Enclosure 1

List of Uncompleted ITAAC Items Included in the Pilot Project

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Enclosure 2

Completion Plans for Uncompleted ITAAC Items Listed in Enclosure 1

Subject: Uncompleted ITAAC 2.1.02.08c (Index No. 31)

ITAAC Statement

Design Commitment

8.c) Each RCP flywheel assembly can withstand a design overspeed condition.

Inspections/Tests/Analyses

Shop testing of each RCP flywheel assembly will be performed at the vendor facility at overspeed conditions.

Acceptance Criteria

Each RCP flywheel assembly has passed an overspeed condition of no less than 125% of operating speed.

ITAAC Completion Description

Shop testing of each RCP flywheel is performed to confirm that the flywheel assembly can withstand a design overspeed condition. Overspeed testing of each flywheel assembly is performed at the supplier's manufacturing facility. There are a total of 8 RCP flywheels. All are tested.

Each flywheel is tested at 2250 rpm (125% of synchronous speed of 1800 rpm) for five (5) minutes. Following the overspeed test, a visual inspection of each flywheel is performed for degradation. The results of the tests and inspections are documented in XXX-MP01-VQQ-001, RCP Casing Quality Release and Certificate of Conformance (Reference 1). The test results are available for NRC inspection as part of the ITAAC completion package (Reference 2).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. XXX-MP01-VQQ-001, RCP Casing Quality Release and Certificate of Conformance
2. ITAAC 2.1.02.083 Completion Package
3. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.2.01.06d.i [Index No. 105]

ITAAC Statement

Design Commitment

6.d) The non-Class 1E electrical penetrations identified in Table 2.2.1-1 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 containment pressure boundary integrity.

Inspections/Tests/Analyses

i) Type tests, analyses, or a combination of type tests and analyses will be performed on non-Class 1E electrical penetrations located in a harsh environment.

Acceptance Criteria

i) A report exists and concludes that the non-Class 1E electrical penetrations identified in Table 2.2.1-1 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 containment pressure boundary integrity.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the non-Class 1E electrical penetrations identified in Table 2.2.1-1 (Attachment 1) as being qualified for a harsh environment can withstand environmental conditions that would exist before, during, and following a design basis accident without the loss of containment pressure boundary integrity. The subject ITAAC requires that type tests, analyses, or a combination of type tests and analyses be performed on non-Class 1E electrical penetrations located in a harsh environment.

Equipment Qualification Summary Reports (EQSRs) and Equipment Qualification Data Packages (EQDPs) are created for the non-Class 1E electrical penetration assemblies identified in Table 2.2.1-1 as being qualified for a harsh environment. The reports conclude that the equipment can withstand the environmental conditions that would exist before, during, and following a design basis accident without loss of containment pressure boundary integrity function. The equipment is qualified using a combination of type testing and analysis. The qualification is performed on the non-Class 1E electrical penetrations in accordance with IEEE 323-1974 (Reference 1) and IEEE 317-1983 (Reference 2). This combination of type testing and analysis meets the requirements of 10 CFR 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants" (Reference 3). Additional information regarding the methods used to qualify equipment supplied for the AP1000 is provided in UFSAR Appendix 3D, "Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment" (Reference 4).

The EQSRs and EQDPs (References 5-8) contain the applicable test reports and associated documentation and conclude that the non-Class 1E electrical penetration assemblies in Table 2.2.1-1 are qualified to perform their required functions in a harsh environment. The EQDPs and the ESQRs comply with the requirements of the UFSAR Tier 2 Chapter 3 (Reference 4) and are available for NRC inspection as part of the ITAAC Completion Package (Reference 9).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations"
2. IEEE 317-1983, "IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations"
3. 10 CFR 50.49, "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants"
4. UFSAR
5. APP-EY01-VBR-002, "Equipment Qualification Data Package for Medium Voltage Electrical Penetration Assemblies for Use in the AP1000 Plant"
6. APP-EY01-VBR-001, "Equipment Qualification Summary Report for Medium Voltage Electrical Penetration Assemblies for Use in the AP1000 Plant"
7. APP-EY01-VBR-004, "Equipment Qualification Data Package for Low Voltage and Low Voltage Control and I&C Electrical Penetration Assembly for Use in the AP1000 Plant
8. APP-EY01-VBR-003, "Equipment Qualification Summary Report for Low Voltage Electrical Penetration Assemblies for Use in the AP1000 Plant"
9. ITAAC 2.2.01.06d.i Completion Package
10. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Attachment 1: Excerpt from COL Appendix C Table 2.2.1-1

Table 2.2.1-1

Equipment Name	Tag No.	Class 1E/Qual. for Harsh Envir.	Envir. Zone (see Table 3D.5-1 of UFSAR Tier 2)	Type of Qualification	EQDP/EQSR Report
Electrical Penetration P03	DAS-EY-P03Z	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P01	ECS-EY-P01X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P02	ECS-EY-P02X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P06	ECS-EY-P06Y	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P07	ECS-EY-P07X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P09	ECS-EY-P09W	No/Yes	1	Type Test & Analysis	Ref. 3 & 4
Electrical Penetration P10	ECS-EY-P10W	No/Yes	1	Type Test & Analysis	Ref. 3 & 4
Electrical Penetration P17	ECS-EY-P17X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P18	ECS-EY-P18X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P19	ECS-EY-P19Z	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P20	ECS-EY-P20Z	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P21	ECS-EY-P21Z	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P22	ECS-EY-P22X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P23	ECS-EY-P23X	No/Yes	1	Type Test & Analysis	Ref. 5 & 6
Electrical Penetration P24	ECS-EY-P24	No/Yes	1	Type Test & Analysis	Ref. 5 & 6

Table 2.2.1-1					
Equipment Name	**Tag No.**	**Class 1E/Qual. for Harsh Envir.**	**Envir. Zone (see Table 3D.5-1 of UFSAR Tier 2)**	**Type of Qualification**	**EQDP/EQSR Report**
Electrical Penetration P25	ECS-EY-P25W	No/Yes	1	Type Test & Analysis	Ref. 3 & 4
Electrical Penetration P26	ECS-EY-P26W	No/Yes	1	Type Test & Analysis	Ref. 3 & 4

Subject: Uncompleted ITAAC 2.2.04.09b.ii [Index No. 243]

ITAAC Statement

Design Commitment

9.b) During shutdown operations, the SGS removes decay heat by delivery of startup feedwater to the steam generator and venting of steam from the steam generators to the atmosphere.

