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U.S. Nuclear Regulatory Commission
11555 Rockville Pike
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Rockville, MD 20852

Subject: **Response to Portion of NRC Request for Additional Information Letter No. 236 Related to ESBWR Design Certification Application - RAI Number 14.3-402**

Enclosures 1 and 2 contain the GE Hitachi Nuclear Energy (GEH) response to RAI Number 14.3-402 from the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by NRC letter dated August 5, 2008.

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-625, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request For Additional Information Letter No. 236 Related To ESBWR Design Certification Application*, dated August 5, 2008

Enclosures:

1. Response to Portion of NRC Request for Additional Information Letter No. 236 Related to ESBWR Design Certification Application - RAI Number 14.3-402

2. Response to Portion of NRC Request for Additional Information Letter No. 236 Related to ESBWR Design Certification Application - DCD Tiers 1 & 2 Markups for RAI Number 14.3-402

cc:

| | |
|---|---|
| AE Cubbage | USNRC (with enclosures) |
| RE Brown | GEH/Wilmington (with enclosures) |
| DH Hinds | GEH/Wilmington (with enclosures) |
| eDRF Section: | 0000-0094-0910 (RAI 14.3-402) |

MFN 09-078

Enclosure 1

# Response to Portion of NRC Request for Additional Information Letter No. 236 Related to ESBWR Design Certification Application

## RAI Number 14.3-402

**NRC RAI 14.3-402**

*In reviewing the response to RAI 14.3-265, the staff finds that additional ITAAC are needed and there are many inconsistencies between Tier 1 and Tier 2 and within Tier 2 that need to be addressed. Note that RAIs 14.3-265 Supplement 1,14.3-403, 7.1-99, 7.1-100, and 7.1-101 are interrelated and should be considered collectively but for ease of tracking were split into multiple RAIs. DCD Tier 1, Tables 2.7.1-1 (Main Control Room), 2.16.2-2 (RBVS), 2.16.2-4 (CRHAVS), and 2.16.2-6 (EFUs) contain ITAAC, which states that, "... software is developed in accordance with the software development program described in Section 3.2." The ITAAC in DCD Tier 1, Table 3.2-1 each state that, "The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions." However, the identified systems are not included in Table 2.2.10-1, which indicates that they will not be included in the software development results summary reports. Revise DCD Tier 1 to provide results summary reports for all systems with ITAAC invoking the software development program described in DCD Tier 1, Section 3.2.*

**GEH Response**

*In reviewing the response to RAI 14.3-265, the staff finds that additional ITAAC are needed and there are many inconsistencies between Tier 1 and Tier 2 and within Tier 2 that need to be addressed.*

Concur.

*Note that RAIs 14.3-265 Supplement 1,14.3-403, 7.1-99, 7.1-100, and 7.1-101 are interrelated and should be considered collectively but for ease of tracking were split into multiple RAIs.*

Concur with the following exception: RAI number 14.3-403 is a typo and should actually refer to this RAI, 14.3-402.

*DCD Tier 1, Tables 2.7.1-1 (Main Control Room), 2.16.2-2 (RBVS), 2.16.2-4 (CRHAVS), and 2.16.2-6 (EFUs) contain ITAAC which states that, "... software is in accordance with the software development program described in Section 3.2." The ITAAC in DCD Tier 1, Table 3.2-1 each state that, "The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions." However, the identified systems are not included in Table 2.2.10-1, which indicates that they will not be included in the software development results summary reports. Revise DCD Tier 1 to provide results summary for all systems with ITAAC invoking the software development program described in DCD Tier 1, Section 3.2.*

Concur. DCD Tier 1, in general, will be revised to remove ITAAC in various sections that states: "...software is developed in accordance with the software development program

described in Section 3.2." The software ITAAC will only show up in DCD Tier 1 in one place, Section 3.2. Instead of ITAAC in each section, a new paragraph in the design description will refer to Section 3.2 for the software ITAAC. Section 3.2 will also be revised to describe the hardware/software development process in accordance with the requirements from the licensing topical reports entitled ESBWR Software Management Program Manual (SMPM) and ESBWR Software Quality Assurance Program Manual (SQAPM). Subsection 14.3.11 will be revised to indicate Tier 2* designations for the SMPM and the SQAPM in Section 14.3. The development process will focus on implementing the I&C platforms.

To support this change, Tables 2.2.10-1 and 2.2.11-1, will be revised to clarify the relationship between the Q-DCIS hardware/software platforms or N-DCIS network segments that implement the functions described in the other applicable subsections of DCD Tier 1. Tables 14.3-4 and 14.3-5, will be revised to clarify the relationship between the Q-DCIS hardware/software platforms or N-DCIS network segments that implement the functions described in the other applicable subsections of DCD Tier 2. Subsections 2.2.10 and 2.2.11, will be revised to indicate conformance to platform or network segment software development and associated acceptance criteria.

As described in Section 14.3, only platforms that perform safety-related functions or functions identified by the RTNSS process rise to the level of material that needs to be included in DCD Tier 1. DCD Tier 2, Chapter 7, Subsection 7.1.1, will be revised to reflect the changes made in DCD Tier 1, Section 3.2. DCD Tier 2, Subsection 14.3.3.2 provides the acceptance criteria for the software plans and shows such detail that is not marked proprietary in the SMPM and SQAPM, and pointers to the sections in the SMPM and SQAPM, where such detail is marked as proprietary in the SMPM and SQAPM. The acceptance criteria for the development of the software plans in DCD Tier 1, Section 3.2, Table 3.2-1, is shown in DCD Tier 2, Subsection 14.3.3.2. The information in DCD Tier 2 that contains the acceptance criteria is marked Tier 2*. This organization follows the guidance in the Standard Review Plan NUREG 0800, Section 14.3, Page 19, which states for detailed supporting information in DCD Tier 2 that does not lend itself to concise verification the acceptance criteria may be that a report "exists" that concludes the design commitments are met.

**DCD Impact**

DCD Tier 1, Subsections 2.2.10 and 2.2.11, will be revised in Revision 6 as shown in response to this RAI.

DCD Tier 1, Tables 2.2.10-1, 2.2.11-1 and 3.2-1, will be revised in Revision 6 as shown in response to this RAI.

DCD Tier 1, Section 3.2, will be revised in Revision 6 as shown in response to this RAI.

DCD Tier 2, Chapter 7, Subsection 7.1.1, will be revised in Revision 6 as shown in response to this RAI.

DCD Tier 2, Subsections 14.3.3.2 and 14.3.11, will be revised in Revision 6 as shown in response to this RAI.

DCD Tier 2, Tables 14.3-4 and 14.3-5, will be revised in Revision 6 as shown in response to this RAI.

**MFN 09-078**

**Enclosure 2**

# Response to Portion of NRC Request for Additional Information Letter No. 236 Related to ESBWR Design Certification Application

## DCD Tiers 1 & 2 Markups for RAI Number 14.3-402

## 2.2.10 Safety-Related Distributed Control and Information System

### Design Description

The Safety-Related Distributed Control and Information System (Q-DCIS) ~~is the designation given to the collection of hardware and software that comprise the safety-related portions of the systems listed in Table 2.2.10-1.~~ comprise the platforms that are defined in Table 2.2.10-1. These platforms comprise systems of integrated software and hardware elements. Q-DCIS platform software is developed in accordance with the software development program described in Section 3.2. Conformance with IEEE Standard 603 requirements by the Q-DCIS platforms is addressed in Subsection 2.2.15.

### Inspections, Tests, Analyses and Acceptance Criteria

~~The inspections, tests, and/or analyses, together with associated acceptance criteria for Q-DCIS are contained within the ITAAC tables for the systems in Table 2.2.10-1.~~Subsection 2.2.15 and Section 3.2 provide the inspections, tests, and/or analyses, together with associated acceptance criteria for the Q-DCIS platforms.

~~Table 2.2.10-1~~

~~Systems and Functions Comprising The Q-DCIS~~

| ~~System~~ (1) | ~~Subsection~~ |
|---|---|
| ~~Nuclear Boiler System~~ | ~~2.1.2~~ |
| ~~Standby Liquid Control~~ | ~~2.2.4~~ |
| ~~Neutron Monitoring System~~ | ~~2.2.5~~ |
| ~~Remote Shutdown System~~ | ~~2.2.6~~ |
| ~~Reactor Protection System~~ | ~~2.2.7~~ |
| ~~Leak Detection and Isolation System~~ | ~~2.2.12~~ |
| ~~Engineered Safety Features Safety System Logic and Control~~ | ~~2.2.13~~ |
| ~~Diverse Instrumentation and Control System~~ | ~~2.2.14~~ |
| ~~Process Radiation Monitoring System~~ | ~~2.3.1~~ |
| ~~Isolation Condenser System~~ | ~~2.4.1~~ |
| ~~Emergency Core Cooling Systems Gravity-Driven Cooling System~~ | ~~2.4.2~~ |
| ~~Containment Monitoring System~~<br>~~□Suppression Pool Temperature Monitoring Subsystem~~ | ~~2.15.7~~ |
| ~~Post Accident Monitoring Instrumentation~~ | ~~3.7~~ |

~~(1) Safety-related portions only~~

**Table 2.2.10-1**

**Q-DCIS Platforms**

| Platform | Software Project |
|---|---|
| Reactor Trip & Isolation System Function Neutron Monitoring System (RTIF-NMS) | RTIF |
| | NMS |
| Safety System Logic & Control / Engineered Safety Features (SSLC/ESF) Platform | SSLC |
| | ESF |
| Independent Control Platform (ICP) | VBIF |
| | ATWS/SLC |

### 2.2.11 Nonsafety-Related Distributed Control and Information System

**Design Description**

The Nonsafety-Related Distributed Control and Information System (N-DCIS) is the designation given to the collection of hardware and software that comprise the nonsafety-related instrumentation, controls and monitoring systems and/or functions. A subset of the N-DCIS comprise the network segments that are defined in Table 2.2.11-1. These network segments comprise systems of integrated software and hardware elements. N-DCIS network segment software is developed in accordance with the software development program described in Section 3.2.

