ALS™

CS Innovations

A Westinghouse Electric Company

Westinghouse Non-Proprietary Class 3

6002-00001-NP

ALS Quality Assurance Plan

Revision 6

November 11, 2011

APPROVALS

Function	Name and Title	Signature and Date
Author	Brian Studaker Principal Quality Engineer	Electronic Approval – Refer to Release Record
Reviewer	Charles Bobbitt Quality Lead	Electronic Approval – Refer to Release Record
Approved	Scott Roberts Director Scottsdale Operations	Electronic Approval – Refer to Release Record

RECORD OF CHANGES

Date	Revision	Description of changes	Made by
2008-02-20	1	Initial release of document	Sten Sogaard
2008-07-28	2	Added Proprietary / Non-Proprietary statements.	Sten Sogaard
2010-07-29	3	Various changes made throughout are documented in the Release Record and RAI100721-0000	Charles Bobbitt
2010-08-12	4	Updated to create proprietary redacted version of the manual.	Fred Lane
2011-10-17	5	Update Approvals Table to new format Update to new template throughout. Replaced VV with IV&V throughout. Replaced reference numbers with document numbers throughout. Section 2 now section 4.0 deleted "A complete list of reference is provided by the CS Innovations document 6002-00020 - ALS Reference Overview." Added new sections 2.0 Scope and 3.0 Acronyms. Added sections 2.2 and 2.3. Added new sections 3.0 Acronyms. Section 3.4, now 5.4 deleted QA Manager after project. Changed "Project Manager" to "ALS Platform Manager" in sections 6.6.4.1, 6.6.4.2, 6.7.2.1, 6.7.2.2, 6.8.2.1, 6.8.2.2, 6.9.2.1, 6.9.2.2. Deleted section 6.1.1.6, 6.2.1.4, 6.4.1.7, 6.5.1.5, 6.7.6.4, 6.8.4.4: Shall comply with the requirements defined for a Management in accordance with 9000-00000 - Quality Assurance Manual Deleted 6.6.1 & replaced with 6.6.2: The scope of the Quality review is to ensure that the EQ Plan complies with the requirements defined for an EQ Plan in accordance with 9000-00000 - Quality Assurance Manual; Deleted "the CSI Quality Assurance Manual," from 6.9.4.3, deleted "the 9000-00000 - Quality Assurance Manual and" from 6.10.4.4 Deleted section 7.0 Test and replaced with STANDARDS, PRACTICES, CONVENTIONS, AND METRICS Update: Section 8.0, removed 9000-01600 – Corrective Action, replace with WEC 16.2 Westinghouse Corrective Actions Process Section 8.2 changed Quality Activity Report to QA Summary Report.	Brian Studaker
2011-11-11	6	Replaced CSI Proprietary & Copyright information with Westinghouse Proprietary & Copyright information throughout. Changed reference "QA Manager" to "QA" throughout. Deleted section 2.3. Added WEC table 3-1. Deleted section 6.1.1, section 6.1.2 now 6.1.1. Deleted sections 6.2.1, 6.2.2, 6.2.3 & 6.2.4. Deleted from 6.3 "this document". Combined 6.3.1 into 6.3. Deleted section 6.3.2. Deleted 2nd sentence from 6.4. Deleted sections 6.4.1 & 6.4.2. Deleted 2nd sentence from 6.5. Deleted sections 6.5.1, 6.5.2 & 6.5.3. Deleted last sentence form section 6.6. Deleted sections 6.6.2, 6.7.5, 6.7.6, 6.8.3, 6.8.4, 6.9.3, 6.9.4. Deleted last sentence from section 6.10. Deleted sections 6.10.3, 6.10.4, 8.4.4, 8.4.5, 8.5.2, 8.5.3. Section 9.2 deleted "pre-baseline" from last sentence. Added to section 13.1; reference to WEC 7.10. Replaced content of section 15.1 with QA statement of maintaining training records.	Brian Studaker

Date	Revision	Description of changes	Made by
		Deleted section 15.2. Deleted 16.1. Section 16.2 now 16.1. Added to now 16.1 "maintained by the ALS project manager". Showing change bars between Revision 4 and Revision 6.	

OPEN ITEMS

Item	Description	Status

TABLE OF CONTENTS

1.0 PURPOSE

1.1 To define the techniques, procedures, and methodologies that will be used by CS Innovations (CSI) to assure quality in the design and test developments of the Advanced Logic System (ALS) Platform, and in particular, in the FPGA design and test activities performed as a part of the platform developments.

1.2 The ALS Quality Assurance Plan has been written in accordance with the requirements defined by IEEE Std 730-1998.

1.3 The plan covers the entire Field Programmable Gate Array (FPGA) development process, which includes processes such as Requirements Specification, Design, Implementation, Source/Data control, Reviews, Change Management, Configuration Management, and Release Management.

1.4 The ALS Quality Assurance Plan is intended for use on the generic Platform where the target system is a Class-1E safety related or mission critical system.

1.5 The ALS Quality Assurance Plan will be referenced in the Management Plan together with the CM Plan, IV&V Plan, and Test Plan.

1.6 The ALS Quality Assurance Plan is a platform specific Quality Assurance Plan and works under the umbrella of the CSI 10CFR50 Appendix B compliant 9000-00000 - Quality Assurance Manual.