Inspections/Tests/Analyses

ii) Type tests and/or analyses will be performed to demonstrate the ability of the power-operated relief valves to discharge steam from the steam generators to the atmosphere.

Acceptance Criteria

ii) A report exists and concludes that each power operated relief valve will relieve greater than 300,000 lb/hr at 1106 psia ±10 psi.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that during shutdown operations, the Steam Generator System (SGS) removes decay heat by delivery of startup feedwater to the steam generator and venting of steam from the steam generators to the atmosphere. This ITAAC requires type tests and/or analysis be performed to demonstrate the ability of the power-operated relief valves to discharge steam from the steam generators to the atmosphere.

A single Power-operated Relief Valve (PORV) is installed on the outlet piping of each steam generator to provide for controlled removal of reactor decay heat during normal Reactor Coolant System (RCS) cooldown when the main steam isolation valves are closed or the turbine bypass system is not available. Each power operated relief valve is verified to have a relief capacity greater than 300,000 lb/hr at 1106 psia in order to satisfy its non-safety related function of decay heat removal.

ASME QME-1-2007 (Reference 1) Functional Qualification Testing is performed on a test valve as part of Type Testing to validate sizing and performance. A smaller test valve is installed in a test flow loop which is heated to the test temperature using saturated steam. The test valves are then opened and the inlet pressure adjusted to the test pressure. Valve flow rate and inlet pressure are measured and recorded throughout this test. Test results are then extrapolated to make them applicable to the actual PORVs in accordance with ASME QME-1-2007 (Reference 1). The extrapolated flow is determined to be ### lb/hr at 1106 psia which is greater than the acceptance criteria of ≥ 300,000 lb/hr.

Test results are summarized in the PORV Equipment Qualification Data Package (EQDP) (Reference 2) and the Equipment Qualification Summary Report (EQSR) (Reference 3), which are available for NRC inspection as part of the ITAAC Completion Package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. ASME-QME-1-2007, “Qualification of Active Mechanical Equipment used in Nuclear Power Plants”
2. Equipment Qualification Data Package (EQDP) XXX
3. Equipment Qualification Summary Report (EQSR) XXX
4. ITAAC 2.2 04.09b.ii Completion Package
5. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.2.05.07a.ii [Index No. 266]

ITAAC Statement

Design Commitment

7.a) The VES provides a 72-hour supply of breathable quality air for the occupants of the MCR.

Inspections/Tests/Analyses

ii) Analysis of storage capacity will be performed based on manufacturers data.

Acceptance Criteria

ii) The calculated storage capacity is greater than or equal to 327,574 scf.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the Main Control Room Emergency Habitability System (VES) provides a 72-hour supply of breathable quality air for the occupants of the Main Control Room (MCR). This ITAAC requires an analysis of storage capacity be performed based on manufacturer's data.

Verification that the minimum volume of compressed air contained in the compressed air storage tanks ensures that there is an adequate supply of breathable air to maintain MCR habitability for a period of 72 hours. In order to demonstrate that the VES storage capacity contains a sufficient amount of breathable quality air to be delivered for a total of 72 hours at the design flow rates of the system, the minimum volume of stored compressed air is shown to be at or above the volume of 327,574 standard cubic feet (scf).

After fabrication, the water volume of each storage tank is measured by the vendor. The volumes of the tanks are then added together and converted to an air volume. The volumes and conversion calculation details are recorded in the Quality Release and Certificate of Conformance Data Package VS2-XXX-VQQ-001 (Reference 1).

The results verify the volume of the VES Air Tanks is XXX,XXX scf which is greater than or equal to the acceptance criteria of 327,574 scf.

VS2-XXX-VQQ-001 (Reference 1) is available for NRC inspection as part of the ITAAC completion package (Reference 2).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. Quality Release and Certificate of Conformance Data Package VS2-XXX-VQQ-001
2. ITAAC 2.2.05.07a.ii Completion Package
3. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Subject: Uncompleted ITAAC 2.3.05.02.ii (Index No. 341)

ITAAC Statement

Design Commitment

2. The seismic Category I equipment identified in Table 2.3.5-1 can withstand seismic design basis loads without loss of safety function.

Inspections/Tests/Analyses

ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.

Acceptance Criteria

ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate the seismic Category I equipment identified in Table 2.3.5-1 can withstand seismic design basis loads without loss of safety function. This ITAAC requires type tests, analyses, or a combination of type tests and analyses to be performed on seismic Category I equipment.

The seismic Category I equipment (Polar Crane, Cask Handling Crane, Maintenance Hatch Hoist and Equipment Hatch Hoist) listed in Table 2.3.5-1 (Attachment 1) is qualified by analysis to demonstrate that these components are designed to maintain their load carrying function during a safe shutdown earthquake. The equipment is qualified based on AP1000 standard plant seismic input and Design Response Spectra, as indicated in Section 3.7.2, “Seismic System Analysis”, of the UFSAR (Reference 1). The qualification is performed based on the guidance of IEEE Standard 344-1987, “IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations” (Reference 2), and Regulatory Guide 1.100 Rev. 2, “Seismic Qualification of Electrical and Mechanical Equipment for Nuclear Power Plants” (Reference 3).

The methods used to qualify safety-related equipment supplied for the AP1000 are provided in Appendix 3D, “Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment”, of the UFSAR (Reference 1).

Seismic analyses are conducted for the Polar Crane, Cask Handling Crane, Maintenance Hatch Hoist and Equipment Hatch Hoist and are documented in the following seismic analysis technical reports: APP-MH01-S2C-006, "Polar Crane Structural Qualification and Bridge Crane Wheel Forces" (Reference 4), APP-MH02-S2C-002, "Cask Handling Crane Structural Qualification and Bridge Crane Wheel Forces" (Reference 5) and APP-MH40-S2C-002, "AP1000 Hatch Hoist and Hoist Platform Structural Qualification" (Reference 6).