~~N-DCIS has no safety-related function.~~

~~N-DCIS includes the systems listed in Table 2.2.11-1.~~

~~N-DCIS is organized into the network segments and architectures defined in Table 2.2.11-2.~~

**Inspections, Tests, Analyses and Acceptance Criteria**

Section 3.2 provides the inspections, tests, and/or analyses, together with associated acceptance criteria for the N-DCIS network segments.~~The inspections, tests, and/or analyses, together with associated acceptance criteria for N-DCIS are contained (as required) within the ITAAC tables for the systems in Table 2.2.11-1.~~

**Table 2.2.11-1**

**N-DCIS Network Segments**

| |
|---|
| GENE *(DPS)* |
| PIP A and PIP B *(FAPCS and Supporting Systems)* |

~~Table 2.2.11-1~~

~~Systems and Functions Comprising The N-DCIS~~

| ~~System~~ [1] | ~~Subsection~~ |
|---|---|
| ~~Rod Control and Information System~~ | ~~2.2.1~~ |
| ~~Control Rod Drive System~~<br>~~□CRD Hydraulic System~~ | ~~2.2.2~~ |
| ~~Feedwater Control System~~ | ~~2.2.3~~ |
| ~~Remote Shutdown System~~<br>~~□Nonsafety-related VDUs~~ | ~~2.2.6~~ |
| ~~Plant Automation System~~ | ~~2.2.8~~ |
| ~~Steam Bypass and Pressure Control System~~ | ~~2.2.9~~ |
| ~~Diverse Instrumentation and Control System~~<br>~~□Diverse Protection System~~ | ~~2.2.14~~ |
| ~~Reactor Water Cleanup/Shutdown Cooling System~~ | ~~2.6.1~~ |
| ~~Fuel and Auxiliary Pools Cooling System~~ | ~~2.6.2~~ |
| ~~Main Control Room Panels~~<br>~~□Nonsafety-related VDUs~~ | ~~2.7.1~~ |
| ~~Condensate and Feedwater System~~ | ~~2.11.2~~ |
| ~~Condensate Purification System~~ | ~~2.11.3~~ |
| ~~Turbine Generator System~~<br>~~□Turbine Generator Control System~~ | ~~2.11.4~~ |
| ~~Reactor Component Cooling Water System~~ | ~~2.12.3~~ |
| ~~Turbine Component Cooling Water System~~ | ~~2.12.4~~ |
| ~~Chilled Water System~~ | ~~2.12.5~~ |
| ~~Plant Service Water System~~ | ~~2.12.7~~ |
| ~~Instrument Air System~~ | ~~2.12.9~~ |
| ~~Electrical Power Distribution System~~ | ~~2.13.1~~ |
| ~~Standby On-Site Power Supply~~ | ~~2.13.4~~ |
| ~~DW Cooling System~~ | ~~2.15.6~~ |
| ~~Plant Service Water System~~<br>~~□ Cooling Tower~~ | ~~4.4~~ |

[1] ~~Nonsafety-related portions only~~

## 3.2 SOFTWARE DEVELOPMENT

### Inspections, Tests, Analyses, and Acceptance Criteria Summary

**Design Description**

The safety-related Distributed Control and Information Systems (Q-DCIS) comprise the platforms that are defined in Table 2.2.10-1. A subset of the nonsafety-related Distributed Control and Information Systems (N-DCIS) comprise the network segments that are defined in Table 2.2.11-1. These platforms or network segments comprise systems of integrated software and hardware elements. Software projects are developed for the various platforms or network segments.

Each platform or network segment software project follows a development process that comprises the following 3-stages:

(1) Develop the platform or network segment software plans and cyber security programs for each platform. {{Design Acceptance Criteria}}

(2) Implement the software projects for each platform or network segment in accordance with the approved platform or network segment software plans and cyber security programs to ensure the process produces adequate software products at the conclusion of each software life-cycle phase baseline as documented by the life-cycle phase Summary Baseline Review Records (BRR).

(3) Perform a multiple-phase test process as part of the installation phase to confirm that the as-built platform or network segment performs as designed.

In support of the above described software development process, the following 3-stage software design commitments are made:

1a1. The SMP is developed for the RTIF software project.

1a2. The SMP is developed for the NMS software project.

1a3. The SMP is developed for the SSLC/ESF software project.

1a4. The SMP is developed for the ATWS/SLC software project.

1a5. The SMP is developed for the VBIF logic processor software project.

1a6. The SMP is developed for the GENE DPS software project.

1a7. The SMP is developed for the PIP software project.

1b1. The SDP is developed for the RTIF software project.

1b2. The SDP is developed for the NMS software project.

1b3. The SDP is developed for the SSLC/ESF software project.

1b4. The SDP is developed for the ATWS/SLC software project.

1b5. The SDP is developed for the VBIF logic processor software project.

1b6. The SDP is developed for the GENE DPS software project.

1b7. The SDP is developed for the PIP software project.

1c1. The SIntP is developed for the RTIF software project.

1c2. The SIntP is developed for the NMS software project.

1c3. The SIntP is developed for the SSLC/ESF software project.

1c4. The SIntP is developed for the ATWS/SLC software project.

1c5. The SIntP is developed for the VBIF logic processor software project.

1c6. The SIntP is developed for the GENE DPS software project.

1c7. The SIntP is developed for the PIP software project.

1d1. The SIP is developed for the RTIF software project.

1d2. The SIP is developed for the NMS software project.

1d3. The SIP is developed for the SSLC/ESF software project.

1d4. The SIP is developed for the ATWS/SLC software project.

1d5. The SIP is developed for the VBIF logic processor software project.

1d6. The SIP is developed for the GENE DPS software project.

1d7. The SIP is developed for the PIP software project.

1e1. The SOMP is developed for the RTIF software project.

1e2. The SOMP is developed for the NMS software project.

1e3. The SOMP is developed for the SSLC/ESF software project.

1e4. The SOMP is developed for the ATWS/SLC software project.

1e5. The SOMP is developed for the VBIF logic processor software project.

1e6. The SOMP is developed for the GENE DPS software project.

1e7. The SOMP is developed for the PIP software project.

1f1. The STrngP is developed for the RTIF software project.

1f2. The STrngP is developed for the NMS software project.

1f3. The STrngP is developed for the SSLC/ESF software project.

1f4. The STrngP is developed for the ATWS/SLC software project.

1f5. The STrngP is developed for the VBIF logic processor software project.

1f6. The STrngP is developed for the GENE DPS software project.

1f7. The STrngP is developed for the PIP software project.

1g1. The SQAP is developed for the RTIF software project.

1g2. The SQAP is developed for the NMS software project.

1g3. The SQAP is developed for the SSLC/ESF software project.

1g4. The SQAP is developed for the ATWS/SLC software project.

1g5. The SQAP is developed for the VBIF logic processor software project.

1g6. The SQAP is developed for the GENE DPS software project.

1g7. The SQAP is developed for the PIP software project.

1h1. The SSP is developed for the RTIF software project.

1h2. The SSP is developed for the NMS software project.

1h3. The SSP is developed for the SSLC/ESF software project.

1h4. The SSP is developed for the ATWS/SLC software project.

1h5. The SSP is developed for the VBIF logic processor software project.

1h6. The SSP is developed for the GENE DPS software project.

1h7. The SSP is developed for the PIP software project.

1i1. The SVVP is developed for the RTIF software project.

1i2. The SVVP is developed for the NMS software project.

1i3. The SVVP is developed for the SSLC/ESF software project.

1i4. The SVVP is developed for the ATWS/SLC software project.

1i5. The SVVP is developed for the VBIF logic processor software project.

1i6. The SVVP is developed for the GENE DPS software project.

1i7. The SVVP is developed for the PIP software project.

1j1. The SCMP is developed for the RTIF software project.

1j2. The SCMP is developed for the NMS software project.

1j3. The SCMP is developed for the SSLC/ESF software project.

1j4. The SCMP is developed for the ATWS/SLC software project.

1j5. The SCMP is developed for the VBIF logic processor software project.

1j6. The SCMP is developed for the GENE DPS software project.

1j7. The SCMP is developed for the PIP software project.

1k1. The STP is developed for the RTIF software project.

1k2. The STP is developed for the NMS software project.

1k3. The STP is developed for the SSLC/ESF software project.

1k4. The STP is developed for the ATWS/SLC software project.

1k5. The STP is developed for the VBIF logic processor software project.

1k6. The STP is developed for the GENE DPS software project.

1k7. The STP is developed for the PIP software project.

1l1. The CySP is developed for the RTIF software project.

1l2. The CySP is developed for the NMS software project.

1l3. The CySP is developed for the SSLC/ESF software project.

1l4. The CySP is developed for the ATWS/SLC software project.

1l5. The CySP is developed for the VBIF logic processor software project.

1l6. The CySP is developed for the GENE DPS software project.

1l7. The CySP is developed for the PIP software project.

2a1. Planning Phase Summary BRR is produced for the RTIF software project.

2a2. Planning Phase Summary BRR is produced for the NMSF software project.

2a3. Planning Phase Summary BRR is produced for the SSLC/ESF software project.

2a4. Planning Phase Summary BRR is produced for the ATWS/SLC software project.

2a5. Planning Phase Summary BRR is produced for the VBIF Logic processor software project.

2a6. Planning Phase Summary BRR is produced for the GENE DPS software project.

2a7. Planning Phase Summary BRR is produced for the PIP software project.

2b1. Requirements Phase Summary BRR is produced for the RTIF software project.

2b2. Requirements Phase Summary BRR is produced for the NMSF software project.

2b3. Requirements Phase Summary BRR is produced for the SSLC/ESF software project.

2b4. Requirements Phase Summary BRR is produced for the ATWS/SLC software project.

2b5. Requirements Phase Summary BRR is produced for the VBIF Logic processor software project.

2b6. Requirements Phase Summary BRR is produced for the GENE DPS software project.

2b7. Requirements Phase Summary BRR is produced for the PIP software project.

2c1. Design Phase Summary BRR is produced for the RTIF software project.

2c2. Design Phase Summary BRR is produced for the NMSF software project.

2c3. Design Phase Summary BRR is produced for the SSLC/ESF software project.

2c4. Design Phase Summary BRR is produced for the ATWS/SLC software project.

2c5. Design Phase Summary BRR is produced for the VBIF Logic processor software project.

2c6. Design Phase Summary BRR is produced for the GENE DPS software project.

2c7. Design Phase Summary BRR is produced for the PIP software project.

