2-out-of-4 coincidence logic to perform NSSS ESF actuation functions identified in Table 2.5.4-2.	4. A test will be performed using simulated input signals for ESF actuation signal input to each division of the as-built ESF-CCS.	4. Each ESF-CCS division receives ESFAS initiation signal from four divisions of the PPS and performs selective 2-out-of-4 coincidence logic for each NSSS ESF actuation function identified in Table 2.5.4-2 and sends the control signals to the ESF components.

Class 1E qualified ~~isolators~~ isolation devices such as fiber optic modems or interposing relays are applied at interfaces between redundant safety divisions and at interfaces between safety and non-safety systems.

The ~~isolators~~ isolation devices used to affect safety system boundaries are Class 1E qualified.

2.c.i A inspection for Class 1E qualified isolation devices will be performed at interfaces between redundant safety divisions and at interfaces between safety and non-safety systems.

2.c.i Electrical isolation devices are installed to prevent propagation of faults between redundant safety divisions and interfaces between safety and non-safety systems.