These seismic analysis reports exist and conclude that the seismic Category I equipment identified in Table 2.3.5-1 can withstand seismic design basis loads without loss of safety function. These reports are available for NRC inspection as part of the ITAAC Completion Package (Reference 7).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. UFSAR
2. IEEE STD 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"
3. Regulatory Guide 1.100 Rev. 2, "Seismic Qualification of Electrical and Mechanical Equipment for Nuclear Power Plants"
4. APP-MH01-S2C-006, "Polar Crane Structural Qualification and Bridge Crane Wheel Forces"
5. APP-MH02-S2C-002, "Cask Handling Crane Structural Qualification and Bridge Crane Wheel Forces"
6. APP-MH40-S2C-002, "AP1000 Hatch Hoist and Hoist Platform Structural Qualification"
7. ITAAC 2.3.05.02.ii Completion Package
8. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Table 2.3.5-1				
Equipment Name	Tag. No.	Seismic Cat. I	Class 1E/Qual. For Harsh Envir.	Safety Function
Containment Polar Crane	MHS-MH-01	Yes	No/No	Avoid uncontrolled lowering of heavy load
Cash Handling Crane	MHS-MH-02	Yes	No/No	Avoid uncontrolled lowering of heavy load
Equipment Hatch Hoist	MHS-MH-05	Yes	No/No	Avoid uncontrolled lowering of heavy load
Maintenance Hatch Hoist	MHS-MH-06	Yes	No/No	Avoid uncontrolled lowering of heavy load

Subject: Uncompleted ITAAC 2.3.05.03c.i [Index No. 349]

ITAAC Statement

Design Commitment

3.c) The equipment hatch hoist is single failure proof.

Inspections/Tests/Analyses

i) Validation of double design factors is provided for hooks where used as load bearing components. Validation of redundant factors is provided for load bearing components such as:
- Hoisting ropes
- Sheaves
- Equalizer assembly
- Holding brakes

Acceptance Criteria

i) A report exists and concludes that the equipment hatch hoist is single failure proof. A certificate of conformance from the vendor exists and concludes that the equipment hatch hoist is single failure proof.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the equipment hatch hoist is single failure proof. The subject ITAAC requires that validation of double design factors is provided for hooks where used as load bearing components. Validation of redundant factors is provided for load bearing components such as:

- Hoisting ropes
- Sheaves
- Equalizer assembly
- Holding brakes

The equipment hatch hoist handles a critical load and is a single-failure-proof design in conformance with the guidelines of NRC NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants,” (Reference 1) supplemented by ASME NOG-1 “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)” (Reference 2). The requirements to follow NUREG-0554 and ASME NOG-1 for the design of the equipment hatch hoist are imposed in the Equipment Hatch Hoist Design Specification (Reference 3).

The equipment hatch hoist supplier provides a single failure proof report, APP-MH40-VDR-001 (Reference 4). This report contains information from a seismic design report, mechanical calculations and design drawings. This information is included in Domestic AP1000 Equipment and Maintenance Hatch Hoist Quality Release and Certificate of Conformance Data Package APP-MH40-VQQ-001 (Reference 5), confirming that the single failure proof design requirements are met. This report includes validation of double design factors for hooks and redundant design factors load bearing components, such as hoisting ropes, sheaves, equalizer assemblies, and holding brakes. The supplier provided Equipment Hatch Hoist Certificate of Conformance (COC) (Reference 5) validates single failure proof criteria are supported for the final manufactured hoist.

The Single Failure Proof Report (Reference 4) and the Quality Release and Certificate of Conformance (Reference 5) exist and conclude that the equipment hatch hoist is single failure proof. These documents are available for NRC inspection as part of is the ITAAC Completion Package (Reference 6).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. NRC NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants”
2. ASME NOG-1-1998, “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)”
3. APP-MH40-Z0-101, “Design Specification for AP1000 Equipment Hatch Hoist and Maintenance Hatch Hoist for Mechanical Handling System (MHS)”
4. APP-MH40-VDR-001, AP1000 Single Failure Proof Report for Equipment and Maintenance Hatch Hoists
5. Domestic AP1000 Equipment and Maintenance Hatch Hoist ITAAC Quality Release and Certificate of Conformance Data Package APP-MH40-VQQ-001
6. ITAAC 2.3.05.03c.i Completion Package
7. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.3.05.03d.i [Index No. 351]

ITAAC Statement

Design Commitment

3.d) The maintenance hatch hoist is single failure proof.

Inspections/Tests/Analyses

i) Validation of double design factors is provided for hooks where used as load bearing components. Validation of redundant factors is provided for load bearing components such as:
- Hoisting ropes
- Sheaves
- Equalizer assembly
- Holding brakes

Acceptance Criteria

i) A report exists and concludes that the maintenance hatch hoist is single failure proof. A certificate of conformance from the vendor exists and concludes that the maintenance hatch hoist is single failure proof.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the maintenance hatch hoist is single failure proof. The subject ITAAC requires that validation of double design factors is provided for hooks where used as load bearing components. Validation of redundant factors is provided for load bearing components such as:

- Hoisting ropes
- Sheaves
- Equalizer assembly
- Holding brakes

The maintenance hatch hoist handles a critical load and is a single-failure-proof design in conformance with the guidelines of NRC NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants,” (Reference 1) supplemented by ASME NOG-1 “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)” (Reference 2). The requirements to follow NUREG-0554 and ASME NOG-1 for the design of the maintenance hatch hoist are imposed in the Maintenance Hatch Hoist Design Specification (Reference 3).

The maintenance hatch hoist supplier provides a single failure proof report, APP-MH40-VDR-001 (Reference 4). This report contains information from a seismic design report, mechanical calculations and design drawings. This information is included in Domestic AP1000 Equipment and Maintenance Hatch Hoist Quality Release and Certificate of Conformance Data Package APP-MH40-ITA-001 (Reference 5), confirming that the single failure proof design requirements are met. This report includes validation of double design factors for hooks, and redundant design factors for load bearing components, such as hoisting ropes, sheaves, equalizer assemblies, and holding brakes. The supplier provided Maintenance Hatch Hoist Certificate of Conformance (COC) (Reference 5) also validates single failure proof criteria are supported for the final manufactured hoist.