2d1. Implementation Phase Summary BRR is produced for the RTIF software project.

2d2. Implementation Phase Summary BRR is produced for the NMSF software project.

2d3. Implementation Phase Summary BRR is produced for the SSLC/ESF software project.

2d4. Implementation Phase Summary BRR is produced for the ATWS/SLC software project.

2d5. Implementation Phase Summary BRR is produced for the VBIF Logic processor software project.

2d6. Implementation Phase Summary BRR is produced for the GENE DPS software project.

2d7. Implementation Phase Summary BRR is produced for the PIP software project.

2e1. Test Phase Summary BRR is produced for the RTIF software project.

2e2. Test Phase Summary BRR is produced for the NMS software project.

2e3. Test Phase Summary BRR is produced for the SSLC/ESF software project.

2e4. Test Phase Summary BRR is produced for the ATWS/SLC software project.

2e5. Test Phase Summary BRR is produced for the VBIF Logic processor software project.

2e6. Test Phase Summary BRR is produced for the GENE DPS software project.

2e7. Test Phase Summary BRR is produced for the PIP software project.

3a1. Installation Phase Summary BRR is produced for the RTIF software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built RTIF software project performs as designed.

3a2. A FAT is performed on the RTIF software project.

3a3. A cyber security FAT is performed on the RTIF software project.

3b1. Installation Phase Summary BRR is produced for the NMS software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built NMS software project performs as designed.

3b2. A FAT is performed on the NMS software project.

3b3. A cyber security FAT is performed on the NMS software project.

3c1. Installation Phase Summary BRR is produced for the SSLC/ESF software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built SSLC/ESF software project performs as designed.

3c2. A FAT is performed on the SSLC/ESF software project.

3c3. A cyber security FAT is performed on the SSLC/ESF software project.

3d1. Installation Phase Summary BRR is produced for the ATWS/SLC software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built ATWS/SLC software project performs as designed.

3d2. A FAT is performed on the ATWS/SLC software project.

3d3. A cyber security FAT is performed on the ATWS/SLC software project.

3e1. Installation Phase Summary BRR is produced for the VBIF Logic processor software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built VBIF Logic processor software project performs as designed.

3e2. A FAT is performed on the VBIF Logic processor software project.

3e3. A cyber security FAT is performed on the VBIF Logic processor software project.

3f1. Installation Phase Summary BRR is produced for the GENE DPS software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built GENE DPS software project performs as designed.

3f2. A FAT is performed on the GENE DPS software project.

3f3. A cyber security FAT is performed on the GENE DPS software project.

3g1. Installation Phase Summary BRR is produced for the PIP software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built PIP software project performs as designed.

3g2. A FAT is performed on the PIP software project.

3g3. A cyber security FAT is performed on the PIP software project.

3h. Installation Phase Summary BRR is produced and will include the results summary report for the Site Acceptance Test (SAT) that uses overlapping tests and confirms that the as-built platforms or network segments are capable of operating as designed as documented in the FAT reports and cyber security FAT reports and when integrated as a complete ESBWR instrumentation and control system with sensors and actuators using overlapping tests in conjunction with the SAT.

3i1. A SAT is performed on the RTIF software project.

3i2. A cyber security SAT is performed on the RTIF software project.

3j1. A SAT is performed on the NMS software project.

3j2. A cyber security SAT is performed on the NMS software project.

3k1. A SAT is performed on the SSLC/ESF software project.

3k2. A cyber security SAT is performed on the SSLC/ESF software project.

3l1. A SAT is performed on the ATWS/SLC software project.

3l2. A cyber security SAT is performed on the ATWS/SLC software project.

3m1. A SAT is performed on the VBIF Logic processor software project.

3m2. A cyber security SAT is performed on the VBIF Logic processor software project.

3n1. A SAT is performed on the GENE DPS software project.

3n2. A cyber security SAT is performed on the GENE DPS software project.

3o1. A SAT is performed on the PIP software project.

3o2. A cyber security SAT is performed on the PIP software project.

**Inspections, Tests, Analyses and Acceptance Criteria**

Table 3.2-1 defines the inspections, tests and analyses, together with associated acceptance criteria, which will be applied to the software and hardware platforms or network segments.

To avoid issues associated with rapid obsolescence of instrumentation and control system structures, systems, and components, details of the system design may not be complete before the NRC issuance of a design certification. Therefore, the portions of the system design that define the governing design processes and develop the system acceptance criteria are marked as {{Design Acceptance Criteria}}.