1.7 The ALS boards are developed to be generic ALS boards which can be configured and reused for different applications. Because of this, the ALS board lifecycle spans the ALS board development integration into an application-specific system. The objective is for CSI to develop and produce generic ALS boards to stock and then later integrate them into dedicated systems. The following subsections will outline the different development, manufacturing and test flows which are associated with ALS boards. Figure 1-1 shows a graphical representation of these flows.

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2.0 SCOPE

2.1 CSI is responsible for the supply of the Advance Logic System (ALS) equipment, systems and components for nuclear power generating facilities. Nuclear Automation supports CSI for the ALS Instrumentation and Controls (I&C) Interface.

2.2 The Westinghouse Electric Company, LLC interface agreement, WEC 23.20 – Westinghouse Nuclear Automation/CS Innovations Interface Agreement, may be used by CS Innovations in whole or part depending upon the applicability to the CS Innovations Quality Assurance Program and ALS Quality Assurance Plan.

3.0 ACRONYMS

3.1 Table 3-1 contains a list of acronyms used throughout this document.

Table 3-1: List of Acronyms

Acronyms	Description
ALS	Advanced Logic System
CAPs	Westinghouse Corrective Actions Process
CGD	Commercial Grade Dedication
CIs	Configuration Items
CM	Configuration Management
CSI	CS Innovations
EQ	Equipment Qualification
FDR	Final Design Review
FPGA	Field Programmable Gate array
IV&V	Independent Verification and Validation
PDR	Preliminary Design Review
QA	Quality Assurance
WEC	Westinghouse Electric Company

4.0 REFERENCES

Table 4-1 contains a list of references used throughout this document.

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5.0 MANAGEMENT

5.1 The ALS relationship between organizational units along with roles and responsibilities are documented in 6002-00000 - ALS Management Plan.

5.2 ALS development efforts within the scope of this document will be performed by personnel associated with the Engineering team.

5.3 Quality efforts within the scope of this document will be performed by personnel associated with the Quality team.

5.4 The goal of the Quality Assurance (QA) assigned to the project is to assure the quality and safety of ALS by:

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5.5 The ALS Quality team must have a close interaction with the development team in order to function effectively and meet its goals, the QA:

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5.6 The ALS Quality Assurance Plan covers the CS Innovation Life Cycle model as documented in 9000-00310 - Project Creation Procedure.

6.0 DOCUMENTATION

6.1 Management Plan: Describes management aspects of the project, such as organization, responsibilities, security aspects, project life cycle and schedule with milestones.

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6.2 Test Plan: Describes the planned scope, approach, resources and schedule for testing activities.

6.3 QA Plan: The ALS Quality Plan is maintained by the QA.

6.4 IV&V Plan: Describes procedures, responsibilities and requirements for a comprehensive evaluation of the item being developed.

6.5 CM Plan: Describes the planned method for change control of Configuration Items (CIs) throughout the project life cycle.

6.6 EQ Plan: The Equipment Qualification (EQ) Plan presents and defines the methodologies and procedures used to conformance/type test a representative test specimen according to the requirements listed in the requirements specification. The EQ Plan will normally include electrical, environmental and seismic testing.

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6.7 ALS Requirements Specification: This specification focuses on common architectural aspects of the ALS design such as inter-board communication, backplane connector definitions, mechanical constraints on the system and other general requirements to ALS boards.

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6.8 ALS-xxx Requirements Specification: Is a complete description of the behavior of an ALS board. A new requirements specification is created for each ALS Board.

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6.9 ALS-xxx Design Specification: Is a detailed description of the ALS Hardware Design excluding the internal FPGA Design.

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6.10 ALS FPGA Design Specifications: Is a detailed set of documents that describe the ALS FPGA Design.

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7.0 STANDARDS, PRACTICES, CONVENTIONS, AND METRICS

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8.0 REVIEWS AND AUDITS

8.1 The QA maintains an ALS Quality Activity Report with updated information for ALS Quality activities. The ALS Quality Activity Reports follow the format defined by the CSI 9000-00310 - Project Creation Procedure.

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8.5 The QA performs in-process audits of the ALS development and related processes according to the procedures identified in this section. QA plans and maintains audit schedules based on life cycle phases, the complex electronics products of each phase and past audit results.

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8.6 Design Data reviews are performed by the QA as a part of the design reviews or as a separate review to verify compliance to the design and coding standards and to verify traceability to the requirements.

8.7 Audit and Document Review Reports:

8.7.1 Document reviews are performed each time an ALS document is released or revised.

9.0 PROBLEM REPORTING AND CORRECTIVE ACTION

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10.0 TOOLS, TECHNIQUES, AND METHODOLOGIES

10.1 No additional tools, techniques, or methodologies have been identified.

11.0 CODE CONTROL

11.1 Code control of development/Engineering versions of design data are maintained in a separate project repository which full revision control. This is covered by the ALS CM Plan.

11.2 Released design data are reviewed and released according to CSI document 9000-00600 - Document Control.

12.0 MEDIA CONTROL

12.1 The methods and procedures used for media control are identified in the ALS CM Plan.

13.0 SUPPLIER CONTROL

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14.0 RECORDS COLLECTION, MAINTENANCE, AND RETENTION

14.1 All records are maintained according to CSI 9000-01700 - Quality Assurance Records.

15.0 TRAINING

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16.0 RISK MANAGEMENT

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