The Single Failure Proof Report (Reference 4) and the Quality Release and Certificate of Conformance (Reference 5), exist and conclude that the maintenance hatch hoist is single failure proof. These documents are available for NRC inspection as part of the ITAAC Completion Package (Reference 6).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. NRC NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants”
2. ASME NOG-1-1998, “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)”
3. APP-MH40-Z0-101, Design Specification for AP1000 Equipment Hatch Hoist and Maintenance Hatch Hoist for Mechanical Handling System (MHS)
4. APP-MH40-VDR-001, AP1000 Single Failure Proof Report for Equipment and Maintenance Hatch Hoists
5. Domestic AP1000 Equipment and Maintenance Hatch Hoist Quality Release and Certificate of Conformance Data Package APP-MH40-ITA-001
6. ITAAC 2.3.05.03d.i Completion Package
7. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.3.06.09a.i [Index No. 372]

ITAAC Statement

Design Commitment

9.a) The RNS provides LTOP for the RCS during shutdown operations.

Inspections/Tests/Analyses

i) Inspections will be conducted on the low temperature overpressure protection relief valve to confirm that the capacity of the vendor code plate rating is greater than or equal to system relief requirements.

Acceptance Criteria

i) The rated capacity recorded on the valve vendor code plate is not less than the flow required to provide low-temperature overpressure protection for the RCS, as determined by the LTOPS evaluation based on the pressure-temperature curves developed for the as-procured reactor vessel material.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the Normal Residual Heat Removal System (RNS) provides low temperature overpressure protection (LTOP) for the Reactor Coolant System (RCS) during shutdown operations. This ITAAC requires inspections be conducted on the low temperature overpressure protection relief valve to confirm that the capacity of the vendor code plate rating is greater than or equal to system relief requirements.

The rated capacity recorded on the valve vendor code plate of the RNS LTOP valve must exceed 850 gpm, which was determined in the AP1000 LTOPS Analysis/Normal RNS Relief Valve Sizing Evaluation (Reference 1). The required relief capacity of the relief valve is used as a design input to determine the set pressure of 500 psig ± 3% psig. The RNS LTOPS relief valve capacity is verified by testing to be ≥ 850 gpm. This is determined by performing testing of the valve assembly at the vendor's manufacturing facility. Testing is performed in accordance with Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, which requires the assembled valve to be mounted to a test stand and cycled three times while measuring the flow rate through the valve. The results are documented in the NV-1 Code Data Report XXX (Reference 2).

Tests are performed to confirm that the value of the valve vendor code plate rating for the valve is greater than or equal to the system relief requirement, thus enabling the valve to provide overpressure protection in accordance with Section III of the ASME Boiler and Pressure Vessel Code. The rated capacity is also documented on the valve vendor code plate.

Code stamping of the Reactor Vessel, as documented in the N-1/N-1A Code Data Report YYY (Reference 3), confirms that the as-procured vessel material is consistent with the design information in the evaluation to determine the required LTOP capacity.

Inspection of the rated capacity recorded on the valve vendor code plate, as supported by the NV-1 Code Data Report XXX (Reference 2), verifies that the rated capacity recorded on the valve vendor code plate is not less than the flow required to provide low-temperature overpressure protection for the RCS. This is determined by the LTOPS evaluation based on the pressure-temperature curves developed for the as-procured reactor vessel material. This report is available for NRC inspection as part of the ITAAC completion package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. APP-RNS-M3C-002, “AP1000 LTOPS Analysis/Normal RNS Relief Valve Sizing Evaluation”
2. NV-1 Code Data Report XXX
3. N-1/N-1A Code Data Report YYY
4. ITAAC 2.3.06.09a.i Completion Package
5. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.3.06.09a.ii [Index No. 373]

ITAAC Statement

Design Commitment

9.a) The RNS provides LTOP for the RCS during shutdown operations.

Inspections/Tests/Analyses

ii) Testing and analysis in accordance with the ASME Code Section III will be performed to determine set pressure.

Acceptance Criteria

ii) A report exists and concludes that the relief valve opens at a pressure not greater than the set pressure required to provide low-temperature overpressure protection for the RCS, as determined by the LTOPS evaluation based on the pressure-temperature curves developed for the as-procured reactor vessel material.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate that the Normal Residual Heat Removal System (RNS) provides low temperature overpressure protection (LTOP) for the Reactor Coolant System (RCS) during shutdown operations. This ITAAC requires testing and analysis in accordance with ASME Code Section III be performed to determine set pressure. Testing and analysis is performed to demonstrate that the relief valve opens at a pressure not greater than the set pressure required to provide low-temperature overpressure protection for the RCS, as determined by the LTOPS evaluation based on the pressure-temperature curves developed for the as-procured reactor vessel material.

The AP1000 LTOPS Analysis/Normal RNS Relief Valve Sizing Evaluation (Reference 1) determines the required relief capacity of the relief valve, which is used as a design input to determine the set pressure of 500 pounds per square inch gauge (psig) ± 3% psig. The RNS LTOPS relief valve set pressure is verified to be 500 psig ± 3% psig. This is determined by performing testing of the valve assembly at the supplier's manufacturing facility. Testing is completed in accordance with Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (1998 Edition with 2000 Addenda), which requires the assembled valve to be mounted to a test stand and cycled three times to verify the opening pressure. The results are documented on the NV-1 Code Data Report XXX (Reference 2). The RNS LTOPS relief valve set pressure is determined to be XXX psig. Code stamping of the Reactor Vessel, as documented in the N-1/N-1A Code Data Report YYY (Reference 3), confirms that the as-procured vessel material is consistent with the design information used to determine the required LTOP setpoint.