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1a1. The SMP is developed for the RTIF software project. | Inspection of the SMP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for the RTIF software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1a2. The SMP is developed for the NMS software project. | Inspection of the SMP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for NMS software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1a3. The SMP is developed for the SSLC/ESF software project. | Inspection of the SMP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for SSLC/ESF software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1a4 The SMP is developed for the ATWS/SLC software project. | Inspection of the SMP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for ATWS/SLC software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1a5. The SMP is developed for the VBIF logic processor software project. | Inspection of the SMP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for VBIF logic processor software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1a6. The SMP is developed for the GENE DPS software project. | Inspection of the SMP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for GENE DPS software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1a7. The SMP is developed for the PIP software project. | Inspection of the SMP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SMP for PIP software projects complies with the SMP criteria. {{Design Acceptance Criteria}} |
| 1b1. The SDP is developed for the RTIF software project. | Inspection of the SDP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for the RTIF software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1b2. The SDP is developed for the NMS software project. | Inspection of the SDP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for NMS software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1b3. The SDP is developed for the SSLC/ESF software project. | Inspection of the SDP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for SSLC/ESF software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1b4 The SDP is developed for the ATWS/SLC software project. | Inspection of the SDP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for ATWS/SLC software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1b5. The SDP is developed for the VBIF logic processor software project. | Inspection of the SDP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for VBIF logic processor software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1b6. The SDP is developed for the GENE DPS software project. | Inspection of the SDP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for GENE DPS software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1b7. The SDP is developed for the PIP software project. | Inspection of the SDP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SDP for PIP software projects complies with the SDP criteria. {{Design Acceptance Criteria}} |
| 1c1. The SIntP is developed for the RTIF software project. | Inspection of the SIntP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for the RTIF software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1c2. The SIntP is developed for the NMS software project. | Inspection of the SIntP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for NMS software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1c3. The SIntP is developed for the SSLC/ESF software project. | Inspection of the SIntP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for SSLC/ESF software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1c4. The SIntP is developed for the ATWS/SLC software project. | Inspection of the SIntP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for ATWS/SLC software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1c5. The SIntP is developed for the VBIF logic processor software project. | Inspection of the SIntP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for VBIF logic processor software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1c6. The SIntP is developed for the GENE DPS software project. | Inspection of the SIntP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for GENE DPS software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1c7. The SIntP is developed for the PIP software project. | Inspection of the SIntP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIntP for PIP software projects complies with the SIntP criteria. {{Design Acceptance Criteria}} |
| 1d1. The SIP is developed for the RTIF software project. | Inspection of the SIP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for the RTIF software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1d2. The SIP is developed for the NMS software project. | Inspection of the SIP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for NMS software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1d3. The SIP is developed for the SSLC/ESF software project. | Inspection of the SIP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for SSLC/ESF software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1d4. The SIP is developed for the ATWS/SLC software project. | Inspection of the SIP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for ATWS/SLC software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1d5. The SIP is developed for the VBIF logic processor software project. | Inspection of the SIP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for VBIF logic processor software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1d6. The SIP is developed for the GENE DPS software project. | Inspection of the SIP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for GENE DPS software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1d7. The SIP is developed for the PIP software project. | Inspection of the SIP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SIP for PIP software projects complies with the SIP criteria. {{Design Acceptance Criteria}} |
| 1e1. The SOMP is developed for the RTIF software project. | Inspection of the SOMP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for the RTIF software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1e2. The SOMP is developed for the NMS software project. | Inspection of the SOMP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for NMS software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1e3. The SOMP is developed for the SSLC/ESF software project. | Inspection of the SOMP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for SSLC/ESF software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1e4. The SOMP is developed for the ATWS/SLC software project. | Inspection of the SOMP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for ATWS/SLC software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1e5. The SOMP is developed for the VBIF logic processor software project. | Inspection of the SOMP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for VBIF logic processor software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1e6. The SOMP is developed for the GENE DPS software project. | Inspection of the SOMP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for GENE DPS software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1e7. The SOMP is developed for the PIP software project. | Inspection of the SOMP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SOMP for PIP software projects complies with the SOMP criteria. {{Design Acceptance Criteria}} |
| 1f1. The STrngP is developed for the RTIF software project. | Inspection of the STrngP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for the RTIF software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1f2. The STrngP is developed for the NMS software project. | Inspection of the STrngP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for NMS software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |
| 1f3. The STrngP is developed for the SSLC/ESF software project. | Inspection of the STrngP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for SSLC/ESF software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |
| 1f4. The STrngP is developed for the ATWS/SLC software project. | Inspection of the STrngP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for ATWS/SLC software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |
| 1f5. The STrngP is developed for the VBIF logic processor software project. | Inspection of the STrngP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for VBIF logic processor software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |
| 1f6. The STrngP is developed for the GENE DPS software project. | Inspection of the STrngP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for GENE DPS software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |
| 1f7. The STrngP is developed for the PIP software project. | Inspection of the STrngP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STrngP for PIP software projects complies with the STrngP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1g1. The SQAP is developed for the RTIF software project. | Inspection of the SQAP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for the RTIF software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1g2. The SQAP is developed for the NMS software project. | Inspection of the SQAP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for NMS software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1g3. The SQAP is developed for the SSLC/ESF software project. | Inspection of the SQAP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for SSLC/ESF software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1g4. The SQAP is developed for the ATWS/SLC software project. | Inspection of the SQAP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for ATWS/SLC software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1g5. The SQAP is developed for the VBIF logic processor software project. | Inspection of the SQAP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for VBIF logic processor software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1g6. The SQAP is developed for the GENE DPS software project. | Inspection of the SQAP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for GENE DPS software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1g7. The SQAP is developed for the PIP software project. | Inspection of the SQAP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SQAP for PIP software projects complies with the SQAP criteria. {{Design Acceptance Criteria}} |
| 1h1. The SSP is developed for the RTIF software project. | Inspection of the SSP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for the RTIF software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1h2. The SSP is developed for the NMS software project. | Inspection of the SSP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for NMS software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1h3. The SSP is developed for the SSLC/ESF software project. | Inspection of the SSP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for SSLC/ESF software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1h4. The SSP is developed for the ATWS/SLC software project. | Inspection of the SSP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for ATWS/SLC software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1h5. The SSP is developed for the VBIF logic processor software project. | Inspection of the SSP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for VBIF logic processor software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1h6. The SSP is developed for the GENE DPS software project. | Inspection of the SSP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for GENE DPS software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1h7. The SSP is developed for the PIP software project. | Inspection of the SSP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SSP for PIP software projects complies with the SSP criteria. {{Design Acceptance Criteria}} |
| 1i1. The SVVP is developed for the RTIF software project. | Inspection of the SVVP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for the RTIF software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1i2. The SVVP is developed for the NMS software project. | Inspection of the SVVP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for NMS software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1i3. The SVVP is developed for the SSLC/ESF software project. | Inspection of the SVVP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for SSLC/ESF software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1i4. The SVVP is developed for the ATWS/SLC software project. | Inspection of the SVVP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for ATWS/SLC software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1i5. The SVVP is developed for the VBIF logic processor software project. | Inspection of the SVVP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for VBIF logic processor software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1i6. The SVVP is developed for the GENE DPS software project. | Inspection of the SVVP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for GENE DPS software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1i7. The SVVP is developed for the PIP software project. | Inspection of the SVVP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SVVP for PIP software projects complies with the SVVP criteria. {{Design Acceptance Criteria}} |
| 1j1. The SCMP is developed for the RTIF software project. | Inspection of the SCMP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for the RTIF software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1j2. The SCMP is developed for the NMS software project. | Inspection of the SCMP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for NMS software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1j3. The SCMP is developed for the SSLC/ESF software project. | Inspection of the SCMP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for SSLC/ESF software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1j4. The SCMP is developed for the ATWS/SLC software project. | Inspection of the SCMP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for ATWS/SLC software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1j5. The SCMP is developed for the VBIF logic processor software project. | Inspection of the SCMP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for VBIF logic processor software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1j6. The SCMP is developed for the GENE DPS software project. | Inspection of the SCMP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for GENE DPS software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1j7. The SCMP is developed for the PIP software project. | Inspection of the SCMP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the SCMP for PIP software projects complies with the SCMP criteria. {{Design Acceptance Criteria}} |
| 1k1. The STP is developed for the RTIF software project. | Inspection of the STP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for the RTIF software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1k2. The STP is developed for the NMS software project. | Inspection of the STP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for NMS software projects complies with the STP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 1k3. The STP is developed for the SSLC/ESF software project. | Inspection of the STP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for SSLC/ESF software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1k4. The STP is developed for the ATWS/SLC software project. | Inspection of the STP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for ATWS/SLC software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1k5. The STP is developed for the VBIF logic processor software project. | Inspection of the STP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for VBIF logic processor software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1k6. The STP is developed for the GENE DPS software project. | Inspection of the STP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for GENE DPS software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1k7. The STP is developed for the PIP hardware and software project. | Inspection of the STP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the STP for PIP software projects complies with the STP criteria. {{Design Acceptance Criteria}} |
| 1l1. The CySP is developed for the RTIF software project. | Inspection of the CySP for the RTIF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for the RTIF software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 112. The CySP is developed for the NMS software project. | Inspection of the CySP for the NMS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for NMS software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |
| 113. The CySP is developed for the SSLC/ESF software project. | Inspection of the CySP for the SSLC/ESF software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for SSLC/ESF software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |
| 114. The CySP is developed for the ATWS/SLC software project. | Inspection of the CySP for the ATWS/SLC software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for ATWS/SLC software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |
| 115. The CySP is developed for the VBIF logic processor software project. | Inspection of the CySP for the VBIF logic processor software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for VBIF logic processor software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |
| 116. The CySP is developed for the GENE DPS software project. | Inspection of the CySP for the GENE DPS software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for GENE DPS software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |
| 117. The CySP is developed for the PIP software project. | Inspection of the CySP for the PIP software projects will be performed. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the CySP for PIP software projects complies with the CySP criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2a1. Planning Phase Summary BRR is produced for the RTIF software project. | Inspection of the Planning Phase Summary BRR will be performed for the RTIF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the RTIF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2a2. Planning Phase Summary BRR is produced for the NMS software project. | Inspection of the Planning Phase Summary BRR will be performed for the NMS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the NMS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2a3. Planning Phase Summary BRR is produced for the SSLC/ESF software project. | Inspection of the Planning Phase Summary BRR will be performed for the SSLC/ESF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2a4. Planning Phase Summary BRR is produced for the ATWS/SLC software project. | Inspection of the Planning Phase Summary BRR will be performed for the ATWS/SLC software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2a5. Planning Phase Summary BRR is produced for the VBIF Logic processor software project. | Inspection of the Planning Phase Summary BRR will be performed for the VBIF Logic processor software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2a6. Planning Phase Summary BRR is produced for the GENE DPS software project. | Inspection of the Planning Phase Summary BRR will be performed for the GENE DPS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2a7. Planning Phase Summary BRR is produced for the PIP software project. | Inspection of the Planning Phase Summary BRR will be performed for the PIP software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Planning Phase Summary BRR for the PIP software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b1. Requirements Phase Summary BRR is produced for the RTIF software project. | Inspection of the Requirements Phase Summary BRR will be performed for the RTIF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the RTIF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b2. Requirements Phase Summary BRR is produced for the NMS software project. | Inspection of the Requirements Phase Summary BRR will be performed for the NMS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the NMS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b3. Requirements Phase Summary BRR is produced for the SSLC/ESF software project. | Inspection of the Requirements Phase Summary BRR will be performed for the SSLC/ESF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2b4. Requirements Phase Summary BRR is produced for the ATWS/SLC software project. | Inspection of the Requirements Phase Summary BRR will be performed for the ATWS/SLC software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b5. Requirements Phase Summary BRR is produced for the VBIF Logic processor software project. | Inspection of the Requirements Phase Summary BRR will be performed for the VBIF Logic processor software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b6. Requirements Phase Summary BRR is produced for the GENE DPS software project. | Inspection of the Requirements Phase Summary BRR will be performed for the GENE DPS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2b7. Requirements Phase Summary BRR is produced for the PIP software project. | Inspection of the Requirements Phase Summary BRR will be performed for the PIP software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Requirements Phase Summary BRR for the PIP software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2c1. Design Phase Summary BRR is produced for the RTIF software project. | Inspection of the Design Phase Summary BRR will be performed for the RTIF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the RTIF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2c2. Design Phase Summary BRR is produced for the NMS software project. | Inspection of the Design Phase Summary BRR will be performed for the NMS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the NMS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2c3. Design Phase Summary BRR is produced for the SSLC/ESF software project. | Inspection of the Design Phase Summary BRR will be performed for the SSLC/ESF software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2c4. Design Phase Summary BRR is produced for the ATWS/SLC software project. | Inspection of the Design Phase Summary BRR will be performed for the ATWS/SLC software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2c5. Design Phase Summary BRR is produced for the VBIF Logic processor software project. | Inspection of the Design Phase Summary BRR will be performed for the VBIF Logic processor software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2c6. Design Phase Summary BRR is produced for the GENE DPS software project. | Inspection of the Design Phase Summary BRR will be performed for the GENE DPS software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2c7. Design Phase Summary BRR is produced for the PIP software project. | Inspection of the Design Phase Summary BRR will be performed for the PIP software project. {{Design Acceptance Criteria}} | Inspection report(s) exist and conclude that the Design Phase Summary BRR for the PIP software projects complies with the BRR criteria. {{Design Acceptance Criteria}} |
| 2d1. Implementation Phase Summary BRR is produced for the RTIF software project. | Inspection of the Implementation Phase Summary BRR will be performed for the RTIF software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the RTIF software projects complies with the BRR criteria. |
| 2d2. Implementation Phase Summary BRR is produced for the NMS software project. | Inspection of the Implementation Phase Summary BRR will be performed for the NMS software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the NMS software projects complies with the BRR criteria. |
| 2d3. Implementation Phase Summary BRR is produced for the SSLC/ESF software project. | Inspection of the Implementation Phase Summary BRR will be performed for the SSLC/ESF software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. |
| 2d4. Implementation Phase Summary BRR is produced for the ATWS/SLC software project. | Inspection of the Implementation Phase Summary BRR will be performed for the ATWS/SLC software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. |
| 2d5. Implementation Phase Summary BRR is produced for the VBIF Logic processor software project. | Inspection of the Implementation Phase Summary BRR will be performed for the VBIF Logic processor software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2d6. Implementation Phase Summary BRR is produced for the GENE DPS software project. | Inspection of the Implementation Phase Summary BRR will be performed for the GENE DPS software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. |
| 2d7. Implementation Phase Summary BRR is produced for the PIP software project. | Inspection of the Implementation Phase Summary BRR will be performed for the PIP software project. | Inspection report(s) exist and conclude that the Implementation Phase Summary BRR for the PIP software projects complies with the BRR criteria. |
| 2e1. Test Phase Summary BRR is produced for the RTIF software project. | Inspection of the Test Phase Summary BRR will be performed for the RTIF software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the RTIF software projects complies with the BRR criteria. |
| 2e2. Test Phase Summary BRR is produced for the NMS software project. | Inspection of the Test Phase Summary BRR will be performed for the NMS software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the NMS software projects complies with the BRR criteria. |
| 2e3. Test Phase Summary BRR is produced for the SSLC/ESF software project. | Inspection of the Test Phase Summary BRR will be performed for the SSLC/ESF software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. |
| 2e4. Test Phase Summary BRR is produced for the ATWS/SLC software project. | Inspection of the Test Phase Summary BRR will be performed for the ATWS/SLC software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 2e5. Test Phase Summary BRR is produced for the VBIF Logic processor software project. | Inspection of the Test Phase Summary BRR will be performed for the VBIF Logic processor software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. |
| 2e6. Test Phase Summary BRR is produced for the GENE DPS software project. | Inspection of the Test Phase Summary BRR will be performed for the GENE DPS software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. |
| 2e7. Test Phase Summary BRR is produced for the PIP software project. | Inspection of the Test Phase Summary BRR will be performed for the PIP software project. | Inspection report(s) exist and conclude that the Test Phase Summary BRR for the PIP software projects complies with the BRR criteria. |
| 3a1. Installation Phase Summary BRR is produced for the RTIF software project and will include the results summary report for the Factory Acceptance Test (FAT) that confirms that each part of the as-built RTIF software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the RTIF software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the RTIF software projects complies with the BRR criteria. |
| 3a2. A FAT is performed on the RTIF software project. | Inspection of the FAT report will be performed for the RTIF software project. | Inspection report(s) exist and conclude that the FAT report for the RTIF software projects complies with the FAT criteria. |
| 3a3. A cyber security FAT is performed on the RTIF software project. | Inspection of the cyber security FAT report will be performed for the RTIF software project. | Inspection reports exist and conclude that the cyber security FAT reports for the RTIF software project complies with the FAT criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3b1. Installation Phase Summary BRR is produced for the NMS software project and will include the results summary report for the FAT that confirms that each part of the as-built NMS software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the NMS software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the NMS software projects complies with the FAT criteria. |
| 3b2. A FAT is performed on the NMS software project. | Inspection of the FAT report will be performed for the NMS software project. | Inspection report(s) exist and conclude that the FAT report for the NMS software projects complies with the FAT criteria. |
| 3b3. A cyber security FAT is performed on the NMS software project. | Inspection of the cyber security FAT report will be performed for the NMS software project. | Inspection report(s) exist and conclude that the cyber security FAT report for the NMS software project complies with the FAT criteria. |
| 3c1. Installation Phase Summary BRR is produced for the SSLC/ESF software project and will include the results summary report for the FAT that confirms that each part of the as-built SSLC/ESF software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the SSLC/ESF software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the SSLC/ESF software projects complies with the BRR criteria. |
| 3c2. A FAT is performed on the SSLC/ESF software project. | Inspection of the FAT report will be performed for the SSLC/ESF software project. | Inspection report(s) exist and conclude that the FAT report for the SSLC/ESF software project complies with the FAT criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3c3. A cyber security FAT is performed on the SSLC/ESF software project. | Inspection of the cyber security FAT report will be performed for the SSLC/ESF software project. | Inspection report(s) exist and conclude that the cyber security FAT reports for the SSLC/ESF software project complies with the FAT criteria. |
| 3d1. Installation Phase Summary BRR is produced for the ATWS/SLC software project and will include the results summary report for the FAT that confirms that each part of the as-built ATWS/SLC software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the ATWS/SLC software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the ATWS/SLC software projects complies with the BRR criteria. |
| 3d2. A FAT is performed on the ATWS/SLC software project. | Inspection of the FAT report will be performed for the ATWS/SLC software project. | Inspection report(s) exist and conclude that the FAT report for the ATWS/SLC software project complies with the FAT criteria. |
| 3d3. A cyber security FAT is performed on the ATWS/SLC software project. | Inspection of the cyber security FAT report will be performed for the ATWS/SLC software project. | Inspection report(s) exist and conclude that the cyber security FAT reports for the ATWS/SLC software project complies with the FAT criteria. |
| 3e1. Installation Phase Summary BRR is produced for the VBIF Logic processor software project and will include the results summary report for the FAT that confirms that each part of the as-built VBIF Logic processor software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the VBIF Logic processor software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the VBIF Logic processor software projects complies with the BRR criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3e2. A FAT is performed on the VBIF Logic processor software project. | Inspection of the FAT report will be performed for the VBIF Logic processor software project. | Inspection report(s) exist and conclude that the FAT report for the VBIF Logic processor software project complies with the FAT criteria. |
| 3e3. A cyber security FAT is performed on the VBIF Logic processor software project. | Inspection of the cyber security FAT report will be performed for the VBIF Logic processor software project. | Inspection report(s) exist and conclude that the cyber security FAT report for the VBIF Logic processor software project complies with the FAT criteria. |
| 3f1. Installation Phase Summary BRR is produced for the GENE DPS software project and will include the results summary report for the FAT that confirms that each part of the as-built GENE DPS software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the GENE DPS software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the GENE DPS software projects complies with the BRR criteria. |
| 3f2. A FAT is performed on the GENE DPS software project. | Inspection of the FAT report will be performed for the GENE DPS software project. | Inspection report(s) exist and conclude that the FAT report for the GENE DPS software project complies with the FAT criteria. |
| 3f3. A cyber security FAT is performed on the GENE DPS software project. | Inspection of the cyber security FAT report will be performed for the GENE DPS software project. | Inspection reports exist and conclude that the cyber security FAT report for the GENE DPS software project complies with the FAT criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3g1. Installation Phase Summary BRR is produced for the PIP software project and will include the results summary report for the FAT that confirms that each part of the as-built PIP software project performs as designed. | Inspection of the Installation Phase Summary BRR will be performed for the PIP software project. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the PIP software projects complies with the BRR criteria. |
| 3g2. A FAT is performed on the PIP software project. | Inspection of the FAT report will be performed for the PIP software project. | Inspection report(s) exist and conclude that the FAT report for the PIP software project complies with the FAT criteria. |
| 3g3. A cyber security FAT is performed on the PIP software project. | Inspection of the cyber security FAT report will be performed for the PIP software project. | Inspection reports exist and conclude that the cyber security FAT report for the PIP software project complies with the FAT criteria. |
| 3h. Installation Phase Summary BRR is produced for the each software project and will include the results summary report for the SAT that uses overlapping tests and confirms that the as-built platforms or network segments are capable of operating as designed as shown in the FAT reports and cyber security FAT reports and when integrated as a complete ESBWR instrumentation and control system with sensors and actuators using overlapping tests in conjunction with the SAT. | Inspection of the Installation Phase Summary BRR will be performed for the overall SAT. | Inspection report(s) exist and conclude that the Installation Phase Summary BRR for the overall SAT complies with the BRR criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3i1. A SAT is performed on the RTIF software project. | Inspection of the SAT report will be performed for the RTIF software project. | Inspection reports exist and conclude that the SAT report and documentation for the RTIF software project complies with the SAT criteria. |
| 3i2. A cyber security SAT is performed on the RTIF software project. | Inspection of the cyber security SAT report will be performed for the RTIF software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the RTIF software project complies with the SAT criteria. |
| 3j1. A SAT is performed on the NMS software project. | Inspection of the SAT report will be performed for the NMS software project. | Inspection reports exist and conclude that the SAT report and documentation for the NMS software project complies with the SAT criteria. |
| 3j2. A cyber security SAT is performed on the NMS software project. | Inspection of the cyber security SAT report will be performed for the NMS software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the NMS software project complies with the SAT criteria. |
| 3k1. A SAT is performed on the SSLC/ESF software project. | Inspection of the SAT report will be performed for the SSLC/ESF software project. | Inspection reports exist and conclude that the SAT report and documentation for the SSLC/ESF software project complies with the SAT criteria. |
| 3k2. A cyber security SAT is performed on the SSLC/ESF software project. | Inspection of the cyber security SAT report will be performed for the SSLC/ESF software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the SSLC/ESF software project complies with the SAT criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3l1. A SAT is performed on the ATWS/SLC software project. | Inspection of the SAT report will be performed for the ATWS/SLC software project. | Inspection reports exist and conclude that the SAT report and documentation for the ATWS/SLC software project complies with the SAT criteria. |
| 3l2. A cyber security SAT is performed on the ATWS/SLC software project. | Inspection of the cyber security SAT report will be performed for the ATWS/SLC software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the ATWS/SLC software project complies with the SAT criteria. |
| 3m1. A SAT is performed on the VBIF logic processor software project. | Inspection of the SAT report will be performed for the VBIF logic processor software project. | Inspection reports exist and conclude that the SAT report and documentation for the VBIF logic processor software project complies with the SAT criteria. |
| 3m2. A cyber security SAT is performed on the VBIF logic processor software project. | Inspection of the cyber security SAT report will be performed for the VBIF logic processor software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the VBIF logic processor software project complies with the SAT criteria. |
| 3n1. A SAT is performed on the GENE DPS software project. | Inspection of the SAT report will be performed for the GENE DPS software project. | Inspection reports exist and conclude that the SAT report and documentation for the GENE DPS software project complies with the SAT criteria. |
| 3n2. A cyber security SAT is performed on the GENE software project. | Inspection of the cyber security SAT report will be performed for the GENE DPS software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the GENE DPS software project complies with the SAT criteria. |

**Table 3.2-1**
**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 3o1. A SAT is performed on the PIP software project. | Inspection of the SAT report will be performed for the PIP software project. | Inspection reports exist and conclude that the SAT report and documentation for the PIP software project complies with the SAT criteria. |
| 3o2. A cyber security SAT is performed on the PIP software project. | Inspection of the cyber security SAT report will be performed for the PIP software project. | Inspection reports exist and conclude that the cyber security SAT report and documentation for the PIP software project complies with the SAT criteria. |

~~NUREG-0800, Branch Technical Position HICB-14 (BTP 7-14), outlines activities to be considered when establishing a software development program for software-based Instrumentation and Control (I&C) systems. HICB-14 divides these activities into separate software development plans. The overall approach is that the software plans address and document the elements necessary to ensure the production and delivery of High Quality Software.~~

~~GEH has completed a detailed analysis of regulatory guidelines and industry standards and incorporated information from that study into the ESBWR Software Plans. Compliance with this process will provide a sound base for development of High Quality Software.~~

~~The ESBWR Instrument & Controls (I&C) Software Plans are included in two GEH documents, the ESBWR I&C Software Management Program Manual (SMPM) and the ESBWR I&C Software Quality Assurance Program Manual (SQAPM). The software plans are identified in the ESBWR Man-Machine Interface System and Human Factor & Engineering Implementation Plan. The ESBWR Cyber Security Program Plan is further defined by a separate Licensing Topical Report, ESBWR Cyber Security Program Plan (CySP).~~

~~The ESBWR I&C software program will produce requirements, design, development, and testing documents throughout the software lifecycle as described in the SMPM. Result Summary Reports, based on the software plan implementation, address the ESBWR safety related systems described in Table 2.2.10-1 and their associated safety related functions defined in the Task Analysis. The results summary reports are available for the NRC staff review, and are included in the list of items for Inspections, Tests, Analyses, and Acceptance Criteria.~~

~~The following is a list of the Design Commitments for the Software Development ITAAC:~~

~~(1)Implement the Software Management Plan (SMP) for the design and development of ESBWR I&C System software.~~

(2)Implement the Software Development Plan (SDP) for the design and development of ESBWR I&C System software.