The NV-1 Code Data Report XXX (Reference 2) concludes that the relief valve opens at a pressure not greater than the set pressure required to provide low-temperature overpressure protection for the RCS, as determined by the LTOPS evaluation (Reference 1) based on the pressure-temperature curves developed for the as-procured reactor vessel material. This report is available for NRC inspection as part of the ITAAC completion package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. APP-RNS-M3C-002, “AP1000 LTOPS Analysis/Normal RNS Relief Valve Sizing Evaluation”
2. NV-1 Code Data Report XXX
3. N-1/N-1A Code Data Report YYY
4. ITAAC 2.3.06.09a.ii Completion Package
5. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.3.07.07b.i [Index No. 402]

ITAAC Statement

Design Commitment

7.b) The SFS provides spent fuel cooling for 7 days by boiling the spent fuel pool water and makeup water from on-site storage tanks.

Inspections/Tests/Analyses

i) Inspection will be performed to verify that the spent fuel pool includes a sufficient volume of water.

Acceptance Criteria

i) The volume of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is greater than or equal to 129,500 gallons.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate the Spent Fuel Pool Cooling System (SFS) provides spent fuel cooling for 7 days by boiling the spent fuel pool water and makeup water from on-site storage tanks. This ITAAC requires an inspection to be performed to verify the spent fuel pool includes a sufficient volume of water.

An inspection of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is conducted to determine the as-built dimensions of the described volume. The inspection is performed by taking measurements using survey equipment in accordance with Construction Site Instruction (CSI) 3-24, “Site-Specific Field Surveying Instructions” (Reference 1).

The as-built volume of the spent fuel pool is calculated using the inspection results. The calculated volume of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is compared to the minimum volume of 129,500 gallons specified in the Acceptance Criteria. The results of the comparison are documented in Inspection Report XXX for the Spent Fuel Pool and Fuel Transfer Canal Volume (Reference 2), which is available for NRC inspection as part of the ITAAC Completion Package (Reference 3). The results verify the volume of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is greater than or equal to 129,500 gallons. The actual calculated volume is ###,### gallons.

[Alternate Methodology]: The volume of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is determined by filling this volume with a specified amount of water measured with a calibrated flow meter. Prior to beginning the measurement of the total volume, the spent fuel pool is filled to an elevation corresponding to the top of the fuel in the Spent Fuel Storage Racks; as well as the fuel transfer canal, to an elevation corresponding to the top of the of the weir gate bottom structure. The volume of water in the cask loading pit is not included. The recorded volume of water added is compared to the Acceptance Criteria. The results of the comparison are documented in Inspection Report XXX for the Spent Fuel Pool and Fuel Transfer Canal Volume (Reference 2), which is available for NRC inspection as part of the ITAAC Completion Package (Reference 3). The results verify the volume of the spent fuel pool and fuel transfer canal above the fuel and to the elevation 6 feet below the operating deck is greater than or equal to 129,500 gallons. The actual measured volume is ###,### gallons.

<u>List of ITAAC Findings</u>

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

<u>References (available for NRC inspection)</u>

1. Construction Site Instruction (CSI) 3-24, “Site-Specific Field Surveying Instructions”
2. Inspection Report XXX for the Spent Fuel Pool and Fuel Transfer Canal Volume
3. ITAAC 2.3.07.07b.i Completion Package
4. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.5.02.07a (Index No. 534)

ITAAC Statement

Design Commitment

7.a) The PMS provides process signals to the PLS through isolation devices.

Inspection/Test/Analysis

Type tests, analyses, or a combination of type tests and analyses of the isolation devices will be performed.

Acceptance Criteria

A report exists and concludes that the isolation devices prevent credible faults from propagating into the PMS.

ITAAC Completion Description

Type testing and analysis of isolation devices are performed to verify that devices prevent credible faults from propagating into the PMS from the Plant Control System (PLS). Electrical isolation is used to separate functions that are required to be available following faults in connected functions. Methods of electrical isolation are:

- Fiber-optic transmission
- Relay isolation
- Inductive isolation (transformer coupled)

The type testing, governed by IEEE 384-1981 (Reference 1), is performed on isolation barrier components (relay isolation and inductive isolation (transformer coupled)) to qualify the barrier components and the barrier component protection utilized in the isolation barrier assemblies.

The testing demonstrates that the most severe credible faults injected into the non-Class 1E side of the isolation barrier do not degrade the intended safety function. This is accomplished by completing the prescribed tests under conditions where the non-Class 1E side of the isolation barrier is exposed to credible faults in the form voltage and current. The fault voltage levels tested are 580 VAC and 300 VDC common-mode and differential faults, while the Class 1E side of the isolation barrier is monitored for perturbations. The current levels tested and/or analyzed are [Insert AC Current Here] A AC and [Insert DC Current Here] A DC common-mode and differential faults, while the Class 1E side of the isolation barrier is monitored for perturbations.

Isolation devices are also tested for surge protection where the isolation barriers are subjected to credible surges applied to the non-Class 1E side of the relay isolator (Reference 2).

Analysis is performed for fiber-optic communication media, which provides a high level of electrical isolation. Electrical faults that occur on one end of the link cannot be transmitted into the equipment on the other end. This maintains the independence of the inter-connected system components by preventing faults from propagating into multiple components and leading to a loss of safety function. Due to the inherent properties of fiber optic cable, fault testing is not necessary.

The results of type testing and analysis are documented in APP-PMS-VBR-015, "Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant" (Reference 3) and conclude that the isolation devices prevent credible faults from propagating into the PMS. This report is available for NRC inspection as part of the ITAAC completion package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found one open (1) Notice of Nonconformance (NON) associated with this ITAAC:

1. NON 99900403/2015-204-01
   Corrective actions for this finding will be completed prior to ITAAC Closure Notification submission.

References (available for NRC inspection)

1. IEEE 384-1981, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits"
2. IEC Standard 61000-4-5 Electromagnetic Compatibility (EMC) - Part 4 Testing and Measurement Techniques, Section 5: Surge Immunity Testing
3. APP-PMS-VBR-015, "Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant"
4. ITAAC 2.5.02.07a Completion Package
5. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Subject: Uncompleted ITAAC 2.5.02.07b (Index No. 535)

ITAAC Statement

Design Commitment

7.b) The PMS provides process signals to the DDS through isolation devices.

Inspections/Tests/Analyses

Type tests, analyses, or a combination of type tests and analyses of the isolation devices will be performed.

Acceptance Criteria

A report exists and concludes that the isolation devices prevent credible faults from propagating into the PMS.