(3)Implement the Software Quality Assurance Plan (SQAP) for the design and development of ESBWR I&C System software.

(4)Implement the Software Integration Plan (SIntP) for the design and development of ESBWR I&C System software.

(5)Implement the Software Installation Plan (SIP) for the design and development of ESBWR I&C System software.

(6)Implement the Software Operation and Maintenance Plan (SOMP) for the design and development of ESBWR I&C System software.

(7)Implement the Software Training Plan (STrngP) for the design and development of ESBWR I&C System software.

(8)Implement the Software Safety Plan (SSP) for the design and development of ESBWR I&C System software.

(9)Implement the Software Verification & Validation Plan (SVVP) for the design and development of ESBWR I&C System software.

(10)Implement the Software Configuration Management Plan (SCMP) for the design and development of ESBWR I&C System software.

(11)Implement the Cyber Security Program Plan (CySPP) for the design and development of ESBWR I&C System software.

(12)Implementation of the ESBWR I&C software program satisfactorily produces Software Design Documentation (SDD).

**Inspections, Tests, Analyses and Acceptance Criteria**

Table 3.2-1 provides a definition of the inspections, tests and/or analyses, together with associated acceptance criteria, which will be applied to the software associated with ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.

Because the I&C Systems technology is continually advancing, details of the system design may not be complete before the NRC issuance of a design certification. Therefore, the portions of the system design needed to complete the acceptance criteria are marked as {{Design Acceptance Criteria}}.

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| ~~1. Implement the Software Management Plan (SMP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SMP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SMP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |
| | ~~ii. An inspection is performed on the SMP process results summary report(s).~~ | ~~ii. A Results Summary Report(s) exists and concludes that the SMP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability. The report shall also verify that assessments of the quality of vendor efforts are acceptable.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| ~~2.Implement the Software Development Plan (SDP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SDP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SDP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development. The report shall verify that the software plan defines which tasks are associated with each life cycle phase and that inputs and outputs are defined. The report shall also ensure that methods of review, verification and validation of outputs are defined in an acceptable manor.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |

**Table 3.2-1**

**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| | ii. An inspection is performed on the SDP process results summary report(s). | ii. A results summary report(s) exists and concludes that the SDP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability<br>The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions. |
| 3. Implement the Software Quality Assurance Plan (SQAP) for the design and development of ESBWR I&C System software. | i. An inspection is performed on the SQAP results summary report(s)<br>{{Design Acceptance Criteria}} | i. A results summary report(s) exists and it shall demonstrate that the SQAP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.<br>The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.<br>{{Design Acceptance Criteria}} |
| | ii. An inspection is performed on the SQAP process results summary report(s). | ii. A results summary report(s) exists and concludes that the SQAP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~characteristics: consistency, style, traceability, unambiguity and verifiability. The report shall also verify that high quality software, which performs all intended safety functions, is produced as a result of plan execution.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |
| ~~4. Implement the Software Integration Plan (SIntP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SIntP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SIntP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |
| | ~~ii. An inspection is performed on the SIntP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SIntP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~characteristics: consistency, style, traceability, unambiguity and verifiability. This report(s) shall also verify that methods of software integration between commercial off the shelf (COTS), as well as previously developed software (PDS) and newly developed software are satisfactory.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |
| ~~5. Implement the Software Installation Plan (SIP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SIP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) and it shall demonstrate that the SIP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | ~~ii. An inspection is performed on the SIP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SIP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |
| ~~6. Implement the Software Operations and Maintenance Plan (SOMP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SOMP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SOMP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |
| | ~~ii. An inspection is performed on the Software SOMP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SOMP process defines the organizational responsibilities, activities, and management controls and~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~This report shall specify the methods of performing software operations and maintenance functions following turn over to the COL holder.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |
| ~~7. Implement the Software Training Plan (STrngP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the STrngP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the STrngP satisfactorily addresses the managerial, implementation and resource characteristics to accomplish the training tasks for staff working in the design of the software based products.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | ~~ii. An inspection is performed on the STrngP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the STrngP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~This report(s) shall also verify that the training tasks for staff working in the design, development, peer review, and testing of the software based products. This includes requirements for the training program of the utility operating and maintaining the software based products.~~<br>~~The results summary report(s) address the ESBWR safety related systems described in Table 2.2.10-1 and their associated safety related functions.~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| ~~8. Implement the Software Safety Plan (SSP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SSP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SSP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | ~~ii. An inspection is performed on the SSP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SSP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~This report(s) shall also verify Safety Analysis Reports demonstrate that management, implementation, and resource characteristics are maintained throughout the SW Life Cycle process.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |
| ~~9. Implement the Software Verification and Validation Plan (SVVP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SVVP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SVVP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development. The report shall verify that the organizational, scheduling, and financial independence is maintained throughout the development process.~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |
| | ~~ii. An inspection is performed on the SVVP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SVVP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~V & V Reports shall demonstrate that management, implementation, and resource characteristics are maintained throughout the SW Life Cycle process.~~<br>~~The Requirements Traceability Matrix (RTM) shall demonstrate that management, implementation, and resource characteristics are maintained throughout the SW Life Cycle process.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| ~~10. Implement the Software Configuration Management Plan (SCMP) for the design and development of ESBWR I&C System software.~~ | ~~i. An inspection is performed on the SCMP results summary report(s).~~<br>~~{{Design Acceptance Criteria}}~~ | ~~i. A results summary report(s) exists and it shall demonstrate that the SCMP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.~~<br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~<br>~~{{Design Acceptance Criteria}}~~ |
| | ~~ii. An inspection is performed on the SCMP process results summary report(s).~~ | ~~ii. A results summary report(s) exists and concludes that the SCMP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.~~<br>~~In addition, the report shall verify that the following items are being maintained under the control of an organization that is responsible for processing and archiving the various versions of the software as~~ |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~well as supporting documentation.~~<br><br>~~□Software requirements, designs, and code~~<br>~~□Support software used in development~~<br>~~□Libraries of software components essential to safety~~<br>~~□Software plans that could affect quality~~<br>~~□Test software requirements, designs, or code used in testing~~<br>~~□Test results and analyses used to qualify software~~<br>~~□Software documentation~~<br>~~□Databases and software configuration data~~<br>~~□Pre-developed software items that are safety system software~~<br>~~□Software change documentation~~<br>~~□Tools used in the software project for management, development, or assurance~~<br><br>~~The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |

**Table 3.2-1**

**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| 11.Implement the Cyber Security Program Plan (CySP) for the design and development of ESBWR I&C System software. | i. An inspection is performed on the CySP results summary report(s)<br>{{Design Acceptance Criteria}} | i. A results summary report(s) exists and it shall demonstrate that the CySP satisfactorily addresses the managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.<br>The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.<br>{{Design Acceptance Criteria}} |
| | ii. An inspection is performed on the CySP process results summary report(s). | ii. A results summary report(s) exists and concludes that the CySP process defines the organizational responsibilities, activities, and management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.<br>The results summary report(s) address the ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions. |
| 12. Implementation of the ESBWR I&C software program satisfactorily produces | i. An inspection is performed on the SDD results summary report(s) | i. A results summary report(s) exists and it shall demonstrate that the SW Design Documentation satisfactorily addresses the |

**Table 3.2-1**

**ITAAC For Software Development**

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|---|---|---|
| Software Design Documentation (SDD). | {{Design Acceptance Criteria}} | managerial, implementation and resource characteristics to support the ESBWR I&C Systems development.<br>The results summary report(s) address the ESBWR safety related systems described in Table 2.2.10-1 and their associated safety-related functions.<br>{{Design Acceptance Criteria}} |
| | ii. An inspection is performed on the SDD process results summary report(s). | ii. A results summary report(s) exists and concludes that the SDD processes define the organizational responsibilities, activities, and configuration management controls and demonstrates the following process characteristics: consistency, style, traceability, unambiguity and verifiability.<br>The SDD includes the following software lifecycle design outputs and software life cycle process documentation:<br>□Specification of functional requirements.<br>□Documentation and review of hardware and software.<br>□Performance of system tests and the documentation of system test results.<br>□Performance of installation tests and inspections.<br>The results summary report(s) address the |

~~Table 3.2-1~~

~~ITAAC For Software Development~~

| ~~Design Commitment~~ | ~~Inspections, Tests, Analyses~~ | ~~Acceptance Criteria~~ |
|---|---|---|
| | | ~~ESBWR safety-related systems described in Table 2.2.10-1 and their associated safety-related functions.~~ |

- Communications between the systems.

Figure 7.1-1 shows a simplified functional block diagram of the ESBWR I&C system. The data communication systems embedded in the DCIS perform the data communication functions that are part of or support the systems described in Sections 7.2 through 7.8. A network diagram of the DCIS appears as Figure 7.1-2, which is a functional representation of the design.

The Q-DCIS and N-DCIS architectures, their relationships, and their acceptance criteria are further described throughout Section 7.1.

The Q-DCIS and N-DCIS functions are implemented with diverse power and sensors as indicated in Figure 7.1-3 and diverse hardware and software architectures as shown in Figure 7.1-4. These are discussed in Reference 7.1-4, the Licensing Topical Report (LTR), "ESBWR I&C Defense-In-Depth And Diversity Report," NEDO-33251.

The Q-DCIS comprise the platforms that are defined in Table 7.1-1. The N-DCIS comprise the network segments that are defined in Table 7.1-1. These platforms or network segments comprise systems of integrated software and hardware elements. Software projects are developed for the various platforms or networks segments.

*[Project software plans control the development of each platform or network segment using a life-cycle process. The ESBWR Software Management Program Manual (SMPM) (Reference 7.1-12) and ESBWR Software Quality Assurance Program Manual (SQAPM) (Reference 7.1-10) provide the bases for developing project software plans and the life-cycle model that will control the software development process. These project software plans and baseline review reports (BRR) comprise the data that define the platform or network segment design processes, and reference the platform or network segment implementation documentation that will support closure of ITAAC including {{Design Acceptance Criteria}} ITAAC.*

*A life-cycle phase baseline review process regulates the passage of the platform design from one life-cycle phase to the next life-cycle phase. A life-cycle phase summary BRR comprises a life-cycle phase requirements traceability analysis report, a life-cycle phase software safety analysis report, a life-cycle phase verification and validation report, a life-cycle phase cyber security analysis report, and a life-cycle phase baseline review team (BRT) report. The summary BRRs exist at the end of each life-cycle phase and conclude that the design process has been followed and that the design elements are adequate to pass through to the next life-cycle phase. The summary BRR provides assurance that the project software plans are implemented and producing adequate results at the end of each life-cycle phase.*

*A multiple-phase test process, using a series of overlapping tests, confirms that the as-built platform performs as designed. The Factory Acceptance Test (FAT) confirms that each part of a platform or network segment perform as designed. The Site Acceptance Test (SAT) confirms that the platforms or network segments are capable of operating as shown in the FAT and operate as designed as an integrated ESBWR instrumentation and control system.]**~~The software for the Q-DCIS and N-DCIS is designed and developed in accordance with the LTRs "ESBWR I&C Software Management Plan," NEDO-33226, NEDE-33226P, and "ESBWR I&C Software Quality Assurance Plan" NEDO-33245, NEDE-33245P. (References 7.1-12 and 7.1-10, respectively.) These plans describe the managerial, design, development, and software quality~~

~~assurance requirements for the DCIS and address the Nuclear Regulatory Commission (NRC) review guidance provided in the Standard Review Plan.~~

*Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

### 7.1.2 Q-DCIS General Description Summary

The Q-DCIS, which performs the safety-related control and monitoring functions of the DCIS, is organized into four physically and electrically isolated divisions. The Q-DCIS uses three diverse platforms: ~~NUMAC for the~~ RTIF-NMS ~~functions~~, ~~TRICON for~~ SSLC/ESF ~~functions~~, and independent logic controllers for the ATWS/SLC and vacuum breaker (VB) isolation function. Each division is segmented into systems; segmentation allows, but does not require, the systems to operate independently of each other. The Q-DCIS major cabinets, systems, and functions are:

- Reactor Trip and Isolation Function (RTIF) cabinets. These cabinets include the following systems and functions:
  - Reactor Protection System (RPS) (Refer to Subsection 7.2.1),
  - Main Steam Isolation Valve (MSIV) functions of the Leak Detection and Isolation System (LD&IS) (Refer to Subsection 7.3.3),
  - Anticipated Transient Without Scram/Standby Liquid Control (ATWS/SLC) functions (Refer to Subsection 7.4.1),
  - Suppression Pool Temperature Monitoring (SPTM) subsystem of the Containment Monitoring System (CMS) (Refer to Subsection 7.2.3), and
  - VB isolation function of the containment system (Refer to Subsection 7.3.6).
- Neutron Monitoring System (NMS) (Refer to Subsection 7.2.2) which includes:
  - Startup Range Neutron Monitor (SRNM) functions and
  - Power Range Neutron Monitor (PRNM) functions that include:
    (1) Local Power Range Monitor (LPRM) functions,
    (2) Average Power Range Monitor (APRM) functions, and
    (3) Oscillation Power Range Monitor (OPRM) functions.
- Safety System Logic and Control/Engineered Safety Features (SSLC/ESF) system (Refer to Subsection 7.3.5) which includes:
  - Emergency Core Cooling System (ECCS) functions that include:
    (1) Automatic Depressurization System (ADS) functions,
    (2) Gravity-Driven Cooling System (GDCS) functions,

piping system. This detailed plant-specific information is unavailable at the time of design certification and cannot therefore be used to develop detailed design information. This precludes certification of specific piping designs.

- An extensive definition of design methodologies is contained in Tier 2, Chapter 3. These methodologies are not considered to be part of Tier 1 but are one of several methods for executing the design process steps defined in the piping design. In addition, sample design calculations have been performed with these methods to provide confidence that they are complete and yield acceptable design information.
- Piping design for nuclear plants is a well-understood process based on straightforward engineering principles. This, together with Tier 2 methodology definition and sample calculations, provides confidence that future design work by individual applicants/licensees results in acceptable designs that properly implement the applicable requirements.

The technical material in the piping design Tier 1 entry was selected using the criteria and methodology as discussed above for Tier 1, Section 2 system entries.

### *14.3.3.2 Software Development*

The safety-related Distributed Control and Information Systems (Q-DCIS) comprise the platforms that are defined in Table 14.3-4. A subset of the nonsafety-related Distributed Control and Information Systems (N-DCIS) comprise the network segments that are defined in Table 14.3-5. These platforms or network segments comprise systems of integrated software and hardware elements. Software projects are developed for the various platforms or network segments.

*[Project software plans control the development of each platform or network segment using a life-cycle process. The ESBWR Software Management Program Manual (SMPM, reference 14.3-4) and ESBWR Software Quality Assurance Program Manual (SQAPM, reference 14.3-5) provide the bases for developing project software plans and the life-cycle model that will control the software development process. These project software plans and baseline review reports (BRR) comprise the data that define the platform or network segment design processes, and reference the platform or network segment implementation documentation that will support closure of ITAAC including {{Design Acceptance Criteria}} ITAAC.*

*A life-cycle phase baseline review process regulates the passage of the platform or network segment design from one life-cycle phase to the next life-cycle phase. A life-cycle phase summary BRR comprises a life-cycle phase requirements traceability analysis report, a life-cycle phase software safety analysis report, a life-cycle phase verification and validation report, a life-cycle phase cyber security analysis report, and a life-cycle phase baseline review team (BRT) report. The summary BRRs exist at the end of each life-cycle phase and conclude that the design process has been followed and that the design elements are adequate to pass through to the next life-cycle phase. The summary BRR provides assurance that the project software plans are implemented and producing adequate results at the end of each life-cycle phase.*

*A multiple-phase test process, using a series of overlapping tests, confirms that the as-built platform or network segment performs as designed. The Factory Acceptance Test (FAT) confirms that each part of a platform or network segment performs as designed. The Site*

*Acceptance Test (SAT) confirms that the platforms or network segments are capable of operating as shown in the FAT and operate as designed as an integrated ESBWR instrumentation and control system.]**

In support of the above described software development process, the following software design commitments are made:

(1) The platform or network segment software plans and cyber security programs for each platform or network segment are developed in accordance with the following criteria:

a. Software Management Plan (SMP)

- *[Establishes the managerial process and technical direction for the design and development activities of the computer-based instrumentation and control systems.*
- *Establishes the standards, methods, tools, and procedures for the software design and development process.*
- *Defines the activities performed for each phase of the software development.*
- *Defines how requirements are traced to lower levels of the engineering phases from planning phase to test phase.*
- *Specifies how the safety-related requirements are documented, evaluated, reviewed, verified, and tested during the design process to minimize unknown, unreliable, and abnormal conditions.*
- *Describes the organization and responsibilities of individuals or groups involved in the various V&V and review activities.*
- *Provides a structure for test and review guidance for software functional testing during the software life cycle.*
- *Provides the requirements and guidelines necessary to prepare, execute, and document software tests.*
- *Addresses software test documentation.*
- *Addresses metrics that include error tracking, cyber security tracking, and resolution.]**

b. Software Development Plan (SDP)

- *[Describes the plan for technical project development of the I&C software which performs the monitoring, control, and protection functions for all modes of plant operation.*
- *Describes the software engineering development process for each phase of the software product's life cycle process, i.e., Planning, Requirements, Design, Implementation, Test, Installation, Operations & Maintenance (O&M), and Retirement.*
- *Establishes the standards, methods, tools, and procedures for the software design and development process.*
- *Defines the activities performed for each phase of the software development.*

- *Defines how requirements are traced to lower levels of the engineering phases from planning phase to test phase.*
- *Specifies how the safety-related requirements are documented, evaluated, reviewed, verified, and tested during the design process to minimize unknown, unreliable, and abnormal conditions.*
- *Describes the organization and responsibilities of individuals or groups involved in the various V&V and review activities.*
- *Provides a structure for test and review guidance for software functional testing during the software life cycle.*
- *Provides the requirements and guidelines necessary to prepare, execute, and document software tests.*
- *Addresses software test documentation.*
- *Addresses metrics that include error tracking, cyber security tracking, and resolution.*]*

c. Software Integration Plan (SIntP)

- [*Describes the process for integrating the various software modules together to form single programs.*
- *Describes the process for integrating the software module integration result with the hardware and instrumentation.*
- *Describes the process for testing the resulting integrated product.*
- *Describes the organization and responsibilities of individuals or groups involved in the SFT activities.*
- *Describes software functional test management (e.g., schedule, resources, security, risks and contingency planning, anomaly, problem reporting, and training needs).*
- *Provides a structure for software functional testing.*
- *Provides the requirements and guidelines necessary to prepare, execute, and document software functional tests.*
- *Defines required software functional test documentation.*
- *Defines measurements and metrics for error tracking and resolution, and assess the success or failure of the software integration and software test effort.*]*

d. Software Installation Plan (SIP)

- [*Describes the software installation process and activities performed during the Installation phase.*
- *Defines the installation phase activities.*
- *Describes the installation procedures.*

– *Describes the software installation management. This includes, but is not limited to, schedule, resources, security, risks and contingency planning, anomaly and problem reporting, and training needs.*

– *Provides the requirements and guidelines necessary to prepare, execute, and document software installation.*]*

e. Software Operation and Maintenance Plan (SOMP)

– [*Defines the software process and activities used to operate and maintain the software product during plant operation.*

– *Defines requirements, methods, and considerations for developing the system O&M Manual.*

– *Addresses maintenance procedures and activities to enhance, modify, and maintain software once the software is installed in the plant.*]*

f. Software Training Plan (STrngP)

– [*Describes the software training activities to be carried out before and during the operation of software products for the plant.*

– *Addresses management, implementation and resource characteristics.*

– *Defines the requirements and methods used in developing the training manual.*

– *Defines the training needs of appropriate plant staff, including operators, I&C engineers, and technicians.*

– *Defines a general description of the training facilities.*

– *Defines the organization supporting the training effort including interfaces and responsibilities.*]*

g. Software Quality Assurance Plan (SQAP)

– [*Defines the management organization, techniques, procedures, and methodologies used to assure the delivery of software which meets specified requirements.*