ITAAC Completion Description

Analysis of isolation devices is performed to verify that the Protection and Safety Monitoring System (PMS) provides process signals to the Data Display and Processing System (DDS) through isolation devices. The isolation method used between PMS and DDS is fiber-optic transmission.

Analysis is performed for fiber optic communication media, which provides a high level of electrical isolation. Electrical faults that occur on one end of the link cannot be transmitted into the equipment on the other end. This maintains the independence of the inter-connected system components by preventing fault from propagating into multiple components and leading to a loss of safety function. Due to inherent properties of fiber optic cable, fault testing is not necessary.

The results of the analysis, as well as a discussion on fiber optic cables used as isolators, are documented in APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant” (Reference 1), which concludes that the isolation devices prevent credible faults from propagating into the PMS. This report is available for NRC inspection as part of the ITAAC completion package (Reference 2).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant”
2. ITAAC 2.5.02.07b Completion Package
3. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.5.02.07c (Item No. 536)

ITAAC Statement

Design Commitment

7.c) Data communication between safety and nonsafety systems does not inhibit the performance of the safety function.

Inspections/Tests/Analyses

Type tests, analyses, or a combination of type tests and analyses of the PMS gateways will be performed.

Acceptance Criteria

A report exists and concludes that data communication between safety and nonsafety systems does not inhibit the performance of the safety function.

ITAAC Completion Description

A combination of type tests and analyses of the PMS gateways is performed to verify that data communication between safety and nonsafety systems does not inhibit the performance of the safety function The AP1000 includes data flow between safety and non-safety systems for three different purposes:

- Data Flows from Safety to Non Safety Systems for Control Purposes (PMS to Plant Control System (PLS))
- Data Flows from Safety to Non Safety Systems for Information System Purposes (PMS to Data Display and Processing System (DDS))
- Data Flows from Non Safety to Safety Systems for Component Control Purposes (PLS to PMS).

Electrical isolation is used to separate systems that are required to be available following faults in connected systems. Electrical isolation is specifically used for data flows for Control Purposes, Information Purposes, Safety System Actuation Purposes, and Component Control Purposes. Methods of electrical isolation are fiber-optic transmission, relay isolation and inductive isolation (transformer coupled). Fault testing to verify that each isolator capability is performed by exposing the barrier to both common mode as well as transverse faults at the levels determined to be worst case. A procedure for testing the isolators is established in accordance with IEEE Standard 384-1981 (Reference 1) and the results of the testing are documented in APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant” (Reference 2).

Analyses of the PMS Advant Ovation Interface (AOI) gateways are performed, and demonstrate that data communication between safety and non-safety systems does not inhibit the performance of the safety function. The analyses are documented in WCAP-16674 (Reference 3).

Analyses of the PMS inputs of non-Class 1E manual system level controls for Safety System Actuation Purposes are performed, and demonstrate that data communication between safety and non-safety systems does not inhibit the performance of the safety function. The analyses are documented in Reference 3.

These reports, which conclude that data communications between safety and nonsafety systems does not inhibit the performance of the safety functions, are available for NRC inspection as part of the ITAAC Completion Package (Reference 4)

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. IEEE Standard 384-1981, IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits
2. APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant”
3. WCAP-16674, Report specific to ITAAC 2.5.02.07c Summarizing methods used to verify communication with the safety systems does not inhibit the safety function
4. ITAAC 2.5.02.07c Completion Package
5. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.5.02.07d (Index No.537)

ITAAC Statement

Design Commitment

7.d) The PMS ensures that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls.

Inspections/Tests/Analyses

Type tests, analyses, or a combination of type tests and analyses of the PMS manual control circuits and algorithms will be performed.

Acceptance Criteria

A report exists and concludes that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls.

ITAAC Completion Description

A combination of type tests and analyses of the Protection and Safety Monitoring System (PMS) manual control circuits and algorithms is performed to verify the PMS ensures that the automatic safety function and the Class 1E manual controls both have priority over the non-Class 1E soft controls. The PMS function of prioritizing automatic safety functions and Class 1E controls over Plant Control System (PLS) non-Class 1E soft controls is performed by the Component Interface Module (CIM), which arbitrates between PMS and PLS demands. The port structure of the CIM assigns the lowest priority to non-Class 1E signals.

If a PMS command is asserted with a PLS command present, the PMS command will have priority. If a PMS command is reset with a PLS command present, the original PMS command will have priority. If a PLS command is reset and reasserted after the PMS command has been reset, the PLS command is active. That is, the CIM will not take action on any PLS command until all PLS commands are manually withdrawn and reasserted by the operator.

The PMS priority over PLS functionality described in the previous paragraph is proven (through analysis) as part of CIM Validation. The integration of the priority function of the installed CIM is proven (through type testing) during PMS Channel Integration Phase 2 (CIT-02), where the System-Level Engineered Safety Features (ESF) is validated. The results are documented in APP-PMS-XXX-###, "CIM Verification and Validation Report" (Reference 1) and the Protection Monitoring System-Level Engineered Safety Features Channel Integration Test Report (Reference 2). These reports, which conclude that the automatic safety function and the Class1E manual controls both have priority over the non-Class 1E soft controls, are available for NRC inspection as part of the ITAAC 2.5.02.07d Completion Package (Reference 3).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. APP-PMS-XXX-###, CIM Verification and Validation Report
2. PMS System-Level Engineered Safety Features Channel Integration Test Report
3. ITAAC 2.5.02.07d Completion Package
4. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.5.02.07e (Index No. 538)

ITAAC Statement

Design Commitment

7.e) The PMS receives signals from non-safety equipment that provides interlocks for PMS test functions through isolation devices.

Inspections/Tests/Analyses

Type tests, analyses, or a combination of type tests and analyses of the isolation devices will be performed.

Acceptance Criteria

A report exists and concludes that the isolation devices prevent credible faults from propagating into the PMS.

ITAAC Completion Description

A combination of type tests and analysis of the isolation devices is performed to verify that the Protection and Safety Monitoring System (PMS) receives signals from non-safety equipment that provides interlocks for PMS test functions through isolation devices. Electrical isolation is used to separate systems that are required to be available following faults in connected systems. The type of isolation chosen for incoming Plant Control System (PLS) signals is relay isolation.