– *Assures that software development, evaluation and acceptance standards, are implemented, documented, and followed.*

– *Assures that the results of software quality reviews and audits will be given to appropriate management within the scope of the SQAPM.*

– *Assures that test results adhere to acceptance standards.*]*

h. Software Safety Plan (SSP)

– [*Establishes the processes and activities intended to ensure that the safety concerns of the software products are properly considered during the software development.*

– *Describes the roles and responsibilities of the Software Safety Team (SST).*

– *Describes the Software Safety Analysis (SSA) process.*

– *Ensures that all system safety requirements have been satisfied by the life cycle phases.*

– *Ensures that no additional hazards have been introduced by the work done during the life cycle activity.*]*

i. Software Verification & Validation Plan (SVVP)

– [*Establishes the V&V tasks for the software designed and developed for software products.*

– *Ensure that the developed software meets its specified requirements, performs its intended functions correctly, and does not perform any unintended function.*

– *Ensure that the final software product meets the contract requirements, required industry and regulatory standards, and licensing commitments.*

– *Ensure that the final software product is correct, complete, accurate, and traceable to requirements specified in the design documents and outputs.*]*

j. Software Configuration Management Plan (SCMP)

– [*Establishes the Software Configuration Management (SCM) activities during the design and development of the software products.*

– *Describes the individual with the overall responsibility and authority for the SCM and organizations responsible for supporting the SCM activities.*

– *Defines the SCM tasks, including methods, timing, and responsibility for the implementation of design control and design change control.*

– *Identifies the tools, procedures, and individuals needed to execute or support each SCM task.*

– *Identifies the SCM required schedule and coordination with the design activities and the Quality tasks described in this SQAPM.*]*

k. Software Test Plan (STP)

– [*Prescribes the scope, approach, resources, and schedule of the testing activities associated with the software development process.*

– *Identifies the items being tested, the features to be tested, the testing tasks to be performed, the personnel responsible for each task, and the risks associated with this plan.*]*

l. Cyber Security Program (CySP)

– [*Defines the implementation of the requirements for the development and management of an effective cyber security program.*

– *Defines implementation by life-cycle phase.*]*

(2) Implementation of the software projects for each platform or network segment in accordance with the approved software plans ensures that adequate software products are

produced at the conclusion of each software life-cycle phase baseline as documented by the following life-cycle phase Summary Baseline Review Records.

a. [*Planning Phase Summary BRR are produced for each hardware and software platform or network segment accordance with the criteria described in the SMPM, Section 5.6.5 (Reference 14.3-4).*]*

b. [*Requirements Phase Summary BRR are produced for each hardware and software platform or network segment in accordance with the criteria described in the SMPM, Section 5.7.12 (Reference 14.3-4).*]*

c. [*Design Phase Summary BRR are produced for each hardware and software platform or network segment in accordance with the criteria described in the SMPM, Section 5.8.3.13 (Reference 14.3-4).*]*

d. [*Implementation Phase Summary BRR are produced for each hardware and software platform or network segment in accordance with the criteria described in the SMPM, Section 5.9.3.10 (Reference 14.3-4).*]*

e. [*Test Phase Summary BRR are produced for each hardware and software platform or network segment in accordance with the criteria described in the SMPM, Section 5.10.9 (Reference 14.3-4).*]*

(3) A multiple-phase test process performed as part of the installation phase will be used to confirm that each as-built platform or network segment performs in accordance with its defined criteria.

a. [*Installation Phase Summary BRR are produced for the each software project and will include the results summary report for the Factory Acceptance Test (FAT) performed in accordance with the criteria described in the SQAPM, Sections 7.4 and 7.5 (Reference 14.3-5), that confirms that each part of the as-built software project performs as designed. The FAT is documented in two parts in accordance with the SQAPM, Section 7.7 (Reference 14.3-5), such that, a FAT and a cyber security FAT will be performed on each platform or network segment.*]*

b. [*Installation Phase Summary BRR are produced for the each software project and will include the results summary report for the Site Acceptance Test (SAT), that uses overlapping tests and confirms that the as-built platforms or network segments are capable of operating as designed as documented in the FAT reports and cyber security FAT reports and when integrated as a complete ESBWR instrumentation and control system with sensors and actuators using overlapping tests in conjunction with the SAT.*]*

* Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

~~Development of the associated ESBWR Instrumentation and Controls (I&C) software applications is dependent upon the detailed, as-procured characteristics of the hardware to be used. An example would be the microprocessors to be used for the programmable digital control features. Consequently, software development cannot be completed at the time of design certification without first selecting the specific implementation hardware. In addition to the~~

~~technology issue discussed below, this would be incompatible with the principle that certification should not define vendor-specific (i.e., as-procured) design characteristics for components.~~

~~All aspects of digital, microprocessor based control technology are expected to undergo significant changes as the technology continues to evolve. These future changes are expected to be beneficial and involve both the software and the hardware. Certification of specific software details at this time would preclude future site-specific applicants from taking advantage of these technology advances.~~

~~Development of software for programming of real-time microprocessor based controllers is being continually upgraded by techniques like automated development of system requirements and automated verification activities. These trends, coupled with ongoing industry efforts to establish standards for software development, provide confidence that future execution of this Tier 1 entry results in I&C equipment, which fully comply with ESBWR requirements and all Tier 2 commitments.~~

~~The software development process is discussed in detail in Appendix 7C. This material is not considered part of Tier 1; however, it provides one of several acceptable methods for implementing the ITAAC in the Tier 1.~~

### *14.3.3.3 Human Factors Engineering*

The human factors engineering (HFE) entry defines the processes by which the details of the human-system interface (HSI) is developed, designed and evaluated. The processes defined in this entry require the use of analyses based on human factors principles and apply to the main control room (MCR), including areas which provide the displays, controls and alarms required for normal, abnormal and emergency plant conditions. They also apply to the Remote Shutdown System (RSS), Technical Support Center (TSC), Emergency Operations Facility (EOF), and Local Control Stations (LCSs) with safety-related functions or as defined by HFE task analysis. For detailed HSI design implementation, the certification of processes (rather than specific design features) is necessitated and justified by the following:

- The technology of equipment associated with HSI implementation is rapidly evolving (and improving) and certification of implementation processes permits future licensees to take advantage of beneficial technological advances available at the time of application. An example is the rapid advances that have taken (and are taking) place in flat panel display technology.
- Detailed implementation of the HSI is dependent upon the details of the as procured, as-installed equipment. For example, different manufacturers use different techniques to monitor equipment performance. Because this equipment is not available at the time of design certification, it is not possible to develop HSI implementation details. This can be only be accomplished by a licensee when specific equipment characteristics are known.
- The fundamental design work for the ESBWR HSI has been completed and is described in Tier 2. This includes commitments to a set of standard design features as well as a minimum inventory of fixed alarms, displays and controls necessary for the operators to implement the emergency operating procedures and to carry out those human actions shown to be important by the plant Probabilistic Risk Assessment (PRA). This design information, coupled with the comprehensive commitments to HSI implementation

### 14.3.9 Site-Specific ITAAC

RG 1.206 Section C.III.7.2 states that the COL Applicant is required "to develop ITAAC for the site-specific design portions of the facility (Site Specific ITAAC) that are not included in the certified design." Therefore, if there are design functions and/or features for ensuring plant safety, which are not addressed in Tier 1, then the Tier 1 ITAAC must be supplemented with Site Specific ITAAC. If Tier 1 addresses all functions and features that ensure plant safety, then a Site Specific ITAAC is not required. The COL Applicant shall provide Site Specific ITAAC for systems not evaluated in the DCD (COL 14.3-2-A).

Based upon Subsection 14.3.7 and RG 1.206 Sections C.II.1 and C.III.7.2, the extent to which each site-specific system requires ITAAC is dependent upon the safety significance of the functions performed by the system. In particular, a system with a safety-significant function (e.g., safety-related function) should have at least one entry in an ITAAC table for that function. If a site-specific system is described in the Final Safety Analysis Report (FSAR) and does not meet an ITAAC selection criterion, just the system title and the statement "No entry for this system" are provided within the ITAAC portion of the COL application. If a site-specific system is not described in the FSAR, then the system is not addressed within the ITAAC.

Site Specific ITAAC do not address ancillary buildings and structures on the site, such as administrative buildings, parking lots, warehouses, training facilities, etc.

### 14.3.10 COL Information

#### *14.3-1-A Emergency Planning ITAAC*

The COL Applicant shall provide Emergency Planning ITAAC, based on industry guidance (Subsection 14.3.8).

#### *14.3-2-A Site-Specific ITAAC*

The COL Applicant shall provide Site Specific ITAAC for systems not evaluated in the DCD (Subsection 14.3.9).

### 14.3.11 References

14.3-1 USNRC, Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," June 2006.

14.3-2 USNRC, NUREG 0800, "Standard Review Plan."

14.3-3 Nuclear Energy Institute, "New Plant Security Task Force Work Product," August 2007.

14.3-4 [*GE-Hitachi Nuclear Energy, "ESBWR – Software Management Program Manual," NEDO-33226, Class I (Non-proprietary); and "ESBWR – Software Management Program Manual," NEDE-33226P, Class III (Proprietary), Revision 3, June 2008.*]*

14.3-5 [*GE-Hitachi Nuclear Energy, "ESBWR – Software Quality Assurance Program Manual," NEDO-33245, Class I (Non-proprietary); and "ESBWR – Software Quality Assurance Program Manual," NEDE-33245P, Class III (Proprietary), Revision 3, July 2008.*]*

*Text sections that are bracketed and italicized with an asterisk following the brackets are designated as Tier 2*. Prior NRC approval is required to change.

**Table 14.3-4**

**Q-DCIS Platforms**

| Platform | Software Project |
|---|---|
| Reactor Trip & Isolation System Function Neutron Monitoring System (RTIF-NMS) | RTIF |
| | NMS |
| Safety System Logic & Control / Engineered Safety Features (SSLC/ESF) Platform | SSLC |
| | ESF |
| Independent Control Platform (ICP) | VBIF |
| | ATWS/SLC |

**Table 14.3-5**

**N-DCIS Network Segments**

| |
|---|
| GENE *(DPS)* |
| PIP A and PIP B *(FAPCS and Supporting Systems)* |