The type testing, governed by IEEE 384-1981 (Reference 1), is performed on isolation barrier components (relay isolation and inductive isolation (transformer coupled)) to qualify the barrier components and the barrier component protection utilized in the isolation barrier assemblies.

The testing demonstrates that the most severe credible faults injected into the non-Class 1E side of the isolation barrier do not degrade the intended safety function. This is accomplished by completing the prescribed tests under conditions where the non-Class 1E side of the isolation barrier is exposed to credible faults in the form voltage and current. The fault voltage levels tested are 580 VAC and 300 VDC common-mode and differential faults, while the Class 1E side of the isolation barrier is monitored for perturbations. The current levels tested and/or analyzed are [Insert AC Current Here] A AC and [Insert DC Current Here] A DC common-mode and differential faults, while the Class 1E side of the isolation barrier is monitored for perturbations.

Isolation devices are also tested for surge protection where the isolation barriers are subjected to credible surges applied to the non-Class 1E side of the relay isolator (Reference 2).

The results of the testing and analysis are documented in in APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant” (Reference 3), which concludes that the isolation devices prevent credible faults from propagating into the PMS. This report is available for NRC inspection as part of the ITAAC completion package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found one open (1) Notice of Nonconformance (NON) associated with this ITAAC:

1. NON 99900403/2015-204-01
   Corrective actions for this finding will be completed prior to ITAAC Closure Notification submission.

References (available for NRC inspection)

1. IEEE Standard 384-1981, “IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits”
2. IEC Standard 61000-4-5 Electromagnetic Compatibility (EMC) - Part 4 Testing and Measurement Techniques, Section 5: Surge Immunity Testing
3. APP-PMS-VBR-015, “Isolation Summary Report for the Protection and Safety Monitoring System for Use in the AP1000 Plant”
4. ITAAC 2.5.02.07e Completion Package
5. NEI 08-01, “Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52”

Subject: Uncompleted ITAAC 2.5.02.14 [Index No. 553]

ITAAC Statement

Design Commitment

14. The Component Interface Module (CIM) is developed using a planned design process which provides for specific design documentation and reviews.

Inspections/Tests/Analyses

An inspection and or an audit will be performed of the processes used to design the hardware, development software, qualification and testing.

Acceptance Criteria

A report exists and concludes that CIM meets the below listed life cycle stages. Life cycle stages:

a. Design requirements phase, may be referred to as conceptual or project definition phase

b. System definition phase

c. Hardware and software development phase, consisting of hardware and software design and implementation

d. System integration and test phase

e. Installation phase

ITAAC Completion Description

An inspection is performed to demonstrate that the Component Interface Module (CIM) is developed using a planned design process which provides for specific design documentation and reviews. The inspection is performed of the processes used to design the hardware, development software, qualification and testing. The review consists of an inspection of the processes used during each CIM life cycle stage below:

a. Design requirements phase
    - During the design requirements phase, the project requirements of the CIM are developed and planning documents created.

b. System definition phase
   - During the system definition phase, the software and hardware requirements are developed.

c. Hardware and software development phase
   - During the hardware and software development phase, the software and hardware designs are developed.

d. System integration and test phase
   - During the system integration phase, both the software and hardware are integrated and tested.

e. Installation phase
   - During the installation phase, the FPGA design is installed into the hardware and verified through production testing.

The Component Interface Module Design Process Technical Report (Reference 1) documents the inspection of the processes used during each of the CIM life cycle stages identified in the acceptance criteria. The processes used to fulfill the requirements of the acceptance criteria are summarized in the table below:

ITAAC Requirement	Fulfillment
a. Design requirements phase	CIM-Safety Remote Node Controller (SRNC) Project Plans CIM-SRNC Requirement Specifications
b. System definition phase	CIM-SRNC Field Programmable Gate Array (FPGA) Development Plan CIM-SRNC FPGA Development Procedure
c. Hardware and software development phase	CIM-SRNC FPGA Development Plan CIM-SRNC Configuration Management Plan CIM-SRNC Design Tools CIM-SRNC Test Plan CIM-SRNC Management Plan
d. System integration and test phase	CIM and SRNC FPGA Build Procedures CIM-SRNC Test Plan CIM-SRNC Subsystem Test Procedure
e. Installation phase	FPGA Logic Loading Procedures Final Acceptance Testing Procedures

Reference 1 concludes that the CIM meets each of the life cycle stages. Reference 1 is available for NRC inspection as part of the ITAAC Completion Package (Reference 2).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review determined that two associated findings, listed below, have been identified.

1. Notice of Nonconformance 99900404/2014-201-01
2. Notice of Nonconformance 99900404/2014-201-02

The corrective actions for the ITAAC Findings are completed prior to submittal of the ITAAC Closure Notification.

References (available for NRC inspection)

1. APP-GW-GLR-611, "Component Interface Module Design Process Technical Report"
2. ITAAC 2.5.02.14 Completion Package
3. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Subject: Uncompleted ITAAC 2.6.01.02.ii (Index No.580)

ITAAC Statement

Design Commitment

2. The seismic Category I equipment, identified in Table 2.6.1-1 can withstand seismic design basis loads without loss of safety function.

Inspections/Tests/Analyses

ii) Type tests, analyses, or a combination of type tests and analyses of seismic Category I equipment will be performed.

Acceptance Criteria

ii) A report exists and concludes that the seismic Category I equipment can withstand seismic design basis loads without loss of safety function.

ITAAC Completion Description

Multiple ITAAC are performed to demonstrate the seismic Category I equipment identified in Table 2.6.1-1 can withstand seismic design basis loads without loss of safety function. This ITAAC requires type tests, analyses, or a combination of type tests and analyses to be performed on seismic Category I equipment.

The seismic Category I equipment identified in Table 2.6.1-1 (Attachment 1) is qualified by testing combined with analysis in accordance IEEE Standard 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations" (Reference 1) to demonstrate the equipment can withstand seismic design basis loads without loss of safety function. Additional information about the methods used to qualify safety-related equipment supplied for the AP1000 is provided in Appendix 3D, "Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment", of the UFSAR (Reference 2).

The following Main AC Power System (ECS) Equipment Qualification Summary Report (EQSR) and Equipment Qualification Data Package (EQDP) document the results of seismic testing with analysis for the seismic Category I equipment identified in Table 2.6.1-1:

- APP-ES02-VBR-003, "Equipment Qualification Data Package for the Reactor Coolant Pump (RCP) Circuit Breakers for Use in the AP1000 Plant" (Reference 3)

- APP-ES02-VBR-001, "Equipment Qualification Summary Report for the Reactor Coolant Pump (RCP) Circuit Breakers for Use in the AP1000 Plant" (Reference 4)

The EQSR and EQDP, which comply with the requirements of UFSAR Chapter 3 (Reference 2), exist and conclude that the seismic Category I equipment identified in Table 2.6.1-1 can withstand seismic design basis loads without loss of safety function. These reports are available for NRC inspection as part of the ITAAC completion package (Reference 5).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. IEEE STD 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"
2. UFSAR
3. APP-ES02-VBR-003, "Equipment Qualification Data Package for the Reactor Coolant Pump (RCP) Circuit Breakers for Use in the AP1000 Plant"
4. APP-ES02-VBR-001, "Equipment Qualification Summary Report for the Reactor Coolant Pump (RCP) Circuit Breakers for Use in the AP1000 Plant"
5. ITAAC 2.6.01.02.ii Completion Package
6. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"

Table 2.6.1-1				
Equipment Name	**Tag Number**	**Seismic Category I**	**Class 1E/Qual. For Harsh Envir.**	**Safety-Related Display**
Reactor Coolant Pump (RCP) Circuit Breaker	ECS-ES-31	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-32	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-41	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-42	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-51	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-52	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-61	Yes	Yes/No (Trip Open Only)	No
RCP Circuit Breaker	ECS-ES-62	Yes	Yes/No (Trip Open Only)	No

Subject: Uncompleted ITAAC C.3.8.01.01 (Index No. 842) Vogtle /Uncompleted ITAAC C.3.8.02.01 (Index No. 873) VCS

ITAAC Statement

Design Commitment

Systems, structures, and components (SSCs) that are required to be functional during and following a design basis event shall be protected against or qualified to withstand the dynamic and environmental effects associated with analyses of postulated failures in high and moderate energy piping.

Inspections/Tests/Analyses

Inspection of the as-designed pipe rupture hazard analysis report will be conducted. The report documents the analyses to determine where protection features are necessary to mitigate the consequence of a pipe break. Pipe break events involving high-energy fluid systems are analyzed for the effects of pipe whip, jet impingement, flooding, room pressurization, and temperature effects. Pipe break events involving moderate-energy fluid systems are analyzed for wetting from spray, flooding, and other environmental effects, as appropriate.

Acceptance Criteria

An as-designed pipe rupture hazard analysis report exists and concludes that the analysis performed for high and moderate energy piping confirms the protection of SSCs required to be functional during and following a design basis event.

ITAAC Completion Description

Analyses are performed to verify that systems, structures, and components (SSCs) that are required to be functional during and following a design basis event are protected against or qualified to withstand the dynamic and environmental effects associated with analyses of postulated failures in high and moderate energy piping. The as-designed pipe rupture hazard analysis report documents the analyses to determine where protection features are necessary to mitigate the consequence of a pipe break. Pipe break events involving high-energy fluid systems are analyzed for the effects of pipe whip, jet impingement, flooding, room pressurization, and temperature effects. Pipe break events involving moderate-energy fluid systems are analyzed for wetting from spray, flooding, and other environmental effects, as appropriate.

The methodology and criteria for the pipe rupture hazards analysis (PRHA) is defined in UFSAR subsections 3.6.1.3.2, 3.6.2.5, and 3.6.2.7 (Reference 1).

UFSAR Subsection 3.6.1.3.2 defines the design criteria for pipe rupture protection mechanisms. Protection is provided by either physical separation, or by a barrier, pipe whip restraint, or jet shield.

UFSAR Subsection 3.6.2.5 defines the methods and criteria for performing a pipe rupture hazards evaluation and preparing the as-designed pipe rupture hazards analysis report.

UFSAR Subsection 3.6.2.7 discusses the evaluation of the potential effects of spray from high- and moderate-energy through-wall cracks on essential systems and components.

APP-GW-GLR-075, AP1000 PRHA Summary Report for the Auxiliary Building – All Levels (Reference 2) and APP-GW-GLR-076, AP1000 PRHA Summary Report for the Containment Building – All Levels (Reference 3) are prepared to document results of the pipe rupture hazards evaluation. The following activities are included in the PRHA Summary Reports (References 2 and 3).

- Preparation of stress summary
- Identification pipe break locations in high energy piping
- Identification of wall crack locations in high and moderate energy piping
- Identification and location of essential systems, structures, and components
- Evaluation of pipe whip and jet impingement
- Evaluation of flooding, environmental effects, temperature and room pressurization
- Evaluation of wetting from spray
- Design and location of protective hardware

These analyses are performed in accordance with the criteria and methods defined in UFSAR subsections 3.6.1.3.2 and 3.6.2.5. SSCs are required to be functional during and following a design basis event are confirmed to be protected against or designed to withstand the dynamic and environmental effects of postulated failure in high and moderate energy piping.

These reports exist and conclude that the analysis performed for high and moderate energy piping confirms the protection of SSCs required to be functional during and following a design basis event. These reports are available for NRC inspection as part of the ITAAC completion package (Reference 4).

List of ITAAC Findings

In accordance with plant procedures for ITAAC completion, the Licensee performed a review of all findings pertaining to the subject ITAAC and associated corrective actions. This review found there are no relevant ITAAC findings associated with this ITAAC.

References (available for NRC inspection)

1. UFSAR
2. APP-GW-GLR-075, AP1000 PRHA Summary Report for the Auxiliary Building – All Levels
3. APP-GW-GLR-076, AP1000 PRHA Summary Report for the Containment Building – All Levels
4. ITAAC C.3.8.01.01 Completion Package
5. NEI 08-01, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52"